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THE AUSTRALIAN ZOOLOGIST

VOLUME XIV PART 1

A CATALOGUE OF THE PSOCOPTERA OF THE WORLD

by C. N. SMITHERS

Australian Museum, Sydney

INTRODUCTION

It is one hundred years since a catalogue of the species of Psocoptera was published at which time Hagen (1866. *Verh. zool.-bot. Ges. Wien* 16: 201-220) listed 135 species in 21 genera. Since 1866 much has been accomplished in the study of these insects but the group is still relatively poorly known and the present list contains 1605 species in 197 genera. Revisions are needed in many families. It was felt that the publication of a synomymic list of known species, with bibliographic references, might encourage students to take an interest in the Order and assist them by reducing the drudgery of list compilation and bibliographic work which is so necessary before constructive contributions can be made. This list, therefore, like the Bibliography of the Psocoptera already published (Smithers, 1965d) and to which it is complementary, is to be regarded as a working tool to be used in increasing knowledge of the insects, and not as an attempt to be in any way final in itself. It is hoped that any errors and omissions will not detract too greatly from its practical usefulness and that psocidologists will publish corrections.

The list, inevitably, has been compiled largely from the literature; it does not include any nomenclatural or systematic changes which have not already been established or implied by publication. Many desirable changes, based on recent unpublished research, are known to psocidologists and although these are not included notes are sometimes made in the appropriate places to indicate where future changes will probably be made and which species groups are in particular need of study. Work on this list was completed on 30th June, 1965; material coming to the notice of the author after that date is not usually included.

ARRANGEMENT OF THE LIST

In broad terms the classification used is that of Badonnel (1951, *In* Grasse P. *Traite de Zoologie* 10 (2): 1301-1340) together with a few more recent changes. Badonnel (*loc. cit.*) used what is essentially a combination of the classifications of Pearman (1936. *Proc. R. ent. Soc. Lond.* (*B*) 5: 58-62) and Roesler (1944. *Stettin. ent. Ztg.* 105: 117-166) in that he retained the family and family group arrangement of Pearman but used the sub-ordinal arrangement of Roesler. In most cases the arrangement of subgenera is that of Roesler.

Genera are listed alphabetically within the families (or subfamilies or tribes where these are recognised) and species are so listed within the genera. A **bold type** heading is given for each genus. Following this is a bibliographic reference to the current name (in *italics*) with a citation of the type species. How type species have been designated is not indicated. Generic synonyms, if any (in *italics*), are then similarly listed. Where subgenera have been recognised these follow in parentheses and in **bold type**, again with bibliographic references and type species citation. A reference to the author responsible for the subgeneric status is given in cases where the subgenus was first proposed as a full genus. Following the generic name (or subgeneric names when present) is a list of species in the genus. For each species the current specific name is given in **bold type** at the left, followed by the name of its author. The broad geographical distribution of the species is given at the right. Where applicable, the appropriate subgeneric name is given in **bold type** in parentheses after the specific name and author. This arrangement leads to the currently accepted names in all categories being in **bold type**. Bibliographic citations for original descriptions and synonyms are given for each species, each combination which has appeared in the literature being included.

Many groups now regarded as subgenera were orginally established as full genera but the authors responsible for their subgeneric status have not usually referred by name to all the species involved when making the change in status. This has resulted in the name combination which is used in the list having not previously appeared in the literature although it has been implied by the author making the change of status. In such cases, it has been considered unnecessary to repeat the current name at the end of the list of synonyms as perusal of the citations relating to the subgenera should make the situation clear. The same applies to cases where genera have been synonymized but the responsible authors have not listed all the species involved.

In some genera in which subgenera have been recognised not all species have been sufficiently characterised to enable subgeneric placing to be made; such species have not been referred to any particular subgenus but are to be regarded for the time being, as belonging to the genus *sens. lat.*

It has been the aim to include in the list all living species as well as those known from amber. Fossil species are not included.

The distribution data for each species are usually given in broad terms only and may not be complete in some cases.

Many of the species described by L. Navas are difficult to recognise and place with certainty. These are listed under the genera in which they were described unless placed elsewhere in subsequently published work.

Titles of papers have been omitted from the references. These can be obtained from Smithers (1965c). A supplementary bibliography only is given at the end of this paper.

ACKNOWLEDGEMENTS

This list has been prepared from a card index which has been compiled over the past ten years during which time I have received help and encouragement from many sources. I would like, in particular, to record my thanks to Dr. A. Badonnel and Mr. J. V. Pearman for supplying information on synonyms in *Philotarsus, Mesopsocus* and *Amphigerontia* and Dr. E. Mockford for providing information on some American species. Mr. A. M. Nadler allowed access to a list in his possession. Much of the necessary final bibliographical work was carried out in America and Britain whilst on a trip, undertaken primarily for other reasons, various parts of which were financed by the Commonwealth Science and Industry Endowment Fund, the Rockefeller Foundation, the Society of the Sigma-Xi and the British Council. Their financial assistance is gratefully acknowledged. Thanks are due also to the library staff of the Australian Museum for assistance in obtaining literature, Miss C. Gow for preparing the typescript of this paper, to my wife for assistance in checking typescript and Miss J. Walsh for proof reading.

Order **PSOCOPTERA**
Suborder **TROGIOMORPHA**
Group **ATROPETAE**
Family **LEPIDOPSOCIDAE**
Subfamily **THYLACELLINAE**
Genus **Thylacella** Enderlein

Thylacella Enderlein, 1911. *Palaeontographica* 58: 439.
Type species: *Thylacella eversiana* Enderlein.
Udamolepis Enderlein, 1912. *Zool. Anz.* 39: 301.
Type species: *Udamolepis pilipennis* Enderlein.

congolensis (Badonnel). Congo, Nigeria.
Udamolepis congolensis Badonnel, 1949. *Bull. Inst. sci. nat. Belge* 25: 6, figs. 1-8.

eversiana Enderlein. Zanzibar (in copal).
Thylacella eversiana Enderlein, 1911. *Palaeontographica* 58: 349, figs. 95, 96.

fasciata Badonnel. Angola, Congo, Nigeria.
Thylacella fasciata Badonnel, 1955. *Pub. Cult. Cia. Diamant Angola* 26: 26, figs. 8-12.

fenestrata Smithers. Madagascar.
Thylacella fenestrata Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 213, figs. 1-4.

immaculata Badonnel. Angola.
Thylacella immaculata Badonnel, 1955. *Pub. Cult. Cia. Diamant Angola* 26: 27, figs. 13-16.

madagascariensis Smithers. Madagascar.
Thylacella madagascariensis Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 215, figs. 5-8.

pilipennis (Enderlein). East Africa.
Udamolepis pilipennis Enderlein, 1912. *Zool. Anz.* 39: 301, figs. 1, 2.

Genus **Thylax** Hagen

Thylax Hagen, 1866. *Ent. mon. Mag.* 2: 172.
Type species: *Thylax fimbriatum* Hagen.

fimbriatum Hagen. Zanzibar (in copal).
Thylax fimbriatum Hagen, 1866. *Ent. mon. Mag.* 2: 172.
Thylax fimbriata Hagen. Hagen, 1866. *Verh. zool.-bot. Ges. Wien* 16: 200.
Thylax fimbricatus Hagen. Kolbe, 1885. *Berl. ent. Z.* 29: 183, 186.
Thylax madagascariensis Kolbe. Enderlein, 1906. *Spolia zeylan.* 4: 77. Note.

Subfamily **PERIENTOMINAE**
Genus **Lepium** Enderlein

Lepium Enderlein, 1906. *Spolia zeylan.* 4: 81.
Type species: *Lepium chrysochlorum* Enderlein.

chrysochlorum Enderlein. India.
Perientomum morosum Hagen. Enderlein, 1903. *Ann. hist.-nat. Mus. hung.* 1: 323, figs. 8-10; pl. XIII, figs. 64, 64a; pl. XIV, fig. 64b.
Lepium chrysochlorum Enderlein, 1906. *Spolia zeylan.* 4: 81, fig. 15.

enderleini Banks. Formosa.
Lepium enderleini Banks, 1937. *Philipp. J. Sci.* 63: 268, pl. 2, fig. 18.

luridum Enderlein. Ceylon.
Lepium luridum Enderlein, 1906. *Spolia zeylan.* 4: 83, figs. 16, 64, 65, 73.

Genus **Nepticulomima** Enderlein

Nepticulomima Enderlein, 1906. *Spolia zeylan.* 4: 95.
Type species: *Nepticulomima sakuntala* Enderlein.

biroiana (Enderlein). New Guinea, Bismarck Archipelago, Java, Samoa.
Perientomum biroianum Enderlein, 1903. *Ann. hist.-nat. Mus. hung.* 1: 327, fig. 12; pl. XI, fig. 60b; pl. XII, figs. 60a, 60c.
Nepticulomina biroiana (Enderlein). Enderlein, 1906. *Spolia zeylan.* 4: 97, figs. 17, 79, 84, 85.

brasiliensis (Enderlein). Brazil.
Perientomum brasiliense Enderlein, 1906. *Zool. Jb. Abt. Syst.* 24: 88.
Nepticulomima brasiliensis (Enderlein). Enderlein, 1906. *Spolia zeylan.* 4: 99, figs. 19, 78, 86, 87.

chalcomelas Enderlein. Ceylon.
Nepticulomima chalcomelas Enderlein, 1906. *Spolia zeylan.* 4: 100, figs. 21, 76, 88, 89, 99.

essigkeana Enderlein. Ceylon.
Nepticulomima essigkeana Enderlein, 1906. *Spolia zeylan.* 4: 97, figs. 17, 79, 84, 85.

hosemanni (Enderlein). Cameroons, Ivory Coast, Congo.
Perientomum hosemanni Enderlein, 1903. *Zool. Jb. Abt. Syst.* 19: 3; pl. I, figs. 1-9.
Nepticulomima hosemanni (Enderlein). Enderlein, 1906. *Spolia zeylan.* 4: 99, figs. 18, 90, 91, 110.

jacobsoni Enderlein. Java.
Nepticulomima jacobsoni Enderlein, 1926. *Zool. Meded.* 9: 66.

latisquama Enderlein. Java.
Nepticulomima latisquama Enderlein, 1926. *Zool. Meded.* 9: 67.

mortua (Hagen). Zanzibar (in copal).
Perientomum mortuum Hagen, 1865. *Ent. mon. Mag.* 2: 152.
Nepticulomima mortua (Hagen). Enderlein, 1906. *Spolia zeylan.* 4: 102.

penicillata Enderlein. Java.
Nepticulomima penicillata Enderlein, 1926. *Zool Meded.* 9: 67.

sakuntala Enderlein. Ceylon, Java, England (stored products).
Nepticulomima sakuntala Enderlein, 1906. *Spolia zeylan.* 4: 96, figs. 20, 77, 82, 83, 117, 125.

saltuaria Smithers. Australia.
Nepticulomima saltuaria Smithers, 1965. *J. ent. Soc. Qd.* 4: 72, figs. 6-10.

scottiana Enderlein. Seychelles.
Nepticulomima scottiana Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 222, figs. 7, 8; pl. 15, fig. 67.

Genus **Notolepium** Enderlein

Notolepium Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 74.
Type species: *Notolepium paraguayense* Enderlein.

paraguayense Enderlein. Paraguay.
Notolepium paraguayense Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 74, fig. 8.

Genus **Parasoa** Thornton

Parasoa Thornton, 1962 *Pacific Ins.* 4: 449.
Type species: *Parasoa haploneura* Thornton.

haploneura Thornton. Batu Caves (Malaya).
Parasoa haploneura Thornton, 1962. *Pacific Ins.* 4: 452, figs. 18-29.

Genus **Perientomum** Hagen

Perientomum Hagen, 1865. *Ent. mon. Mag.* 2: 151.
Type species: *Amphientomum trichopteryx* Hagen.

acutipenne Enderlein. Ceylon.
Perientomum acutipenne Enderlein, 1906. *Spolia zeylan.* 4: 94, figs. 66, 67, 72.

argentatum Enderlein. Ceylon.
Perientomum argentatum Enderlein, 1906. *Spolia zeylan.* 4: 88, figs. 14, 50, 75.

ceylonicum Enderlein. Ceylon.
Perientomum triste Hagen. Enderlein, 1903. *Ann. hist.-nat. Mus. hung.* 1: 325, fig. 11; pl. XIII, figs. 65, 65a.
Perientomum ceylonicum Enderlein, 1906. *Spolia zeylan.* 4: 92, figs. 13, 45, 46.

chrysargyrium Enderlein. Ceylon.
Perientomum chrysargyrium Enderlein, 1906. *Spolia zeylan.* 4: 86, figs. 9, 48, 74, 101.

fortunatum Navas. Canary Islands.
Perientomum fortunatum Navas, 1917. *Mem. Accad. Nuovi Lincei* (2) 3: 20, fig. 9. (Probably an Amphientomid; cf. Badonnel, 1944. *Rev. franc. Ent.* 11: 53).

fucatum Smithers. Australia.
Perientomum fucatum Smithers, 1965. *J. ent. Soc. Qd.* 4: 74, figs. 4, 5.

greeni Enderlein. Ceylon.
Perientomum greeni Enderlein, 1906. *Spolia zeylan.* 4: 87, figs. 10, 51, 52, 71.

gregarium (Hagen). Ceylon.
Amphientomum gregarium Hagen, 1865. *Ent. mon. Mag.* 2: 149.
Perientomum gregarium (Hagen). Hagen, 1866. *Verh. zool.-bot. Ges. Wien* 16: 204.

incultum (Hagen). Probably Zanzibar (in copal).
Amphientomum incultum Hagen, 1865. *Ent. mon. Mag.* 2: 149.
Perientomum incultum (Hagen). Hagen, 1866. *Verh. zool.-bot. Ges. Wien* 16: 210.
Amphientomum lepidopterum Hagen, 1866. *Verh. zool.-bot. Ges. Wien* 16: 204.

morosum Hagen. Ceylon.
Perientomum morosum Hagen, 1865. *Ent. mon. Mag.* 2: 152.
Amphientomum morosum (Hagen). Hagen, 1866. *Verh. zool.-bot. Ges. Wien* 16: 204.
(Not *Perientomum morosum* Hagen. Enderlein, 1903. *Ann. hist.-nat. Mus. hung.* 1: 323, figs. 8-10; pl. XIII, figs. 64, 64a; pl. XIV, fig. 64b).
Perientomum morosum Hagen. Enderlein, 1906. *Spolia zeylan.* 4: 90, figs. 11, 47, 49, 69.

trichopteryx (Hagen). Ceylon.
Amphientomum trichopteryx Hagen, 1859. *Verh. zool. -bot. Ges. Wien.* 9: 205.
Perientomum trichopteryx (Hagen). Hagen, 1865. *Ent. mon. Mag.* 2: 151.

triste Hagen. Ceylon.
Perientomum triste Hagen, 1865. *Ent. mon. Mag.* 2: 152.
Amphientomum triste Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 204.
(Not *Perientomum triste* Hagen. Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 325, fig. 11; pl. XIII, figs. 65, 65a).

Genus **Proentomum** Badonnel

Proentomum Badonnel, 1949. *Rev. franc. Ent.* 16: 23.
Type species: *Proentomum personatum* Badonnel.

personatum Badonnel. Ivory Coast.
Proentomum personatum Badonnel, 1949. *Rev. franc. Ent.* 16: 23, figs. 1-6.

Genus **Soa** Enderlein

Soa Enderlein, 1904. *Zool. Jb. Abt. Syst.* 20: 109.
Type species: *Soa dahliana* Enderlein.

angolana Badonnel. Angola.
Soa angolana Badonnel, 1955. *Pub. Cult. Cia. Diamant Angola* 26: 24, figs. 1-6.

dahliana Enderlein. Bismarck Archipelago, Guam.
Soa dahliana Enderlein, 1904. *Zool. Jb. Abt. Syst.* 20: 110; pl. 7, figs. 2-9.

flaviterminata Enderlein. England, Germany, Angola, Congo, Ivory Coast, Sierra Leone, Seychelles, Ceylon, Java, Tahiti, Rio de Janiero.
Soa flaviterminata Enderlein, 1906. *Spolia zeylan.* 4: 79, figs. 8, 41, 44, 59.

Subfamily **LEPIDOPSOCINAE**

Genus **Cyptophania** Banks

Cyptophania Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 440.
Type species: *Cyptophania hirsuta* Banks.
Pteroxaniella Karny, 1932. *Ins. Samoa* 7 (4): 122.
Type species: *Pteroxaniella bifurcata* Karny.
Subgenera:
(Cyptophania) Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 440.
Type species: *Cyptophania hirsuta* Banks. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.
(Ptenocorium) Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 223.
Type species: *Ptenocorium alutaceum* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.
alutacea (Enderlein). **(Ptenocorium).** Seychelles.
Ptenocorium alutaceum Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 224, figs. 9, 10; pl. 15, fig. 68.
Cyptophania (*Ptenocorium*) *alutacea* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.
hirsuta Banks. **(Cyptophania).** Hawaii, Samoa, Laysan Island.
Cyptophania hirsuta Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 440; pl. VII, fig. 1; pl. VIII, fig. 7; pl. IX, fig. 5.
Pteroxaniella bifurcata Karny, 1932. *Ins. Samoa* 7 (4): 123, fig. 5.
Cyptophania (*Cyptophania*) *hirsuta* Banks. Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.

Genus **Echinopsocus** Enderlein

Echinopsocus Enderlein, 1903. *Ann. hist.-nat. Mus. hung.* 1: 331.
Type species: *Echinopsocus erinaceus* Enderlein.
erinaceus Enderlein. New Guinea.
Echinopsocus erinaceus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 332; pl. X, figs. 63c-63f; pl. VI, fig. 63b; pl. XII, figs. 63a, 63g.

Genus **Echmepteryx** Aaron

Echmepteryx Aaron, 1886. *Proc. Acad. nat. Sci. Philad.* 38: 17.
Type species: *Amphientomum hageni* Packard.
Subgenera:
(Echmepteryx) Aaron, 1886. *Proc. Acad. nat. Sci. Philad.* 38: 17.
Type species: *Amphientomum hageni* Packard. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.
(Thylacopsis) Enderlein, 1911. *Palaeontographica* 58: 348.
Type species: *Thylax mihira* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.
(Thylacomorpha) Enderlein, 1912. *Zool. Anz.* 39: 303.
Type species: *Thylacomorpha symmetrolepis* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.
(Oxypsocus) Tillyard, 1923. *Trans. N.Z. Inst.* 54: 178.
Type species: *Oxypsocus hamiltoni* Tillyard. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.
(Loxopholia) Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 225.
Type species: *Loxopholia pinnula* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.
acutipennis Enderlein. **(Echmepteryx).** Seychelles.
Echmepteryx acutipennis Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 231, figs. 29, 30; pl. 16, fig. 77.
aesculana Enderlein. **(Echmepteryx).** Seychelles.
Echmepteryx aesculanus Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 229, figs. 23, 24; pl. 15, fig. 74.

albida (Badonnel). **(Thylacopsis).** Ivory Coast, Iles Glorieuses, Victoria Island, Queensland.
Thylacopsis albidus Badonnel, 1949. *Rev. franc. Ent.* 16: 25, figs. 13-17.
Echmepteryx albidus (Badonnel). Badonnel, 1962. *Biol. l'Amerique australe* 1: 186.

annulitibia (Enderlein). **(Loxopholia).** Seychelles.
Loxopholia annulitibia Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 227, figs. 19, 20; pl. 15, fig. 72.

argentifasciata (Enderlein). **(Loxopholia).** Seychelles.
Loxopholia argentifasciata Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 227, figs. 17, 18; pl. 15, fig. 71.

armillata Enderlein. **(Echmepteryx).** Paraguay.
Echmepteryx armillata Enderlein, 1910. *Zool. Anz.* 36: 167.

brunnea Smithers. **(Loxopholia).** Australia.
Echmepteryx (Loxopholia) brunnea Smithers, 1965. *J. ent. Soc. Qd.* 4: 75, figs. 11-16.

cubana Banks. **(Echmepteryx).** Cuba.
Echmepteryx cubana Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 393, fig. 20.

desquamata Karny. **(Echmepteryx).** Samoa.
Echmepteryx desquamata Karny, 1932. *Ins. Samoa* 7 (4): 122, fig. 4.

dryas (Enderlein). **(Thylacopsis).** Seychelles.
Thylacopsis dryas Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 232, figs. 31, 32; pl. 16, fig. 78.

falco (Badonnel). **(Thylacopsis).** Ivory Coast, Madagascar.
Thylacopsis falco Badonnel, 1949. *Rev. franc. Ent.* 16: 24, figs. 8-12.

fastigata (Enderlein). **(Thylacopsis).** Seychelles.
Thylacopsis fastigata Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 236, figs. 41, 42; pl. 16, fig. 83.

hageni (Packard). **(Echmepteryx).** North America.
Amphientomum hageni Packard, 1870. *Proc. Boston Soc. nat. Hist.* 13: 405, figs. a-d.
Echmepteryx agilis Aaron, 1886. *Proc. Acad. nat. Sci. Philad.* 38: 17, figs. 4-9.
Echmepteryx hageni (Packard). Enderlein, 1906. *Spolia zeylan.* 4: 104.
(Not *Echmepteryx hageni* (Packard). Mockford, 1950. *Proc. Ind. Acad. Sci.* 60: 193).
Echmepteryx (Echmepteryx) hageni (Packard). Roesler, 1944. *Stettin. ent. Ztg.* 105: 132.

hamiltoni (Tillyard). **(Oxypsocus).** New Zealand.
Oxypsocus hamiltoni Tillyard, 1923. *Trans. N.Z. Inst.* 54: 178, figs. 5, 6; pl. 18, fig. 1.
Echmepteryx (Oxypsocus) hamiltoni (Tillyard). Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.

hartmeyeri Enderlein. **(Loxopholia).** S.W. Australia.
Echmepteryx hartmeyeri Enderlein, 1907. *Fauna S.W. Austr.* (1) 3: 238.
Loxopholia hartmeyeri (Enderlein). Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 225.

hebes (Enderlein). **(Loxopholia).** Seychelles.
Loxopholia hebes Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 228, figs. 21, 22; pl. 15, fig. 73.

hieroglyphica Enderlein. **(Echmepteryx).** Seychelles.
Echmepteryx hieroglyphica Enderlien, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 230, figs. 27, 28; pl. 15, fig. 76.

laccinipennis Enderlein. **(Echmepteryx).** Java.
Echmepteryx laccinipennis Enderlein, 1926. *Zool. Meded.* 9: 68.

maculimargo Enderlein. **(Echmepteryx).** Seychelles.
Echmepteryx maculimargo Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 230, figs. 25, 26; pl. 15, fig. 75.

madagascariensis (Kolbe). **(Thylacopsis).** Madagascar, East Africa, Seychelles, Germany (introduced).
Thylax madagascariensis Kolbe, 1885. *Berl. ent. Z.* 29: 184; pl. IVB, figs. 1a, 1b, 1c.
Thylacopsis madagascariensis (Kolbe). Enderlein, 1911. *Palaeontographica* 58: 348.

mahensis (Enderlein.). **(Thylacopsis).** Seychelles.
Thylacopsis mahensis Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.) (2)* 19: 234, figs. 35, 36; pl. 16, fig. 80.

mihira Enderlein. **(Thylacopsis).** Ceylon.
Echmepteryx mihira Enderlein, 1906. *Spolia zeylan.* 4: 107, figs. 22, 81, 106, 122. (Mis-spelt *"mihara,"* p. 43).
Thylax mihira (Enderlein). Enderlein, 1908. *Reise in Ostafrika* 2: 256; pl. 11, fig. 12.
Thylacopsis mihira (Enderlein). Enderlein, 1911. *Palaeontographica* 58: 348.
Echmepteryx (Thylacopsis) mihira Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.

monticola (Enderlein). **(Thylacopsis).** Seychelles.
Thylacopsis monticola Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.) (2)* 19: 233, figs. 33, 34; pl. 16, fig. 79.

nigra (Enderlein). **(Loxopholia).** Seychelles.
Loxopholia nigra Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.) (2)* 19: 226, figs. 15, 16.

pallida Smithers. **(Thylacopsis).** Australia.
Echmepteryx (Thylacopsis) pallida Smithers, 1965. *J. ent. Soc. Qd.* 4: 75, figs. 1-3.

pinnula (Enderlein). **(Loxopholia).** Seychelles.
Loxopholia pinnula Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.) (2)* 19: 225, figs. 13, 14; pl. 15, fig. 70.
Echmepteryx (Loxopholia) pinnula (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.

pretiosa Banks. **(Echmepteryx).** Guam.
Echmepteryx pretiosa Banks, 1942. *Bull. Bishop Mus. Honolulu* 172: 28, figs. 1e, 1g.

psyche (Enderlein). **(Thylacopsis).** Seychelles.
Thylacopsis psyche Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.) (2)* 19: 234, figs. 37, 38; pl. 16, fig. 81.

punctulata (Enderlein). **(Thylacopsis).** Seychelles.
Thylacopsis punctulata Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.) (2)* 19: 236, figs. 43, 44; pl. 16, fig. 84.

quadrimaculata Smithers. **(Loxopholia).** Australia.
Echmepteryx (Loxopholia) quadrimaculata Smithers, 1965. *J. ent. Soc. Qd.* 4: 78, figs. 17-20.

scotti (Enderlein). **(Thylacopsis).** Seychelles.
Thylacopsis scotti Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.) (2)* 19: 235, figs. 39, 40; pl. 16, fig. 82.

sericea Enderlein. **(Echmepteryx).** Ceylon.
Echmepteryx sericea Enderlein, 1906. *Spolia zeylan.* 4: 108, figs. 23, 80, 104, 105, 107.

similis Badonnel. **(Echmepteryx).** Angola.
Echmepteryx (Echmepteryx) similis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 28, figs. 17-22.

symmetrolepis (Enderlein). **(Thylacomorpha).** Seychelles.
Thylacomorpha symmetrolepis Enderlein, 1912. *Zool. Anz.* 39: 303.
Echmepteryx (Thylacomorpha) symmetrolepis (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 133.

terricolis Badonnel. **(Echmepteryx).** Chile.
Echmepteryx terricolis Badonnel, 1963. *Biol. l'Amerique australe* 2: 294, figs. 1-3, 6-15.

Genus **Lepidopsocus** Enderlein

Lepidopsocus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 328.
Type species: *Lepidopsocus nepticulides* Enderlein.

costalis (Banks). Hawaii.
Echmepteryx costalis Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 439, pl. VII, fig. 3; pl. VIII, fig. 3; pl. IX, fig. 4.
Lepidopsocus costalis (Banks). Zimmerman, 1948. *Ins. Hawaii* 2: 224, figs. 123, 124b.

fasciatus Enderlein. Seychelles.
Lepidopsocus fasciatus Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 238, figs. 51, 52; pl. 16, fig. 87.

hopkinsi Karny. Samoa.
Lepidopsocus hopkinsi Karny, 1932. *Ins. Samoa* 7 (4): 120, fig. 3.

marmoratus (Banks). Hawaii.
Echmepteryx marmorata Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 439.
Lepidopsocus marmoratus (Banks). Zimmerman, 1948. *Ins. Hawaii* 2: 225, fig. 124c.

nepticulides Enderlein. Singapore.
Lepidopsocus nepticulides Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 330; pl. IX, fig. 62a; pl. X, figs. 62d-62f; pl. XI, fig. 62b; pl. XII, fig. 62c, 62g.

ochreus Enderlein. Seychelles.
Lepidopsocus ochreus Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 238, figs. 49, 50; pl. 16, fig. 86.

unicolor (Banks). Hawaii.
Echmepteryx unicolor Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 439.
Lepidopsocus unicolor (Banks). Zimmerman, 1948. *Ins. Hawaii* 2: 225, fig. 124a.

Genus **Pteroxanium** Enderlein

Lepidilla Ribaga, 1905. *Redia* 2: 99.
Type species: *Lepidilla kelloggi* Ribaga.

Pteroxanium Enderlein, 1922. *Ent. mon. Mag.* 58: 102.
Type species: *Pteroxanium squamosum* Enderlein.

Tasmanopsocus Hickman, 1934. *Pap. roy. Soc. Tasm.* 1933: 77.
Type species: *Tasmanopsocus litoralis* Hickman.

Pteroxanium Enderlein, Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.
Type species: *Pteroxanium kelloggi* (Ribaga). (*Lepidilla* preocc.).

funebris Badonnel. Chile.
Pteroxanium funebris Badonnel, 1963. *Biol. l'Amerique australe* 2: 298, figs. 4, 5, 16-21.

kelloggi (Ribaga). North America, Europe, Tasmania, New Zealand, Argentina.
Lepidilla kelloggi Ribaga, 1905, *Redia* 2: 100; pl. IX, figs. 1-9; pl. X, figs. 10, 11.
Hyperetes britannicus Harrison, 1916. *Lanc. Nat.* 9: 108.
Pteroxanium squamosum Enderlein, 1922. *Ent. mon. Mag.* 58: 103, figs. 1-6.
Tasmanopsocus litoralis Hickman, 1934. *Pap. roy. Soc. Tasm.* 1933: 78, figs.1a-1e, 2a-2g.
Pteroxanium kelloggi (Ribaga). Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.

Genus **Scolopama** Enderlein

Scolopama Enderlein, 1906. *Spolia zeylan.* 4: 110.
Type species: *Scolopama halterata* Enderlein.

halterata Enderlein. Ceylon.
Scolopama halterata Enderlein, 1906. *Spolia zeylan.* 4: 110, figs. 108, 109, 126.

Subfamily **LEPOLEPIDINAE**

Genus **Lepolepis** Enderlein

Lepolepis Enderlein, 1906. *Spolia zeylan.* 4: 112.
Type species: *Lepolepis ceylonica* Enderlein.

bicolor Broadhead. England.
Lepolepis bicolor Broadhead, 1955. *Proc. R. ent. Soc. Lond.* (*B*) 24: 9, figs. 4-13.

ceylonica Enderlein. Ceylon, Formosa.
Lepolepis ceylonica Enderlein, 1906. *Spolia zeylan.* 4: 113, figs. 24, 114-116, 118-120.
Lepolepis ceylonica var. *formosana* Enderlein, 1908. *Zool. Anz.* 33: 772.

occidentalis Mockford. Eastern North America.
Echmepteryx hageni (Packard). Mockford, 1950. *Proc. Ind. Acad. Sci.* 60: 193.
Lepolepis occidentalis Mockford, 1955. *Amer. Mid. Nat.* 53: 436; pl. 1, figs. 1-4.

Family **TROGIIDAE**

Subfamily **EMPHERIINAE**

Genus **Empheria** Hagen

Empheria Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* 2 (1): 64. Type species: *Empheria reticulata* Hagen.

Subgenera:

(Empheria) Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* 2 (1): 64. Type species: *Empheria reticulata* Hagen. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 129.

(Bebiosis) Enderlein, 1911. *Palaeontographica* 58: 344.
Type species: *Bebiosis pertinens* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 130.

pertinens (Enderlein). **(Bebiosis).** East Prussia (in amber).
Bebiosis pertinens Enderlein, 1911. *Palaeontographica* 58: 344, figs. 81, 87, 90, 93; figs. R, S.
Empheria (*Bebiosis*) *pertinens* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 130.

reticulata Hagen. **(Empheria).** Prussia (in amber).
Empheria reticulata Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* 2 (1): 64; pl. 8, fig. 6.
Empheria (*Empheria*) *reticulata* Hagen. Roesler, 1944. *Stettin. ent. Ztg.* 105: 129.

Genus **Trichempheria** Enderlein

Trichempheria Enderlein, 1911. *Palaeontographica* 58: 345.
Type species: *Empheria villosa* Hagen.

villosa (Hagen). East Prussia (in amber).
Empheria villosa Hagen, 1882. *Stettin. ent. Ztg.* 43: 221; pl. I, fig. 9.
Trichempheria villosa (Hagen). Enderlein, 1911. *Palaeontographica* 58: 345, figs. 80, 84, 86, 88, 94.

Subfamily **TROGIINAE**

Genus **Cerobasis** Kolbe

Hyperetes Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 132.
Type species: *Hyperetes guestfalicus* Kolbe.
Cerobasis Kolbe, 1882. *Ent. Nachr.* 8: 212.
Type species: *Cerobasis muraria* Kolbe.
Tichobia Kolbe, 1882. *Ent. Nachr.* 8: 212.
Type species: *Tichobia alternans* Kolbe.
Albardia Jacobson and Bianchi, 1904. *Orth. Neuropt. Russ. Emp.* p. 496.
Type species: *Tichobia alternans* Kolbe. (*Tichobia* preocc.).
Myopsocnema Enderlein, 1905. *Res. Swed. Zool. Exped. Egypt* 18: 17.
Type species: *Clothilla annulata* Hagen.

Cerobasis Kolbe. Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.
Type species: *Hyperetes guestfalicus* Kolbe. (*Hyperetes, Albardia* preocc.).
Zlinia Obr, 1948. *Pub. Fac. Sci. Univ. Masaryk* 306: 93, 103.
Type species: *Zlinia multispinosa* Obr.

annulata (Hagen). Europe, North America, Canary Island.
Clothilla annulata Hagen, 1865. *Ent. mon. Mag.* 2: 122.
Atropos annulata (Hagen). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 135; pl. IV, fig. 24.
Myopsocnema annulata (Hagen). Enderlein, 1905. *Res. Swed. Zool. Exped. Egypt* 18: 17, figs. 3-6; pl. 2, fig. 10.

australica (Enderlein). S.W. Australia.
Hyperetes australicus Enderlein, 1907. *Fauna S.W. Austr.* (1) 3: 239, fig. 6.
Cerobasis australicus (Enderlein). Smithers, 1965. *J. ent. Soc. Qd.* 4: 79.

canariensis (Enderlein). Canary Islands.
Myopsocnema canariensis Enderlein, 1910. *Zool. Anz.* 36: 169, figs. 3, 4.

chrysops Badonnel. Chile.
Cerobasis chrysops Badonnel, 1963. *Biol. l'Amerique australe* 2: 302, figs. 23, 24.

guestfalica (Kolbe). Europe, North America, Morocco, St. Paul Island, Argentina, Australia, South Africa. (Widespread, domestic sp.).
Hyperetes guestfalicus Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 132; pl. IV, fig. 22.
Hyperetes pinicola Kolbe, 1881. *Ent. Nachr.* 7: 227.
Tichobia alternans Kolbe, 1882. *Ent. Nachr.* 8: 212.
Cerobasis muraria Kolbe, 1882. *Ent. Nachr.* 8: 212.
Hyperetes tessulatus Hagen, 1883. *Stettin. ent. Ztg.* 44: 216.
Albardia alternans (Kolbe). Jacobson and Bianchi, 1904. *Orth. Neuropt. Russ. Emp.* p. 496.
Cerobasis guestfalica (Kolbe). Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.

lapidaria Badonnel. Angola.
Cerobasis lapidarius Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 32, figs. 25, 26.

multispinosa (Obr). Moravia.
Zlinia multispinosa Obr, 1948. *Pub. Fac. Sci. Univ. Masaryk* 306: 93, 104, figs. 184-190.

Genus **Lepinotus** Heyden

Lepinotus Heyden, 1850. *Stettin. ent. Ztg.* 11: 84.
Type species: *Lepinotus inquilinus* Heyden.
Paradoxides Motschulsky, 1851. *Bull. Soc. imp. Nat. Moscou* 24: 510.
(Not *Paradoxides* Brongniart, 1822. *N. H. Crust. foss.* 31).
Paradoxenus Motschulsky, 1852. *Etudes ent.* 1: 19.
Type species: *Paradoxides psocoides* Motschulsky. (*Paradoxides* preocc.).
Cuixa Navas, 1927. *Boll. Soc. ent. Ital.* 59: 151.
Type species: *Cuixa canaria* Navas.
Heterolepinotus Obr, 1948. *Pub. Fac. Sci. Univ. Masaryk* 306: 95, 105.
Type species: *Heterolepinotus quadrispinosus* Obr.

angolensis Badonnel. Angola, Rhodesia, Tanganyika.
Lepinotus angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 29, fig. 23.

inquilinus Heyden. Cosmopolitan (domestic sp.).
Termes pulsatorium Scopoli, 1763. *Entomologica Carniolica* p. 380.
(Not *Termes pulsatorium* Linnaeus, 1761. *Fauna Suecica* p. 474).
Lepinotus inquilinus Heyden, 1850. *Stettin. ent. Ztg.* 11: 84.
Paradoxides psocoides Motschulsky, 1851. *Bull. Soc. imp. Nat. Moscou* 24: 510-511, 1 fig.

Paradoxenus psocoides (Motschulsky). Motschulsky, 1852, *Etudes ent.* 1: 19.
Clothilla inquilina (Heyden). Brauer, 1857. *Neuroptera austriaca,* p. 32.
Clothilla picea Hagen, 1861. *Smithson. misc. Coll.* 4: 8.
Atropos inquilina (Heyden). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst.* 8: 136, fig. 25.
Atropos sericea Kolbe, 1883. *Stettin. ent. Ztg.* 44: 86.
Lepinotus piceus (Hagen). Hagen, 1883. *Stettin. ent. Ztg.* 44: 314.
Atropos distincta Kolbe, 1888. *Jber. Ver. Naturk. Zwickau* 1887: 190, 191.
Atropos picea (Hagen). Kolbe, 1888. *Jber. Ver. Naturk. Zwickau* 1887: 190, 191.
Clothilla distincta (Kolbe). Tetens, 1891. *Ent. Nachr.* 17: 372.
Lepinotus sericeus (Kolbe). Tetens, 1891. *Ent. Nachr.* 17: 373, 384.
Cuixa canaria Navas, 1927. *Boll. Soc. ent. Ital.* 59: 151, figs. 2a, b, c.

lepinotoides (Ribaga). South Africa.
Atropos lepinotoides Ribaga, 1911. *Redia* 7: 156, fig. 1.
Lepinotus lepinotoides (Ribaga). Pearman, 1931. *Ent. mon. Mag.* 67: 47.

patruelis Pearman. Europe, North America, Argentina.
Lepinotus patruelis Pearman, 1931. *Ent. mon. Mag.* 67: 47, figs. 1-4.

quadrispinosus (Obr). Czechoslovakia, Angola.
Heterolepinotus quadrispinosus Obr, 1948. *Pub. Fac. Sci. Univ. Masaryk* 306: 97, 105, figs. 191-194.
Lepinotus (*Heterolepinotus*) *quadrispinosus* (Obr). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 31, fig. 24.

reticulatus Enderlein. Widespread (domestic sp.).
Clothilla inquilina (Heyden). Hagen, 1882. *Stettin. ent. Ztg.* 43: 526; pl. II, fig. 6.
Atropos inquilina (Heyden). Kolbe, 1888. *Jber. Ver. Naturk. Zwickau* 1887: 190, 191.
Lepinotus reticulatus Enderlein, 1905. *Res. Swed. Exp. Egypt* 18: 31, fig. 9; pl. I, figs. 1, 2; pl. 2, figs. 12, 19, 23.
Lepinotus tasmaniensis Hickman, 1934. *Pap. roy. Soc. Tasm.* 1933: 81, figs. 3a-3d.

Genus **Myrmicodipnella** Enderlein

Myrmicodipnella Enderlein, 1909. *Boll. Lab. Zool. Portici* 3: 329.
Type species: *Myrmicodipnella aptera* Enderlein.

aptera Enderlein. San Francisco.
Myrmicodipnella aptera Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 337, figs. 1-3.

Genus **Trogium** Illiger

Trogium Illiger, 1798. *Kugelann Verzeichniss der Krafer preussens* p. 500.
Type species: *Termes pulsatorium* Linnaeus.
Atropos Leach, 1815. *Edinburgh Encyclopaedia* 9: 139.
Type species: *Termes lignarium* de Geer.
Clothilla Westwood, 1841. *Ann. Mag. nat. Hist.* 6: 480.
Type species: *Clothilla studiosa* Westwood.

pulsatorium (Linnaeus). Widespread (domestic sp.).
Termes pulsatorium Linnaeus, 1758. *Systema Naturae* p. 610.
Hemerobius pulsatorius Fabricius, 1775. *Systema Entomologiae* p. 311.
Termes lignarium de Geer, 1778. *Memoires pour servir a l'histoire des Insectes* 7: 314; pl. 4, fig. 1. (part), (not figs. 2, 3, 4).
Trogium pulsatorium (Linnaeus). Illiger, 1798. *Kugelann Verzeichniss der Kafer Preussens etc.* p. 500.
Atropos lignaria (de Geer). Leach, 1815. *Edinburgh Encyclopaedia* 9: 139.
Psylla pulsatoria Billburg, 1820. *Enumeratio insectorum* 4: 94.
Psocus pulsatorius (Linnaeus). Nitzsch, 1821. *Germar's Magaz. Entom.* 4: 276; pl. 2.

Troctes pulsatorius (Linnaeus). Burmeister, 1839. *Handbuch der Entomologie* 2: 773.
Clothilla studiosa Westwood, 1841. *Ann. Mag. nat. Hist.* 6: 480.
Clothilla pulsatoria (Linnaeus). Hagen, 1866. *Ent. mon. Mag.* 2: 122.
Atropos pulsatoria (Linnaeus). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 91, 135, fig. 23.
Clothilla ocelloria Weber, 1906. *N.Y. Med. J.* 84: 886, fig. 2.

Family **PSOQUILLIDAE**

Genus **Balliella** Badonnel

Balliella Badonnel, 1949. *Bull. Inst. sci. nat. Belg.* 25: 9.
Type species: *Balliella ealensis* Badonnel.
ealensis Badonnel. Congo.
Balliella ealensis Badonnel, 1949. *Bull. Inst. sci. nat. Belg.* 25: 10, figs. 9-13.

Genus **Eosilla** Ribaga

Eosilla Ribaga, 1908. *Redia* 5: 20.
Type species: *Eosilla jacobsoni* Ribaga.
Subgenera:
(Eosilla) Ribaga, 1908. *Redia* 5: 20.
Type species: *Eosilla jacobsoni* Ribaga. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 119.
(Empheriella) Enderlein, 1912. *Zool. Anz.* 39: 305.
Type species: *Empheriella denervosa* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 119.
denervosa (Enderlein). **(Empheriella).** Seychelles.
Empheriella denervosa Enderlein, 1912. *Zool. Anz.* 39: 305.
Eosilla (Empheriella) denervosa (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 130.
jacobsoni Ribaga. **(Eosilla).** Java.
Eosilla jacobsoni Ribaga, 1908. *Redia* 5: 20; pl. II, figs. 1-12.
Eosilla (Eosilla) jacobsoni Ribaga. Roesler, 1944. *Stettin. ent. Ztg.* 105: 130.

Genus **Psoquilla** Hagen

Psoquilla Hagen, 1865. *Ent. mon. Mag.* 2: 123.
Type species: *Psoquilla marginepunctata* Hagen.
Heteropsocus Verrill, 1902. *Trans. Conn. Acad. Arts Sci.* 11: 817.
Type species: *Heteropsocus dispar* Verrill.
infuscata Badonnel. Ivory Coast.
Psoquilla infuscata Badonnel, 1949. *Rev. franc. Ent.* 16: 27, figs. 18-23.
marginepunctata Hagen. Paraguay, Brazil, North America, Bermuda, Hawaii, Malaya, England, Germany(?), Congo, Gold Coast, Ivory Coast, Angola.
Psoquilla marginepunctata Hagen, 1865. *Ent. mon. Mag.* 2: 123.
Heteropsocus dispar Verrill, 1902. *Trans. Conn. Acad. Arts Sci.* 11: 817, figs. 192, 192a, 192b.

Genus **Rhyopsocus** Hagen

Rhyopsocus Hagen, 1876. *Bull. U.S. nat. Mus.* 1 (3): 55.
Type species: *Rhyopsocus eclipticus* Hagen.
Deipnopsocus Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 358.
Type species: *Deipnopsocus spheciophilus* Enderlein.
Rhyopsocopsis Pearman, 1929. *Ent. mon. Mag.* 65: 107.
Type species: *Rhyopsocopsis peregrinus* Pearman.
afer (Badonnel). Congo, Ivory Coast, Angola, South Africa, Tanganyika.
Deipnopsocus afer Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 267, figs. 1-6.
Rhyopsocus afer (Pearman). Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 9.

bentonae Sommerman. U.S.A.
Rhyopsocus bentonae Sommerman, 1956. *J. Wash. Acad. Sci.* 46: 146, figs. 1-12.
disparilis (Pearman). England. (In stored products, introduced?).
Deipnopsocus speciophilus var. *disparilis* Pearman, 1931. *Ent. mon. Mag.* 67: 96, fig. 2.
Deipnopsocus disparilis Pearman. Badonnel, 1949. *Rev. franc. Ent.* 16:29.
eclipticus Hagen. Kerguelen Island.
Rhyopsocus eclipticus Hagen, 1876. *Bull. U.S. nat. Mus.* 1 (3): 52.
peregrinus (Pearman). England (introduced?).
Rhyopsocopsis peregrinus Pearman, 1929. *Ent. mon. Mag.* 65: 107, figs. 3a, 3b.
phillipsae Sommerman. North America.
Rhyopsocus phillipsae Sommerman, 1956. *J. Wash. Acad. Sci.* 46: 146, figs. 13-17.
spheciophilus (Enderlein). Peru.
Deipnopsocus spheciophilus Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 259; pl. 17, figs. 4-8.
squamosus Mockford and Gurney. Texas.
Rhyopsocus squamosus Mockord and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 357, figs. 1-4.
texanus (Banks). North America.
Deipnopsocus texanus Banks, 1930. *Psyche, Camb. Mass.* 37: 223, figs.
Rhyopsocus texanus (Banks). Sommerman, 1956. *J. Wash. Acad. Sci.* 46: 145.

Group **PSOCATROPETAE**

Family **PSYLLIPSOCIDAE**

Genus **Dolopteryx** Smithers

Dolopteryx Smithers, 1958. *J. ent. Soc. S. Afr.* 21: 113.
Type species: *Dolopteryx domestica* Smithers.
domestica Smithers. Rhodesia.
Dolopteryx domestica Smithers, 1958. *J. ent. Soc. S. Afr.* 21: 114, figs. 1-6.

Genus **Dorypteryx** Aaron

Dorypteryx Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 37.
Type species: *Dorypteryx pallida* Aaron.
astizi Brethes. Buenos Aires.
Dorypteryx astizi Brethes, 1923. *Bull. Soc. ent. Fr.* 1923: 117, figs. 1, 2.
hageni Banks. Mammoth Cave (Kentucky).
Dorypteryx? hageni Banks, 1897. *Amer. Nat.* 31: 382; pl. X, fig. 4.
pallida Aaron. North America, Europe.
Dorypteryx pallida Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 38; pl. 9, figs. 2, 3.
Dorypteryx albicans Ribaga, 1907. *Redia* 4: 1; pl. IV, figs. 1-8.

Genus **Psocatropos** Ribaga

Psocatropos Ribaga, 1899. *Riv. Pat. veg. Padova* 8: 156.
Type species: *Psocatropos lachlani* Ribaga.
Psocinella Banks, 1900. *Ent. News* 11: 431.
Type species: *Psocinella slossonae* Banks.
Axinopsocus Enderlein, 1903. *Zool. Jb. Abt. Syst.* 19: 2.
Type species: *Axinopsocus microps* Enderlein.
Vulturops Townsend, 1912. *Ent. News* 23: 267.
Type species: *Vulturops termitorum* Townsend.
Gambrella Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 221.
Type species: *Gambrella pilipennis* Enderlein.
floridanus (Corbett and Hargreaves). Florida.
Vulturops floridanus Corbett and Hargreaves, 1915. *Psyche, Camb. Mass.* 22: 142-143, 14 figs.

lachlani Ribaga. Italy, Florida, Texas, Hawaii.
Psocatropos lachlani Ribaga, 1899. *Riv. Pat. veg. Padova* 8: 157; pl. VII.
Psocinella slossonae Banks, 1900. *Ent. News* 11: 432, figs. on p. 431.

microps (Enderlein). Cameroons, Mozambique, Angola, Congo, East Africa, Formosa, Java.
Axinopsocus microps Enderlein, 1903. *Zool. Jb. Abt. Syst.* 19: 3; pl. I, figs. 10-18.
Psoquilla microps (Enderlein). Enderlein, 1908. *Zool. Anz.* 33: 776.
Psocatropos lesnei Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 254, figs. 30-37.
Psocatropos microps (Enderlein). Badonnel, 1944. *Rev. franc. Ent.* 11: 59.

pilipennis (Enderlein). Seychelles, India.
Gambrella pilipennis Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 221, fig. 6.
Psocatropos pilipennis (Enderlein). Menon, 1942. *Indian J. Ent.* 4: 13, figs. 16-29.

termitorum (Townsend). Peru.
Vulturops termitorum Townsend, 1912. *Ent. News.* 23: 269, figs. 1-3.

Genus **Psyllipsocus** Selys-Longchamps

Psyllipsocus Selys-Longchamps, 1872. *Ent. mon. Mag.* 9: 145.
Type species: *Psyllipsocus ramburii* Selys-Longchamps.
Nymphopsocus Enderlein, 1903. *Zool. Anz.* 27: 76.
Type species: *Nymphopsocus destructor* Enderlein.
Ocelloria Weber, 1906. *N.Y. Med. J.* 84: 858.
Type species: *Ocelloria gravonymphia* Weber.
Ocellataria Weber, 1907. *Ent. News.* 18: 189.
Type species: *Ocellataria gravinympha* Weber.
Fita Navas, 1913. *Rev. Acad. Madr.* 12: 332.
Type species: *Fita vestigator* Navas.
Fabrella Lacroix, 1915. *Bull. Soc. ent. Fr.* 1915: 194.
Type species: *Fabrella convexa* Lacroix.

Subgenera:

(Psyllipsocus) Selys-Longchamps, 1872. *Ent. mon. Mag.* 9: 145.
Type species: *Psyllipsocus ramburii* Selys-Longchamps. Subgeneric status: Thornton, 1962. *Pacific Ins.* 4: 449.

(Parempheria) Enderlein, 1906. *Stettin. ent. Ztg.* 67: 306.
Type species: *Parempheria sauteri* Enderlein. Subgeneric status: Thornton, 1962. *Pacific Ins.* 4: 449.

banksi Cockerell. **(Psyllipsocus).** Burma (in amber).
Psyllipsocus banksi Cockerell, 1916. *Amer. J. Sci.* 42: 136, figs. 2, 3.

batuensis Thornton. **(Psyllipsocus).** Batu Caves (Malaya).
Psyllipsocus batuensis Thornton, 1962. *Pacific Ins.* 4: 442, figs. 1-4, 10-12, 16, 17.

bombayensis Menon. **(Psyllipsocus).** India.
Psyllipsocus bombayensis Menon, 1942. *Indian J. Ent.* 4: 38, figs. 30-34.

collarti Badonnel. **(Psyllipsocus).** Congo.
Psyllipsocus collarti Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 140, figs. 5, 7-11.

delamarei Badonnel. **(Psyllipsocus).** Argentina.
Psyllipsocus delmarei Badonnel, 1946. *Biol. de l'Amerique australe* 1: 187, figs. 1-5.

edentulus Menon. **(Psyllipsocus).** India.
Psyllipsocus edentulus Menon, 1942. *Indian J. Ent.* 4: 40, figs. 35-38.

hirsutus Thornton. **(Parempheria).** Batu Caves (Malaya).
Psyllipsocus (*Parempheria*) *hirsutus* Thornton, 1962. *Pacific Ins.* 4: 447, figs. 5-8, 9, 13-15.

metamicropterus (Enderlein). **(Parempheria).** Formosa.
Parempheria metamicroptera Enderlein, 1908. *Zool. Anz.* 33: 775, fig. 2.

Psyllipsocus metamicropterus (Enderlein). Gurney, 1943. *Ann. ent. Soc. Amer.* 36: 205.
Psyllipsocus (*Parempheria*) *metamicropterus* (Enderlein). Thornton, 1962. *Pacific Ins.* 4: 449.

minutissimus (Enderlein). **(Parempheria).** Hawaii.
Parempheria minutissima Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 458.
Psyllipsocus minutissimus (Enderlein). Gurney, 1943. *Ann. ent. Soc. Amer.* 36: 205.
Psyllipsocus (*Parempheria*) *minutissimus* (Enderlein). Thornton, 1962. *Pacific Ins.* 4: 449.

oculatus Gurney. **(Psyllipsocus).** Mexico, Texas.
Psyllipsocus oculatus Gurney, 1943. *Ann. ent. Soc. Amer.* 36: 214, figs. 35, 36, 38-40.

ramburii Selys-Longchamps. **(Psyllipsocus).** North America, Europe, Algeria, Guam, Angola, Australia, Afghanistan, Armenia. (Widespread domestic and cave sp.).
Psocus pedicularius Rambur, 1842. *Histoire naturelle des Insectes.* p. 323.
Psyllipsocus ramburii Selys-Longchamps, 1872. *Ent. mon. Mag.* 9: 145.
Nymphopsocus destructor Enderlein, 1903. *Zool. Anz.* 27: 76.
Ocelloria gravonymphia Weber, 1906. *N.Y. Med. J.* 84: 885, fig. 1.
Ocellataria gravinympha Weber, 1907. *Ent. News.* 18: 189, figs. 1-5.
Nymphopsocus troglodyta Enderlein, 1909. *Arch. Zool. exp. gén.* 5 (1): 536; pl. 18, figs. 9-11, 13, 14.
Nymphopsocus troglodyta var. *algericus* Enderlein, 1909. *Arch. Zool. exp. gén.* 5 (1): 538.
Fita vestigator Navas, 1913. *Rev. Acad. Madr.* 12: 333, fig. 4.
Fabrella convexa Lacroix, 1915. *Bull. Soc. ent. Fr.* 1915: 194.
Psyllipsocus (*Nymphopsocus*) *troglodytes* Enderlein. Badonnel, 1935. *Bull. Soc. ent. Fr.* 40: 201.
Psyllipsocus ramburii brachypterus Badonnel, 1943. *Faun. Fr.* 42: 131.
Psyllipsocus ramburii destructor (Enderlein). Badonnel, 1943. *Faun. Fr.* 42: 132.
Psyllipsocus ramburii troglodytes (Enderlein). Badonnel, 1943. *Faun. Fr.* 42: 132.

sauteri (Enderlein). **(Parempheria).** Japan, Formosa.
Parempheria sauteri Enderlein, 1906. *Stettin. ent. Ztg.* 67: 307, fig. 1.
Psyllipsocus sauteri (Enderlein). Gurney, 1943. *Ann. ent. Soc. Amer.* 36: 203.
Psyllipsocus (*Parempheria*) *sauteri* (Enderlein). Thornton, 1962. *Pacific Ins.* 4: 449.

spinosus Badonnel. **(Psyllipsocus).** Angola.
Psyllipsocus spinosus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 35, figs. 27-31.

yucatan Gurney. **(Psyllipsocus).** Yucatan.
Psyllipsocus yucatan Gurney, 1943. *Ann. ent. Soc. Amer.* 36: 212, figs. 18, 19, 21, 29-31, 33, 34-37.

Genus **Speleketor** Gurney

Speleketor Gurney, 1943. *Ann. ent. Soc. Amer.* 36: 197.
Type species: *Speleketor flocki* Gurney.

flocki Gurney. Arizona (in caves).
Speleketor flocki Gurney, 1943. *Ann. ent. Soc. Amer.* 36: 197, figs. 1-12, 15, 24-28.

Family **PRIONOGLARIDAE**

Genus **Prionoglaris** Enderlein

Prionoglaris Enderlein, 1909. *Arch. Zool. exp. gén.* 1: 533.
Type species: *Prionoglaris stygia* Enderlein.
Scoliopsyllopsis Enderlein, 1912. *Zool. Anz.* 39: 304.
Type species: *Scoliopsyllopsis latreillei* Enderlein.

lindbergi Badonnel. Afghanistan.
Prionoglaris lindbergi Badonnel, 1962. *K. fysiogr. Sällsk. Lund. Förh.* 32: 2, figs. 1, 4, 5.
stygia Enderlein. France, Belgium, Balkans, Portugal.
Prionoglaris stygia Enderlein, 1909. *Arch. Zool. exp. gén.* 1: 534; pl. XVIII, figs. 1-8.
Scoliopsyllopsis latreillei Enderlein, 1912. *Zool. Anz.* 39: 304.

Suborder **TROCTOMORPHA**
Group **AMPHIENTOMETAE**
Family **AMPHIENTOMIDAE**
Subfamily **ELECTRENTOMINAE**
Genus **Electrentomum** Enderlein

Electrentomum Enderlein, 1911. *Palaeontographica* 58: 337.
Type species: *Electrentomum klebsianum* Enderlein.
klebsianum Enderlein. East Prussia (in amber).
Electrentomum klebsianum Enderlein, 1911. *Palaeontographica* 58: 328, figs. 70-76, 79.

Genus **Manicapsocus** Smithers

Manicapsocus Smithers, 1966. *J. ent. Soc. S. Afr.* 28: 46.
Type species: *Manicapsocus alettae* Smithers.
alettae Smithers. Rhodesia.
Manicapsocus alettae Smithers, 1966. *J. ent. Soc. S. Afr.* 28: 46, figs. 1-3, 5.

Genus **Parelectrentomum** Roesler

Parelectrentomum Roesler, 1940. *Zool. Anz.* 129: 228.
Type species: *Parelectrentomum priscum* Roesler.
priscum Roesler. East Prussia (in amber).
Parelectrentomum priscum Roesler, 1940. *Zool. Anz.* 129: 228, fig. 4.

Subfamily **COMPSOCINAE**
Genus **Compsocus** Banks

Compsocus Banks, 1930. *Psyche, Camb. Mass.* 37: 184.
Type species: *Compsocus elegans* Banks.
elegans Banks. Panama.
Compsocus elegans Banks, 1930. *Psyche, Camb. Mass.* 37: 184, fig. 4.

Subfamily **TINEOMORPHINAE**
Genus **Cymatopsocus** Enderlein

Cymatopsocus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 314.
Type species: *Cymatopsocus opalinus* Enderlein.
opalinus Enderlein. Malacca, Kuala Lumpur.
Cymatopsocus opalinus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 315; pl. IX, figs. 56a, b, d; pl. X, figs. 56e-g, k, l; pl. XI, fig. 56c; pl. XII, fig. 56h, i, m.

Genus **Tineomorpha** Enderlein

Tineomorpha Enderlein, 1906. *Spolia zeylan.* 4: 49.
Type species: *Tineomorpha greeniana* Enderlein.
angolana Badonnel. Angola.
Tineomorpha angolana Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 36, figs. 32-38.
greeniana Enderlein. Ceylon.
Tineomorpha greeniana Enderlein, 1906. *Spolia zeylan.* 4: 49, figs. 1, 25, 68, 94, 97, 100.
Tineomorpha greeniana var. *major* Enderlein, 1906. *Spolia zeylan.* 4: 51, fig. 26.
jacobsoniana Enderlein. Java.
Tineomorpha jacobsoniana Enderlein, 1926. *Zool. Meded.* 9: 63.

Subfamily **AMPHIENTOMINAE**

Genus **Amphientomum** Pictet

Amphientomum Pictet, 1854. *Traite de Palaeontologie* 2: 376.
Type species: *Amphientomum paradoxum* Pictet.
Amphicetomum Pictet. Hagen, 1859. *Verh. zool. -bot. Ges. Wien.* 9: 205. Mis-spelling.

Subgenera:
(Amphientomum) Pictet, 1854. *Traite de Palaeontologie* 2: 376.
Type species: *Amphientomum paradoxum* Pictet. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 138.
(Palaeoseopsis) Enderlein, 1925. *Konowia* 4: 106.
Type species: *Amphientomum colpolepis* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 138.

acuminatum Smithers. **(Palaeoseopsis).** Madagascar.
Amphientomum (Palaeoseopsis) acuminatum Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 217, figs. 9-13.

aelleni Badonnel. Congo.
Amphientomum aelleni Badonnel, 1959. *Rev. suisse zool.* 66: 58, figs. 1-6.

colpolepis Enderlein. **(Palaeoseopsis).** East Prussia (in amber).
Amphientomum paradoxum Hagen. Hagen, 1882. *Stettin. ent. Ztg.* 43: 268 (part).
Amphientomum colpolepis Enderlein, 1905. *Zool. Anz.* 29: 577, figs. 2, 3 (not 1, 2 as in publication).
Palaeoseopsis colpolepis (Enderlein). Enderlein, 1925. *Konowia* 4: 106.
Amphientomum (Palaeoseopsis) colpolepis Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 138.

flexuosum Badonnel. **(Palaeoseopsis).** Angola.
Amphientomum (Palaeoseopsis) flexuosum Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 38, figs. 39-45.

leptolepis Enderlein. **(Amphientomum).** East Prussia (in amber).
Amphientomum paradoxum Hagen. Hagen, 1882. *Stettin. ent. Ztg.* 43: 268 (part).
Amphientomum leptolepis Enderlein, 1905. *Zool. Anz.* 29: 580, fig. 6.

paradoxum Pictet. **(Amphientomum).** East Prussia (in amber).
Amphientomum paradoxum Pictet, 1854. *Traite de Palaeontologie* 2: 376, pl. 40, fig. 27.
Amphientomum paradoxum Pictet. Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* p. 61; pl. 7, fig. 2; pl. 8, fig. 10.
Amphientomum paradoxum Pictet. Hagen, 1882. *Stettin. ent. Ztg.* 43: 268; pl. I, fig. VI, 1-8.
Amphientomum (Amphientomum) paradoxum Pictet. Roesler, 1944. *Stettin. ent. Ztg.* 105: 138.

pauliani Smithers. **(Palaeoseopsis).** Madagascar.
Amphientomum (Palaeoseopsis) pauliani Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 219, figs. 14-17.

Genus **Hemiseopsis** Enderlein

Hemiseopsis Enderlein, 1906. *Spolia zeylan.* 4: 73.
Type species: *Amphientomum fulleborni* Enderlein.

fulleborni (Enderlein). East Africa, Congo.
Amphientomum fulleborni Enderlein, 1902. *Mitt. zool. Mus. Berl.* 2: 14, fig. 3; pl. 5, figs. 1, 4, 6, 8, 10, 11.
Hemiseopsis fulleborni (Enderlein). Enderlein, 1906. *Spolia zeylan.* 4: 73.

machadoi Badonnel. Angola.
Hemiseopsis machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 40, figs. 46-53.

Genus **Marcenendius** Navas

Marcenendius Navas, 1913. *Rev. Acad. Madr.* 12: 334.
Type species: *Marcenendius nostras* Navas.

illustris Navas. Spain.
Marcenendius illustris Navas, 1923. *Arx. Inst. Cienc. Barcelona* 8: 11, fig.

nostras Navas. Spain.
Marcenendius nostras Navas, 1913. *Rev. Acad. Madr.* 12: 334, fig. 5.

Genus **Nephax** Pearman

Nephax Pearman, 1935. *Stylops* 4: 134.
Type species: *Nephax sofadanus* Pearman.

angolensis Badonnel. Angola.
Nephax angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 49, figs. 80-87.

capensis Pearman. South Africa.
Nephax capensis Pearman, 1935. *Stylops* 4: 136, fig. B.

sofadanus Pearman. Palestine.
Nephax sofadanus Pearman, 1935. *Stylops* 4: 134, fig. A.

Genus **Paramphientomum** Enderlein

Paramphientomum Enderlein, 1906. *Spolia zeylan.* 4: 63.
Type species: *Paramphientomum nietneri* Enderlein.

Subgenera:

(Paramphientomum) Enderlein, 1906. *Spolia zeylan.* 4: 63.
Type species: *Paramphientomum nietneri* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

(Hormocoria) Enderlein, 1926. *Zool. Meded.* 9: 65.
Type species: *Hormocoria tristigata* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

nietneri Enderlein. **(Paramphientomum).** Ceylon, Java.
Paramphientomum nietneri Enderlein, 1906. *Spolia zeylan.* 4: 63, figs. 7, 27-29, 34, 56, 112.
Paramphientomum (Paramphientomum) nietneri Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

nigriceps Banks. **(Paramphientomum).** Formosa.
Paramphientomum nigriceps Banks, 1937. *Philipp. J. Sci.* 62: 276; pl. 3, fig. 26.

tristigata (Enderlein). **(Hormocoria).** Java.
Hormocoria tristigata Enderlein, 1926. *Zool. Meded.* 9: 65.
Paramphientomum (Hormocoria) tristigata (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

yumyum Enderlein. **(Paramphientomum).** Japan, Formosa.
Paramphientomum yumyum Enderlein, 1907. *Stettin. ent. Ztg.* 68: 102, figs. 1, 2.

Genus **Pseudoseopsis** Badonnel

Pseudoseopsis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 46.
Type species: *Pseudoseopsis vilhenai* Badonnel.

helmani Mockford and Gurney. Texas.
Pseudoseopsis helmani Mockford and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 358, figs. 15-18.

vilhenai Badonnel. Angola.
Pseudoseopsis vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 47, figs. 73-79.

Genus **Seopsis** Enderlein

Seopsis Enderlein, 1906. *Spolia zeylan* 4: 67.
Type species: *Seopsis vasantasena* Enderlein.

luzonica Banks. Philippines.
Seopsis luzonica Banks, 1937. *Philipp. J. Sci.* 63: 134; pl. 1, fig. 5.

metallops Enderlein. Ceylon.
Seopsis metallops Enderlein, 1906. *Spolia zeylan.* 4: 74, figs. 4, 33, 57, 92, 93, 121.
pavonius Badonnel. Angola.
Seopsis pavonius Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 41, figs. 54-62.
superba (Hagen). Ceylon.
Amphientomum superbum Hagen, 1865. *Ent. mon. Mag.* 2: 150.
Perientomum superbum (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 210
Seopsis superba (Hagen). Enderlein, 1906. *Spolia zeylan.* 4: 69.
termitophilus Badonnel. Angola.
Seopsis termitophilus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 44, figs. 63-69.
tricolor Banks. Philippines.
Seopsis tricolor Banks, 1937. *Philipp. J. Sci.* 63: 133; pl. 1, fig. 3.
vasantasena Enderlein. Ceylon.
Seopsis vasantasena Enderlein, 1906. *Spolia zeylan.* 4: 67, figs. 5, 30, 31, 35, 58, 103.
Seopsis (*Seopsis*) *vasantasena* Enderlein, Roesler, 1944. *Stettin. ent. Ztg.* 105: 138

Genus **Seopsocus** Roesler

Seopsocus Roesler, 1940. *Zool. Anz.* 129: 229.
Type species: *Seopsocus acuminatus* Roesler.
acuminatus Roesler. Brazil.
Seopsocus acuminatus Roesler, 1940. *Zool. Anz.* 129: 231, figs. 5, 7, 9, 11-13.
annulipes Badonnel. Argentina.
Seopsocus annulipes Badonnel, 1962. *Biol. l'Amerique australe* 1: 189, figs. 6-13.
rotundatus Roesler. Brazil.
Seopsocus rotundatus Roesler, 1940. *Zool. Anz.* 129: 233, figs. 6, 8, 10, 14.

Genus **Stigmatopathus** Enderlein

Stigmatopathus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 312.
Type species: *Stigmatopathus horvarthi* Enderlein.
horvarthi Enderlein. India, Malacca, Kuala Lumpur, Java.
Stigmatopathus horvarthi Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 313; pl. IX, figs. 57a, 57e; pl. X, fig. 57d; pl. XI, fig. 57b; pl. XII, fig. 57c.

Genus **Stimulopalpus** Enderlein

Stimulopalpus Enderlein, 1906. *Spolia zeylan.* 4: 65.
Type species: *Stimulopalpus japonicus* Enderlein.
africanus Enderlein. East Africa, Angola, Rhodesia, South Africa.
Stimulopalpus africanus Enderlein, 1907. *Schwed. Exp. Kilimandjaro* 15: 37, figs. A-F.
biocellatus Badonnel. Ivory Coast.
Stimulopalpus biocellatus Badonnel, 1949. *Rev. franc. Ent.* 16: 37, figs. 41-47.
japonicus Enderlein. Japan.
Stimulopalpus japonicus Enderlein, 1906. *Spolia zeylan.* 4: 65, figs. 127-130.
Seopsis (*Stimulopalpus*) *japonicus* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

Genus **Syllysis** Hagen

Syllysis Hagen, 1865. *Ent. mon. Mag.* 2: 151.
Type species: *Amphientomum caudatum* Hagen.
Subgenera:
(Syllysis) Hagen, 1865. *Ent. mon. Mag.* 2: 151.

Type species: *Amphientomum caudatum* Hagen. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

(Colposeopsis) Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 71.
Type species: *Colposeopsis sinipennis* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

caudata (Hagen). **(Syllysis).** Ceylon.
Amphientomum caudatum Hagen, 1865. *Ent. mon. Mag.* 2: 150.
Syllysis caudata (Hagen). Hagen, 1865. *Ent. mon. Mag.* 2: 151.
Syllysis (Syllysis) caudata (Hagen). Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

erato Enderlein. **(Syllysis).** Ceylon.
Syllysis erato Enderlein, 1906. *Spolia zeylan.* 4: 53, figs. 2, 37, 38, 42, 43, 55, 95, 102.

samarangana Enderlein. **(Syllysis).** Java.
Syllysis samarangana Enderlein, 1926. *Zool. Meded.* 9: 64.

sinipennis (Enderlein). **(Colposeopsis).** Paraguay.
Colposeopsis sinipennis Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 72, figs. 2-7.
Syllysis (Colposeopsis) sinipennis (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 139.

ritusamhara Enderlein. **(Syllysis).** Ceylon.
Syllysis ritusamhara Enderlein, 1906. *Spolia zeylan.* 4: 57, figs. 3, 39, 40, 54, 96, 111.

Family **PLAUMANNIDAE**

Genus **Plaumannia** Roesler

Plaumannia Roesler, 1940. *Zool. Anz.* 129: 236.
Type species: *Plaumannia separata* Roesler.

separata Roesler. Brazil.
Plaumannia separata Roesler, 1940. *Zool. Anz.* 129: 237, figs. 15-20.

Group **NANOPSOCETAE**

Family **LIPOSCELIDAE**

Subfamily **EMBIDOPSOCINAE**

Genus **Belapha** Enderlein

Belapha Enderlein, 1917. *Zool. Anz.* 49: 254.
Type species: *Belapha schoutedeni* Enderlein.
Semnopsocus Laing, 1925. *Entomologist* 58: 289.
Type species: *Semnopsocus globifer* Laing.

globifer (Laing). British Guiana.
Semnopsocus globifer Laing, 1925. *Entomologist* 58: 289, figs. A-L.
Belapha globifer (Laing). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 92.

schoutedeni Enderlein. Congo, Angola.
Belapha schoutedeni Enderlein, 1917. *Zool. Anz.* 49: 254, figs. 1-3.

Genus **Belaphopsocus** Badonnel

Belaphopsocus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 96.
Type species: *Belaphopsocus vilhenai* Badonnel.

vilhenai Badonnel. Angola.
Belaphopsocus vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 96, figs. 191-199, III D, III E.

Genus **Belaphotroctes** Roesler

Eutroctes Ribaga, 1911. *Redia* 7: 165.
Type species: *Eutroctes trägardhi* Ribaga.
Belaphotroctes Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.
Type species: *Eutroctes trägardhi* Ribaga. (*Eutroctes* preocc.).

angolensis Badonnel. Angola.
Belaphotroctes angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 90, figs. 182-186.

ghesquierei Badonnel. Congo.
Belaphotroctes ghesquierei Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 20, figs. 25-30.
hermosus Mockford. Texas, New Mexico.
Belaphotroctes hermosus Mockford, 1963. *Ann. ent. Soc. Amer.* 56: 27, figs. 4, 5, 10, 14a-c, 15, 17, 18, 23, 44, 49, 50, 54, 63, 64.
okalensis Mockford. Florida.
Belaphotroctes okalensis Mockford, 1963. *Ann. ent. Soc. Amer.* 56: 31, figs. 9, 11-13, 16a, b-h, 19-22, 24, 28a-b, 42, 53, 55, 65.
tragardhi (Ribaga). South Africa.
Eutroctes trägardhi Ribaga, 1911. *Redia* 7: 166, figs. 7-9.
Belophotroctes trägardhi (Ribaga). Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.

Genus **Embidopsocus** Hagen

Embidopsocus Hagen, 1866. *Ent. mon. Mag.* 2: 170.
Type species: *Embidopsocus luteus* Hagen.
Tropusia Hagen, 1883. *Stettin. ent. Ztg.* 44: 296.
Type species: *Atropos oleagina* Hagen.
Stenotroctes Enderlein, 1905. *Res. Swed. zool. Exp. Egypt* 18: 43.
Type species: *Troctes needhami* Enderlein.
Embidotroctes Enderlein, 1905. *Res. Swed. zool. Exp. Egypt* 18: 48.
Type species: *Embidotroctes paradoxus* Enderlein.
Trigonosceliscus Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 75.
Type species: *Trigonosceliscus leucomelas* Enderlein.
ambiguus Badonnel. Angola.
Embidopsocus ambiguus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 86, figs. 162-165, 173, 180.
angolensis Badonnel. Angola.
Embidopsocus angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 72, figs. 128-135, 139-141.
antennalis Badonnel. Congo.
Embidopsocus antennalis Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 16, figs. 19-24.
citrensis Mockford. North America.
Embidopsocus citrensis Mockford, 1963. *Ann. ent. Soc. Amer.* 56: 35, figs. 3, 8, 31, 32, 35, 52, 56, 57, 67.
congolensis Badonnel. Congo, Ivory Coast, Angola.
Embidopsocus congolensis Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 273, figs. 18-24.
distinctus Badonnel. Angola.
Embidopsocus distinctus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 81, figs. 147, 150-152.
echinus Badonnel. Angola.
Embidopsocus echinus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 77, figs. 136-138, 142.
enderleini (Ribaga). Italy, England, Switzerland, Argentina, South Africa.
Stenotroctes enderleini Ribaga, 1905. *Redia* 2: 106, pl. 10, figs. 12, 14, 15.
Embidotroctes rectivenis Pearman, 1925. *Ent. mon. Mag.* 61: 127, fig. 2.
Embidopsocus enderleini (Ribaga). Pearman, 1935. *Ent. mon. Mag.* 71: 83.
femoralis (Badonnel). Mozambique, Angola.
Stenotroctes femoralis Badonnel, 1931. *Ann. Sci. nat. Zool. ser. 10,* 14: 252, figs. 26-29.
Embidopsocus femoralis (Badonnel). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 88, figs. 167-168, 174-179, 181.
flexuosus Badonnel. Argentina.
Embidopsocus flexuosus Badonnel, 1962. *Biol. l'Amerique australe* 1: 215, figs. 74-77.

granulosus Badonnel. Congo.
Embidopsocus granulosus Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 13, figs. 14-18.
laticeps Mockford. North America.
Embidopsocus laticeps Mockford, 1963. *Ann. ent. Soc. Amer.* 56: 33, figs. 2, 7, 25a-b, 26, 27a-b, 29, 30, 33, 34, 45, 46, 51, 59, 66, 68.
leucomelas (Enderlein). Paraguay, Argentina.
Trigonosceliscus leucomelas Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 76, figs. 9, 10.
Embidopsocus leucomelas (Enderlein). Badonnel, 1962. *Biol. l'Amerique australe* 1: 210, figs. 63-73.
luteus Hagen. Cuba, Porto Rica.
Embidopsocus luteus Hagen, 1866. *Ent. mon. mag.* 2: 171.
machadoi Badonnel. Angola.
Embidopsocus machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 79, figs. 143-146, 148, 149.
needhami (Enderlein). North America.
Troctes needhami Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 360, figs. 16, 22, 23.
Stenotroctes needhami (Enderlein). Enderlein, 1905. *Res. Swed. Zool. Exp. Egypt* 18: 44.
Embidopsocus needhami (Enderlein). Mockford, 1963. *Ann. ent. Soc. Amer.* 56: 36, figs. 1, 6, 37-41, 47, 48, 58a, 58b, 60-62.
oleagina (Hagen). Ceylon, England, Germany.
Atropos oleagina Hagen, 1865. *Ent. mon. Mag.* 2: 121.
Tropusia oleagina (Hagen). Hagen, 1882. *Stettin. ent. Ztg.* 43: 526; pl. II, fig. VIII.
?*Stenotroctes minor* Pearman, 1931. *Ent. mon. Mag.* 67: 95, fig. 1.
?*Embidopsocus minor* (Pearman). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 70 (in key).
Embidopsocus oleagina (Hagen). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 70 (in key).
pallidus Badonnel. Angola.
Embidopsocus pallidus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 84, figs. 153-156.
paradoxus (Enderlein). Cameroons, Ivory Coast.
Embidotroctes paradoxus Enderlein, 1905. *Res. Swed. zool. Exp. Egypt* 18: 50, fig. 10; pl. 4, figs. 44-48.
Embidopsocus paradoxus (Enderlein). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 78.
pauliani Badonnel. Ivory Coast, Angola.
?*Embidopsocus paradoxus* Enderlein. Badonnel, 1949. *Rev. franc. Ent.* 16: 30, figs. 24-27.
Embidopsocus pauliani Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 78, figs. 169, 170.
trichurensis Menon. India.
Embidopsocus trichurensis Menon, 1942. *Indian J. Ent.* 4: 27, figs. 5-10.
vilhenai Badonnel. Angola.
Embidopsocus vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 82, figs. 157-162, 171, 172.
virgatus (Enderlein). ?Argentina, Paraguay.
Stenotroctes virgatus Enderlein, 1905. *Res. Swed. zool. Exp. Egypt* 18: 44, figs. 29, 31, 33.
Embidopsocus virgatus (Enderlein). Badonnel, 1962. *Biol. l'Amerique australe* 1: 206, figs. 52-55, 57, 58.

Genus **Troctulus** Badonnel

Troctulus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 94.
Type species: *Troctulus machadoi* Badonnel.
machadoi Badonnel. Angola.
Troctulus machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 94, figs. 187-190; III, C.

Subfamily **LIPOSCELINAE**

Genus **Liposcelis** Motschulsky

Termes Műller, 1776. *Zoologiae Danicae prodromus* p. 184.
Type species: *Termes fatale* Linnaeus.
(Not *Termes* Linnaeus, 1758. *Syst. Nat.* p. 609).
Trogium auct.
(Not *Trogium* Illiger, 1798. *Kugelann Verzeichniss der Kafer Preussens* etc. p. 500. Type species: *Hemerobius pulsatorium* Linnaeus).
Atropos auct.
(Not *Atropos* Leach, 1815. *Edinburgh Encyclopaedia* 9: 139.
Type species: *Termes lignarium* De Geer).
Troctes auct.
(Not *Troctes* Burmeister, 1839. *Handbuch der Entomologie* p. 774.
Type species: *Termes pulsatorium* Linnaeus).
Liposcelis Motschulsky, 1852. *Etudes entomologiques* 1: 19.
Type species: *Liposcelis brunneus* Motschulsky.
Note: Whether this genus should be referred to as *Liposcelis* Motschulsky or *Troctes* Burmeister has been discussed in the following papers to which reference should be made:
Enderlein, G. 1911. *Palaeontographica* 58: 353.
Gurney, A. B. 1939. *J. Wash. Acad. Sci.* 29: 510, 513.
Pearman, J. V. 1951. *Ent. mon. Mag.* 87: 84.
Broadhead, E. 1952. *Ent. mon. Mag.* 88: 83.
Pearman, J. V. 1952. *Ent. mon. Mag.* 88: 150.

abdominalis Badonnel. Argentina.
Liposcelis abdominalis Badonenl, 1962. *Biol. l'Amerique australe* 1: 193, figs. 19-23, 37.

albothoracicus Broadhead. England (in Turkish millet).
Liposcelis albothoracicus Broadhead, 1955. *Proc. R. ent. Soc. Lond.* (*B*) 24: 7, figs. 1-3.

angolensis Badonnel. Angola.
Liposcelis angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 53, figs. 88-92; I, A-C.
Liposcelis angolensis subsp. **areolatus** Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 57; I, D.

annulatus Badonnel. Angola.
Liposcelis annulatus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 67, figs. 101, 105, 113, 119, 127.

anomalus Badonnel. Angola.
Liposcelis anomalus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 64, figs. 99, 104, 111, 118, 125.

atavus Enderlein. East Prussia (in amber).
Atropos succinica Hagen, 1883. *Stettin. ent. Ztg.* 44: 296 (part).
Liposcelis atavus (Hagen). Enderlein, 1911. *Palaeontographica* 58: 354, fig. 103.

bicolor (Banks). Europe, North America.
Troctes bicolor Banks, 1900. *Ent. News* 11: 559.
Troctes bicolor Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 361, figs. 17, 20.
Liposcelis bicolor (Banks). Roesler, 1939. *Zool. Anz.* 125: 138.

bicoloripes Badonnel. Angola.
Liposcelis bicoloripes Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 63, figs. 110, 117, 124.

bostrychophilus Badonnel. Cosmopolitan.
Liposcelis bostrychophilus Badonnel, 1931. *Ann. Sci. nat. Zool. ser. 10* 14: 250, figs. 22, 23.
Liposcelis divergens Badonnel, 1943. *Faune de France* 42: 139, figs. 351, 354, 356.
Liposcelis granicola Broadhead and Hobby, 1944. *Ent. mon. Mag.* 80: 47, figs. 1-14 .
Liposcelis bostrychophilus **granulosus** Badonnel, 1962. *Biol. l'Amerique australe* 1: 205, figs. 47-51.

brunneus Motschulsky. Valaam (Finland).
Liposcelis brunneus Motschulsky, 1852. *Etudes entomologiques* 1: 19.

castrii Badonnel. Chile.
Liposcelis castrii Badonnel, 1963. *Biol. l'Amerique australe* 2: 310, figs. 38-43.

chilensis Badonnel. Chile.
Liposcelis chilensis Badonnel, 1963. *Biol. l'Amerique australe* 2: 312, figs. 44-49, 56-57.

delamarei Badonnel. Argentina.
Liposcelis delamarei Badonnel, 1962. *Biol. l'Amerique australe* 1: 197, figs. 28-31.

deltachi Sommerman. Texas.
Liposcelis deltachi Sommerman, 1957. *Proc. ent. Soc. Wash.* 59: 127, figs. 3-5.

deserticus Badonnel. Angola.
Liposcelis deserticus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 66, figs. 100, 112, 126.

discalis Badonnel. Argentina.
Liposcelis discalis Badonnel, 1962. *Biol. l'Amerique australe* 1: 202, figs. 41-42.

distinctus Badonnel. Angola.
Liposcelis distinctus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 57, figs. 93, 94, 106, 120; 1E-1G.

divinatorius (Műller). Widespread.
Termes pulsatorium Linnaeus, 1775. *Systema naturae* (Ed. P.L.S. Műller) p. 1024; pl. 29, fig. 5.
Termes divinatorium Műller, 1776. *Zoologiae Danicae prodromus* etc. p. 184.
Termes lignarium de Geer, 1778. *Memoires pour servir á l'histoire des Insectes* 7: 41; pl. 4, fig. 2. (not figs. 1, 3, 4) (part.).
Atropos pulsatorius (L.) Stephens, 1829. *Systematic Catalogue of British Insects* etc. p. 313.
Troctes fatidicus Burmeister, 1839. *Handbuch der Entomologie* 2: 774.
Atropos fatidicus (L.) Walker, 1853. *Cat. Neur. Brit. Mus.* p. 500.
Atropos divinatorius (Műller). Hagen, 1861. *Smithson. misc. Coll.* 4: 8.
Troctes divinatorius (Műller). Kolbe, 1880. *Jber westf. ProvVer. Wiss. Kunst* 8: 133, fig. 21.
Troctes corrodens Heymons, 1909. *Dtsch. ent. Z.* 1909: 452, 3 figs.
Liposcelis divinatorius (Műller). Enderlein, 1911. *Palaeontographica* 58: 353.

entomophilus (Enderlein). Europe, East Africa, Central Africa, Portuguese Guinea, Japan, Chile, New Hebrides, Australia.
Troctes entomophilus Enderlein, 1907. *Stettin. ent. Ztg.* 68: 34, 1 fig.
Liposcelis bakeri Pearman, 1928. *Ent. mon. Mag.* 64: 133, figs. 1, 2.
Liposcelis virgulatus Pearman, 1929. *Ent. mon. Mag.* 65: 106, figs. 2a, 2b.
Liposcelis entomophilus (Enderlein). Broadhead, 1947. *Proc. R. ent. Soc. Lond. (B)* 16: 109, 1 fig.

exiguus Badonnel. Mozambique.
Liposcelis exiguus Badonnel, 1931. *Ann. Sci. nat. Zool. ser. 10,* 14: 251, figs. 24, 25.

fasciatus (Enderlein). Formosa.
Troctes fasciatus Enderlein, 1908. *Zool. Anz.* 33: 778, fig. 3.
Liposcelis fasciatus (Enderlein). Broadhead, 1950. *Trans. R. ent. Soc. Lond.* 101: 381.

formicarius (Hagen). Europe.
Atropos formicaria Hagen, 1865. *Ent. mon. Mag.* 2: 121.
Troctes formicarius (Hagen). Rostock, 1878. *Jber. Ver. Naturk. Zwickau* 1877-1878: 93.

(Not *Liposcelis formicarius* (Hagen). Kimmins, 1941. *J. Soc. Brit.. Ent.* 2: 95).
Liposcelis formicarius (Hagen). Broadhead, 1947. *Proc. R. ent. Soc. Lond.* (*B*) 16: 36.

gallicus (Pearman). Scilly Islands, France.
Troctes gallicus Pearman, 1951. *Ent. mon. Mag.* 87: 87, fig. 3.
! *Liposcelis meridionalis* Rosen. Kimmins, 1941. *J. Soc. Brit. Ent.* 2: 95.

hirsutus Badonnel. Congo.
Liposcelis hirsutus Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 270, figs. 7-17.

kidderi (Hagen). England, France, Kerguelen, Japan.
Atropos divinatoria var. *kidderi* Hagen, 1883. *Stettin. ent. Ztg.* 44: 293.
Liposcelis simulans Race A Broadhead, 1950. *Trans. R. ent. Soc. Lond.* 101: 353, figs. 6, 13; pl. 1, fig. 2.
Troctes kidderi (Hagen). Pearman, 1951. *Ent mon Mag.* 87: 85.

lacinia Sommerman. Texas.
Liposcelis lacinia Sommerman, 1957. *Proc. ent. Soc. Wash.* 59: 125, figs. 1, 2.

liparoides Badonnel. Argentine, Chile.
Liposcelis liparoides Badonnel, 1962. *Biol. l'Amerique australe* 1: 191, figs. 14-18.

liparus Broadhead. England.
Liposcelis liparus Broadhead, 1947. *Trans. R. ent. Soc. Lond.* 98: 42, figs. 1, 4-9; pl. 1, figs. 1-4.

mendax Pearman. England, France, Italy.
Liposcelis mendax Pearman, 1946. *Entomologist* 79: 243, figs. 11-18.

meridionalis (Rosen). Europe.
Troctes meridionalis Rosen, 1911. *Munchen Mitt. ent. Ges.* 1911: 9, figs. 2-6.
(Not *Liposcelis meridionalis* Rosen. Kimmins, 1941. *J. Soc. Brit. Ent.* 2: 95).
Liposcelis meridonalis (Rosen). Enderlein, 1927. *Die Tierwelt Mitteleuropas* 4, 2 (7): 12, fig. 27.

myrmecophilus Broadhead. England.
! *Liposcelis formicarius* (Hagen). Kimmins, 1941. *J. Soc. Brit. Ent.* 2: 95.
Liposcelis myrmecophilus Broadhead, 1950. *Trans. R. ent. Soc. Lond.* 101: 363, fig. 18; pl. II, figs. 9, 10.

nasus Sommerman. Texas.
Liposcelis nasus Sommerman, 1957. *Proc. ent. Soc. Wash.* 59: 128, figs. 6, 7.

niger (Banks). North America.
Troctes niger Banks, 1900. *Ent. News* 11: 560.
Liposcelis niger (Banks). Mockford, 1950. *Proc. Ind. Acad. Sci.* 60: 194.

nigrocinctus Badonnel. Argentine.
Liposcelis nigrocinctus Badonnel, 1962. *Biol. l'Amerique australe* 1: 195, figs. 24-27, 38, 39.

nigrofasciatus Badonnel. Chile.
Liposcelis nigrofasciatus Badonnel, 1963. *Biol. l'Amerique australe* 2: 307, figs. 30-37.

obscurus Broadhead. England.
Liposcelis obscurus Broadhead, 1954. *Ent. mon. Mag.* 90: 10.

paetulus Broadhead. England.
Liposcelis paetulus Broadhead, 1950. *Trans. R. ent. Soc. Lond.* 101: 378, fig. 28; pl. III, fig. 19.

paetus Pearman. India, England, Rhodesia.
Liposcelis paetus Pearman, 1942. *Ent. mon. Mag.* 78: 289, figs. 1, 2.

palatinus Roesler. Germany.
Liposcelis palatinus Roesler, 1954. *Beit. Ent.* 4: 559.

parvulus Badonnel. Chile.
Liposcelis parvulus Badonnel, 1963. *Biol. l'Amerique australe* 2: 316, figs. 50-55.

perforatus Badonnel. Angola.
Liposcelis perforatus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 59, figs. 97, 102, 108, 115, 122; II, A.

pictus Ball. Cyprus, Lebanon, Morocco.
Liposcelis pictus Ball, 1940. *Bull. Mus. Hist. nat. Belg.* 16: 1, 2 figs.

prenolepidis (Enderlein). California.
Troctes prenolepidis Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 328, fig. 4.
Liposcelis prenolepidis (Enderlein). Broadhead, 1950. *Trans. R. ent. Soc. Lond.* 101: 381.

priesneri Enderlein. Albania.
Liposcelis priesneri Enderlein, 1925. *Konowia* 4: 107.

puber Badonnel. Angola.
Liposcelis puber Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 58, figs. 95, 96, 107, 114, 121; I, H, J.

pubescens Broadhead. England, Argentine, Tristan da Cunha.
Liposcelis pubescens Broadhead, 1947. *Trans. R. ent. Soc. Lond.* 98: 46, fig. 5; pl. I, fig. 6.

purpureus (Aaron). North America.
Atropos purpurea Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 37; pl. 9, fig. 1.
Troctes purpurea (Aaron). Banks, 1900. *Ent. News* 11: 559.

resinatus (Hagen). Zanzibar (in copal).
Atropos resinata Hagen, 1866. *Ent. mon. Mag.* 2: 121.
Troctes resinatus (Hagen). Enderlein, 1905. *Res. Swed. zool. Exp. Egypt* 18: 43.
Liposcelis resinatus (Hagen). Enderlein, 1911. *Palaeontographica* 58: 355.

reticulatus Badonnel. Argentine.
Liposcelis reticulatus Badonnel, 1962. *Biol. l'Amerique australe* 1: 199, figs. 32-36, 40.

rufus Broadhead. England, Chile.
Liposcelis rufus Broadhead, 1950. *Trans. R. ent. Soc. Lond.* 101: 366, fig. 21; pl. II, figs. 11, 12.

rugosus Badonnel. Morocco.
Liposcelis rugosus Badonnel, 1945. *Rev. franc. Ent.* 12: 34, figs. 1-4.

setosus Badonnel. Chile.
Liposcelis setosus Badonnel, 1963. *Biol. l'Amerique australe* 2: 305, figs. 25-29.

silvarum (Kolbe). Europe.
Troctes silvarum Kolbe, 1888. *Ent. Nachr.* 14: 234.
Liposcelis silvarum (Kolbe). Enderlein, 1927. *Die Tierwelt Mitteleuropas* 4, 2, (7): 12.

simulans Broadhead. England.
Liposcelis simulans Race B Broadhead, 1950. *Trans. R. ent. Soc. Lond.* 101: 356; pl. 1, fig. 3.

subfuscus Broadhead. England, Japan, Chile.
Liposcelis subfuscus Broadhead, 1947. *Trans. R. ent. Soc. Lond.* 98: 48, fig. 5; pl. 1, fig. 7.

terricolis Badonnel. Morocco, Angola, Europe, Argentine, Chile.
Troctes bicolor Banks var. *decolor* Pearman, 1925. *Ent. mon. Mag.* 61: 126.
Liposcelis terricolis Badonnel, 1945. *Rev. franc. Ent.* 12: 35, figs. 5-8.
! *Liposcelis divinatorius* (Műller). Pearman, 1946. *Entomologist* 79: 238, figs. 1-10.
Liposcelis luridus Broadhead, 1947. *Trans. R. ent. Soc. Lond.* 98: 45, figs. 45, 46; pl. 1, figs. 2, 5.

Note: The synonymy of *Troctes bicolor* Banks var. *decolor* Pearman and *Liposcelis terricolis* is not agreed upon by all authorities; the name *decolor* has priority over *terricolis* in the event of synomymy being established. (Cf. Badonnel, 1963. *Biol. l'Amerique australe* 2: 315).

transvaalensis (Enderlein). South Africa, India.
Troctes transvaalensis Enderlein, 1909. *Stettin. ent. Ztg.* 70: 272, fig. 3.
Liposcelis transvaalensis (Enderlein). Menon, 1942. *Indian J. Ent.* 4: 5, figs. 1-4.

varians Badonnel. Angola.
Liposcelis varians Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 61, figs. 98, 103, 109, 116, 123; II, B, C, D.

Family **PACHYTROCTIDAE**

Subfamily **TAPINELLINAE**

Genus **Psylloneura** Enderlein

Psylloneura Enderlein, 1903. *Ann. hist.-nat. Mus. hung.* 1: 317.
Type species: *Psylloneura simbangana* Enderlein.
Note: This genus may be synonymous with *Pachytroctes* Enderlein (cf. Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 99).

aliena Banks. Cuba.
Psylloneura aliena Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 393, figs. 17, 22.

perantiqua Cockerell. Burma (in amber).
Psylloneura ? perantiqua Cockerell, 1919. *Entomologist* 52: 241, fig. 2.

simbangana Enderlein. New Guinea, Guam.
Psylloneura simbangana Enderlein, 1903. *Ann. hist.-nat. Mus. hung.* 1: 318; pl. IX, fig. 58a; pl. X, fig. 58b; pl. XI, fig. 58c.

ugandana Karny. Uganda.
Psylloneura ugandana Karny, 1924. *Ann. Mag. nat. Hist.* (9) 14: 245, figs. a-d.

Genus **Tapinella** Enderlein

Tapinella Enderlein, 1908. *Zool. Anz.* 33: 772.
Type species: *Tapinella formosana Enderlein.*
Nanopsocus Pearman, 1928. *Ent. mon. Mag.* 64: 134.
Type species: *Nanopsocus oceanicus* Pearman.

africana Badonnel. Congo, Japan.
Tapinella africana Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 276, fig. 25.

bilineata (Smithers). Nigeria.
Pachytroctes bilineata Smithers, 1958. *Ent. mon. Mag.* 94: 55, figs. 1, 3, 4.
Tapinella bilineata (Smithers). Smithers, 1959. *Ent. mon. Mag.* 94: 274.

castanea Pearman. England.
Tapinella castanea Pearman, 1932. *Stylops* 1: 240, fig. 1.

curvata Badonnel. Congo, Angola.
Tapinella africana curvata Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 28, figs. 34, 35, 37, 38.
Tapinella curvata Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 108, figs. 214-216, 220-222; III G.

formosana Enderlein. Formosa, India.
Tapinella formosana Enderlein, 1908. *Zool. Anz.* 33: 774, fig. 1.

maculata Mockford and Gurney. Texas.
Tapinella maculata Mockford and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 360, figs. 19-24.

oceanica (Pearman). New Hebrides.
Nanopsocus oceanicus Pearman, 1928. *Ent. mon. Mag.* 64: 134.

pallida Badonnel. Ivory Coast.
Tapinella pallida Badonnel, 1949. *Rev. franc. Ent.* 16: 36, figs. 30, 35.

squamosa Badonnel. Angola.
Tapinella squamosum Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 111, figs. 223, 224, 217; III H.

williamsi (Banks). Hawaii.
Psylloneura williamsi Banks, 1931. *Proc. Hawaii. Ent. Soc.* 7: 439; pl. VII, figs. 8, 9; pl. VIII, fig. 6; pl. IX, fig. 7.
Tapinella williamsi (Banks). Menon, 1942. *Indian J. Ent.* 4: 9.

Subfamily **PACHYTROCTINAE**

Genus **Antilopsocus** Gurney

Antilopsocus Gurney, 1965. *Ent. News* 76: 1.
Type species: *Antilopsocus nadleri* Gurney.

nadleri Gurney. Brazil, Trinidad.
Antilopsocus nadleri Gurney, 1965. *Ent. News* 76: 4, 21 figs.

Genus **Pachytroctes** Enderlein

Pachytroctes Enderlein, 1905. *Res. Swed. Exp. Egypt* 18: 46.
Type species: *Pachytroctes aegyptius* Enderlein.
Psyllotroctes Roesler, 1940. *Zool. Anz.* 129: 226.
Type species: *Psyllotroctes plaumanni* Roesler.

Subgenera:

(Pachytroctes) Enderlein, 1905. *Res. Swed. Exp. Egypt* 18: 46.
Type species: *Pachytroctes aegyptius* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 136.

(Psacadium) Enderlein, 1908. *Zool. Anz.* 33: 777.
Type species: *Psacadium bilimbatum* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 136.

(Peritroctes) Ribaga, 1911. *Redia* 7: 162.
Type species: *Peritroctes natalensis* Ribaga. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 136.

(Nymphotroctes) Badonnel, 1931. *Bull. Soc. zool. Fr.* 56: 342.
Type species: *Nymphotroctes denisi* Badonnel. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 135.

(Neotroctes) Roesler, 1944. *Stettin. ent. Ztg.* 105: 136.
Type species: *Pachytroctes brasilianus* Roesler.

aegyptius Enderlein. **(Pachytroctes).** Egypt.
Pachytroctes aegyptius Enderlein, 1905. *Res. Swed. Exp. Egypt* 18: 46, figs. 9, 37-43.
Pachytroctes (*Pachytroctes*) *aegyptius* Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 136.

aglyphus Badonnel. **(Pachytroctes).** Angola.
Pachytroctes aglyphus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 107.

ambiguus Badonnel. **(Pachytroctes).** Angola.
Pachytroctes ambiguus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 105; fig. IV F.

angolensis (Badonnel). **(Peritroctes).** Angola.
Peritroctes angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 113, figs. 218, 219, 225-227; III J.

aurantiacus Badonnel. **(Pachytroctes).** Ivory Coast.
Pachytroctes aurantiacus Badonnel, 1949. *Rev. franc. Ent.* 16: 35, figs. 34, 38, 40.

australis Ribaga. **(Pachytroctes).** South Africa.
Pachytroctes australis Ribaga, 1911. *Redia* 7: 159, figs. 2, 3.

bicoloripes Badonnel. **(Pachytroctes).** Ivory Coast.
Pachytroctes bicoloripes Badonnel, 1949. *Rev. franc. Ent.* 16: 33, figs. 29, 37.

bilimbatus (Enderlein). **(Psacadium).** Formosa.
Psacadium bilimbatum Enderlein, 1908. *Zool. Anz.* 33: 777.
Pachytroctes (*Psacadium*) *bilimbatum* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 136.

brasilianus Roesler. **(Neotroctes).** Brazil.
Pachytroctes brasilianus Roesler, 1940. *Zool. Anz.* 129: 228.
Psyllotroctes plaumanni Roesler, 1940. *Zool. Anz.* 129: 227, figs. 2, 3.
Pachytroctes (*Neotroctes*) *brasilianus* Roesler. Roesler, 1944. *Stettin. ent. Ztg.* 105: 136.

brunneus Ribaga. **(Pachytroctes).** South Africa.
Pachytroctes brunneus Ribaga, 1911. *Redia* 7: 161, fig. 4.

cochinensis (Menon). **(Peritroctes).** India.
Peritroctes cochinensis Menon, 1938. *Proc. Ind. Acad. Sci.* (*B*) 8: 283, fig. B; fig. 2, A-E.

denisi (Badonnel). **(Nymphotroctes).** France.
Nymphotroctes denisi Badonnel, 1931. *Bull. Soc. zool. Fr.* 56: 344, figs. 1-5.
Pachytroctes (*Nymphotroctes*) *denisi* (Badonnel). Roesler, 1944. *Stettin. ent. Ztg.* 105: 135.

dichromoscelis Badonnel. **(Pachytroctes).** Ivory Coast.
Pachytroctes dichromoscelis Badonnel, 1949. *Rev. franc. Ent.* 16: 32, figs. 28, 32, 36, 39.

dundoensis Badonnel. **(Pachytroctes).** Angola.
Pachytroctes dundoensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 99, figs. 200, 203, 204; IV A, B.

ealensis Badonnel. **(Pachytroctes).** Congo, Angola.
Pachytroctes ealensis Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 23, figs. 31-33.

enigmaticus Badonnel. **(Pachytroctes).** Angola.
Pachytroctes enigmaticus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 104, figs. 209-211; IV G.

georgi (Menon). **(Psacadium).** India.
Psacadium georgi Menon, 1938. *Proc. Ind. Acad. Sci.* (*B*) 8: 250, figs. A; 1, A-E.

granulosus Badonnel. **(Pachytroctes).** Angola.
Pachytroctes granulosus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 100, figs. 205, 206; IV C.

natalensis (Ribaga). **(Peritroctes).** South Africa.
Peritroctes natalensis Ribaga, 1911. *Redia* 7: 163, figs. 5, 6.
Pachytroctes (*Peritroctes*) *natalensis* (Ribaga). Roesler, 1944. *Stettin. ent. Ztg.* 105: 136.

nivecinctus Badonnel. **(Pachytroctes).** Angola.
Pachytroctes nivecinctus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 102, figs. 201, 207, 208; IV D, E.

tapinelloides Badonnel. **(Pachytroctes).** Angola.
Pachytroctes tapinelloides Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 106, figs. 212, 213; IV H.

Family **SPHAEROPSOCIDAE**

Genus **Badonnelia** Pearman

Badonnelia Pearman, 1953. *Ent. mon. Mag.* 89: 262.
Type species: *Badonnelia titei* Pearman.

castrii Badonnel. Chile.
Badonnelia castrii Badonnel, 1963. *Biol. l'Amerique australe* 2: 327, figs. 72-74.

similis Badonnel. Chile.
Badonnelia similis Badonnel, 1963. *Biol. l'Amerique australe* 2: 329, figs. 60-63, 75.

titei Pearman. England, France.
Badonnelia titei Pearman, 1953. *Ent. mon. Mag.* 89: 262.

Genus **Sphaeropsocopsis** Badonnel

Sphaeropsocopsis Badonnel, 1963. *Biol. l'Amerique australe* 2: 322.
Type species: *Sphaeropsocopsis chilensis* Badonnel.

argentinus (Badonnel). Argentine.
Sphaeropsocus argentinus Badonnel, 1962. *Biol. l'Amerique australe* 1: 218, figs. 78-88.
Sphaeropsocopsis argentinus (Badonnel). Badonnel, 1963. *Biol. l'Amerique australe* 2: 323 (in key).

chilensis Badonnel. Chile.
Sphaeropsocopsis chilensis Badonnel, 1963. *Biol. l'Amerique australe* 2: 323, figs. 58-62, 65, 67, 69, 71.

microps Badonnel. Chile.
Sphaeropsocopsis microps Badonnel, 1963. *Biol. l'Amerique australe* 2: 326, figs. 66, 68, 70.

recens (Hickman). Tasmania.
Sphaeropsocus recens Hickman, 1934. *Pap. roy. Soc. Tasm.* 1933: 83, figs. 4A-4F.
Sphaeropsocopsis recens (Hickman). Badonnel, 1963. *Biol. l'Amerique australe* 2: 323 (in key).

Genus **Sphaeropsocus** Hagen

Sphaeropsocus Hagen, 1882. *Stettin. ent. Ztg.* 43: 225.
Type species: *Sphaeropsocus kunowii* Hagen.
Palaeotroctes Enderlein, 1911. *Palaeontographica* 58: 350.
Type species: *Atropos succinica* Hagen.

kunowii Hagen. East Prussia (in amber).
Sphaeropsocus kunowii Hagen, 1882. *Stettin. ent. Ztg.* 43: 226; pl. 2, fig. 1.
Atropos succinica Hagen, 1882. *Stettin. ent. Ztg.* 43: 231; pl. 2, fig. 3.
Troctes succinicus (Hagen). Kolbe, 1883. *Stettin. ent. Ztg.* 44: 190.
Palaeotroctes succinicus (Hagen). Enderlein, 1911. *Palaeontographica* 58: 350, figs. 99, 102.

Suborder **PSOCOMORPHA**

Group **EPIPSOCETAE**

Family **EPIPSOCIDAE**

Subfamily **GOJINAE**

Genus **Goja** Navas

Goja Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 58.
Type species: *Goja ditata* Navas.

ditata Navas. Costa Rica.
Goja ditata Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 51, fig.

Subfamily **NEUROSTIGMINAE**

Genus **Neurostigma** Enderlein

Neurostigma Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 157.
Type species: *Neurostigma chaetocephalum* Enderlein.

chaetocephalum Enderlein. Peru.
Neurostigma chaetocephalum Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 158; pl. IX, fig. 24.

dispositum Roesler. Brazil.
Neurostigma dispositum Roesler, 1940. *Zool. Anz.* 130: 3, figs. 40-48.

Subfamily **EPIPSOCINAE**

Genus **Epipsocopsis** Badonnel

Epipsocopsis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 118.
Type species: *Epipsocopsis machadoi* Badonnel.

machadoi Badonnel. Angola.
Epipsocopsis machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 118, figs. 237-240.

spatulatus Smithers. Madagascar.
Epipsocopsis spatulatus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 221, figs. 18-20.

stuckenbergi Smithers. Madagascar.
Epipsocopsis stuckenbergi Smithers, 1957. *Nat. malgache* 9: 274, figs. 1-3, 5.

vilhenai Badonnel. Angola.
Epipsocopsis vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 120, figs. 241-243.

Genus **Epipsocus** Hagen

Epipsocus Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 203.
Type species: *Psocus ciliatus* Hagen.
Bertkauia Kolbe, 1882. *Ent. Nachr.* 8: 208.
Type species: *Bertkauia prisca* Kolbe.
Lapithes Bertkau, 1883. *Arch. Naturgesch.* 49: 180.
Type species: *Lapithes pulicarius* Bertkau.

angolensis Badonnel. Angola.
Epipsocus (*Epipsocidus*) *angolensis* Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 117, figs. 233-236.

antillanus Banks. Jamaica.
Epipsocus antillanus Banks, 1924. *Bull. Mus. comp. Zool. Harv.* 65: 422; pl. I, fig. 9.

argentinus Badonnel. Argentine.
Epipsocus argentinus Badonnel, 1962. *Biol. l'Amerique australe* 1: 221, figs. 89-92.

avus (Roesler). East Prussia (in amber).
Psocus ciliatus Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* etc. p. 59; pl. 5, figs. 10, 10b-10e.
(Not *Psocus ciliatus* Latreille, 1794. *Bull. Soc. philom. Paris* 1: 85).
Epipsocus ciliatus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Psocus avus Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.
Epipsocus avus (Roesler). Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.

beguiristaini Williner. Bolivia.
Epipsocus beguiristaini Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 99, fig. 2.

bogotanus Roesler. Columbia.
Epipsocus bogotanus Roesler, 1940. *Zool. Anz.* 130: 8, figs. 61, 62.

borgmeieri R. Karny. Brazil.
Epipsocus borgmeieri R. Karny, 1926. *Pub. Mus. nac. Rio de J.* 8: 3.

conspersus Banks. Assam.
Epipsocus conspersus Banks, 1914. *Rec. Indian Mus.* 8: 351; pl. 25, fig. 3.

costalis Banks. India.
Epipsocus costalis Banks, 1914. *Rec. Indian Mus.* 8: 352, pl. 25, fig. 1.

crosbyanus (Chapman). North America.
Bertkauia crosbyana Chapman, 1930. *J.N.Y. ent. Soc.* 38: 364.
Epipsocus lepicidinarius (Chapman). Mockford, 1950. *Proc. Ind. Acad. Sci.* 60: 195.

dubius Karny. Sarawak.
Epipsocus dubius Karny, 1925. *Sarawak Mus. J.* 3: 67.

fasciicornis Okamoto. Japan.
Epipsocus fasciicornis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 191; pl. 3, fig. 4.

flavipennis Roesler. Brazil.
Epipsocus flavipennis Roesler, 1940. *Zool. Anz.* 130: 9, fig. 65.

fumipennis Banks. Philippines.
Epipsocus fumipennis Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 310.

hageni Banks. Formosa.
Epipsocus hageni Banks, 1917. *Philipp. J. Sci.* 62: 266.

hyalinus Banks. Singapore.
Epipsocus hyalinus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 310.

icarus Banks. Santo Domingo.
Epipsocus icarus Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 392, fig. 1.

inornatus Banks. Philippines.
Epipsocus inornatus Banks, 1916. *Philipp. J. Sci.* 11: 199; pl. 1, fig. 4.

latistigma Roesler. Brazil.
Epipsocus latistigma Roesler, 1940. *Zool. Anz.* 130: 6.

lepicidinarius (Chapman). North America.
Bertkauia lepicidinaria Chapman, 1930. *J.N.Y. ent. Soc.* 38: 363; pl. 19, figs. 8, 9.
Epipsocus lepicidinarius (Chapman). Mockford, 1950. *Proc. Ind. Acad. Sci.* 60: 195.

longiceps Enderlein. Java.
Epipsocus longiceps Enderlein, 1926. *Zool. Meded.* 9: 57.

lucifugus (Rambur). Europe.
Psocus lucifugus Rambur, 1842. *Histoire naturelle des Insectes* p. 342.
Bertkauia prisca Kolbe, 1882. *Ent. Nachr.* 8: 208.
Lapithes pulicarius Bertkau, 1882. *Arch. Naturgesch.* 49: 100; pl. 1, fig. 3a-d.
Bertkauia lucifuga (Rambur). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 21, figs. 3-5; pl. 2, fig. 8.
Epipsocus lucifugus (Rambur). Pearman, 1935. *Ent. mon. Mag.* 71: 85.

molinai Williner. Bolivia.
Epipsocus molinai Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 101, fig. 3.

murcus Enderlein. Malaya.
Epipsocus murcus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 257; pl. 6, fig. 31.

nebulosus Roesler. Brazil.
Epipsocus (Bertkauia) nebulosus Roesler, 1940. *Zool. Anz.* 130: 4, figs. 49-53.

nepos Enderlein. Peru.
Epipsocus nepos Enderlein, 1900. *Berl. ent. Z.* 45: 108, figs. 1-3.

nubilipennis Karny. Sarawak.
Epipsocus nubilipennis Karny, 1925. *Sarawak Mus. J.* 3: 66; pl. 3, fig. 3.

pechi Williner. Bolivia.
Epipsocus pechi Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 97, fig. 1.

petensis Mockford. Guatamala.
Epipsocus (Epipsocus) petensis Mockford, 1959. *Ent. News* 68: 200, figs. 9-11.

pictus Banks. Brazil.
Epipsocus pictus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 309; pl. 3, fig. 31.

plaumanni Roesler. Brazil.
Epipsocus (Bertkauia) plaumanni Roesler, 1940. *Zool. Anz.* 130: 6, figs. 54, 56, 57.

prominens Banks. Philippines.
Epipsocus prominens Banks, 1937. *Philipp. J. Sci.* 63: 132; pl. 1, fig. 10; pl. 2, fig. 17.

quercus Roesler. Brazil.
Epipsocus quercus Roesler, 1940. *Zool. Anz.* 130: 9, figs. 63, 64.

serenus Roesler. Brazil.
Epipsocus serenus Roesler, 1940. *Zool. Anz.* 130: 7, figs. 59, 60.

tahitiensis Karny. Tahiti.
Epipsocus tahitiensis Karny, 1926. *Bull. ent. Res.* 16: 288, fig. 2.

Family **PTILONEURIDAE**

Genus **Cladiopsocus** Roesler

Dendroneura Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 354.
Type species: *Dendroneura ramulosa* Enderlein.
(Not *Dendroneura* Walsingham, 1891. *Proc. Zool. Soc. Lond.* 1891: 509).
Cladiopsocus Roesler, 1940. *Zool. Anz.* 129: 238.
Type species: *Dendroneura ramulosa* Enderlein. (*Dendroneura* preocc.).

ramulosus (Enderlein). Peru.
Dendroneura ramulosa Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 355; pl. 18, figs. 12-15.

Genus **Euplocania** Enderlein

Euplocania Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 69.
Type species: *Euplocania amabilis* Enderlein.

amabilis Enderlein. Paraguay.
Euplocania amabilis Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 69, fig. 1.

chulumanensis Williner. Bolivia.
Euplocania chulumanensis Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 106, fig. 5.

Genus **Ptiloneura** Enderlein

Ptiloneura Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 147.
Type species: *Ptiloneura bidorsalis* Enderlein.

Subgenera:

(Ptiloneura) Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 147.
Type species: *Ptiloneura bidorsalis* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 140.

(Loneura) Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 49.
Type species: *Loneura crenata* Navas. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 140.

bidorsalis Enderlein. **(Ptiloneura).** Peru.
Ptiloneura bidorsalis Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 149; pl. 9, fig. 14.
Ptiloneura bidorsalis var. *octoplumosa* Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 149.
Ptiloneura (Ptiloneura) bidorsalis Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 140.

boliviana (Williner). **(Loneura).** Bolivia.
Loneura boliviana Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 103, fig. 4.

brasiliensis (Roesler). **(Loneura).** Brazil.
Loneura brasiliensis Roesler, 1940. *Zool. Anz.* 129: 238, figs. 21, 22.

crenata (Navas). **(Loneura).** Costa Rica.
Loneura crenata Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 49, fig.
Ptiloneura (Loneura) crenata (Navas). Roesler, 1944. *Stettin. ent. Ztg.* 105: 140.

quinaria Navas. **(Loneura).** Bolivia.
Ptiloneura quinaria Navas, 1920. *Bol. Soc. ent. Esp.* 4: 92.
Loneura quinaria (Navas). Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 105.

splendida (Mockford). **(Loneura).** Guatemala.
Loneura splendida Mockford, 1957. *Ent. News* 68: 197, figs. 1, 2, 7, 8.

Genus **Ptiloneuropsis** Roesler

Ptiloneuropsis Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 236.
Type species: *Ptiloneuropsis immaculata* Roesler.

immaculata Roesler. Brazil.
Ptiloneuropsis immaculata Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 236.

Genus **Triplocania** Roesler

Triplocania Roesler, 1940. *Zool. Anz.* 129: 239.
Type species: *Triplocania magnifica* Roesler.

africana Badonnel. Angola.
Triplocania africana Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 114, figs. 228-232.

dolosa Roesler. Brazil.
Triplocania dolosa Roesler, 1940. *Zool. Anz.* 129: 242, figs. 38, 39.

lurida Roesler. Brazil.
Triplocania lurida Roesler, 1940. *Zool. Anz.* 129: 242, figs. 35-37.

magnifica Roesler. Brazil.
Triplocania magnifica Roesler, 1940. *Zool. Anz.* 129: 240, figs. 23-31.

marginepicta Roesler. Costa Rica.
Triplocania marginepicta Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 237.

reflexa Roesler. Brazil.
Triplocania reflexa Roesler, 1940. *Zool. Anz.* 129: 241, figs. 32-34.

spinosa Mockford. Guatemala.
Triplocania spinosa Mockford, 1957. *Ent. News* 68: 199, figs. 3, 5, 12.

Family **CALLISTOPTERIDAE**

Genus **Callistoptera** Enderlein

Callistoptera Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 240.
Type species: *Callistoptera anna* Enderlein.

anna Enderlein. New Guinea.
Callistoptera anna Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 248; pl. V, fig. 23.

Group **CAECILIETAE**

Family **CALOPSOCIDAE**

Genus **Calopsocus** Hagen

Calopsocus Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 203.
Type species: *Psocus infelix* Hagen.

Subgenera:

(Calopsocus) Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 203.
Type species: *Psocus infelix* Hagen. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 154.

(Mindaus) Navas, 1927. *Mem. Acad. Nuovi Lincei* (2) 10: 25.
Type species: *Mindaus irretitus* Navas. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 154.

infelix (Hagen). **(Calopsocus).** Ceylon, New Guinea, Bismarck Archipelago, Sarawak, Malaya, Java.
Psocus infelix Hagen, 1858. *Verh. zool. -bot. Ges. Wien.* 8: 475.
Calopsocus infelix (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 206.
Calopsocus (*Calopsocus*) *infelix* (Hagen). Roesler, 1944. *Stettin. ent. Ztg.* 105: 154.

iridescens Banks. **(Calopsocus).** Borneo, Sarawak.
Calopsocus iridescens Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 314.

irretitus (Navas). **(Mindaus).** Philippines.
Mindaus irretitus Navas, 1927. *Mem. Accad. Nuovi Lincei* (2) 10: 25, fig. 15.
Calopsocus (*Mindaus*) *irretitus* (Navas). Roesler, 1944. *Stettin. ent. Ztg.* 105: 154.

rizali Banks. **(Calopsocus).** Philippines.
Calopsocus rizali Banks, 1916. *Philipp. J. Sci.* 11: 198; pl. 1, figs. 1, 2.

Genus **Dirla** Navas

Dirla Navas, 1924. *Broteria ser. zool.* 21: 138.
Type species: *Dirla javana* Navas.

javana Navas. Java.
Dirla javana Navas, 1924. *Broteria ser. zool.* 21: 138, fig. 7.

Genus **Neurosema** McLachlan

Neurosema McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 346.
Type species: *Neurosema apicalis* McLachlan.

apicalis McLachlan. New Guinea, Salwatty Island.
Neurosema apicalis McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 347.

Family **CAECILIIDAE**

Subfamily **DYPSOCINAE**

Genus **Coryphosmila** Enderlein

Coryphosmila Enderlein, 1925. *Konowia* 4: 106.
Type species: *Dypsocus dolobrata* (Hagen).
Subgenera:
(Coryphosmila) Enderlein, 1925. *Konowia* 4: 106.
Type species: *Dypsocus dolobrata* (Hagen). Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 155.
(Mepachycera) Enderlein, 1925. *Konowia* 4: 106.
Type species: *Dypsocus parvulus* Banks. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 155.
(Coryphocopis) Enderlein, 1926. *Zool. Meded.* 9: 55.
Type species: *Coryphocopis jacobsoni* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 155.
dolobrata (Hagen). **(Coryphosmila).** Ceylon, Formosa.
Psocus dolobratus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 475.
Dypsocus dolobratus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Coryphosmila dolobrata (Hagen). Enderlein, 1925. *Konowia* 4: 106.
Caecilius dolobratus (Hagen). Banks, 1937. *Philipp. J. Sci.* 62: 263.
Coryphosmila (Coryphosmila) dolobrata (Hagen). Roesler, 1944. *Stettin. ent. Ztg.* 105: 155.
jacobsoni (Enderlein). **(Coryphocopis).** Java.
Coryphocopis jacobsoni Enderlein, 1926. *Zool. Meded.* 9: 55.
Coryphosmila (Coryphocopis) jacobsoni (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 155.
parvula (Banks). **(Mepachycera).** Singapore.
Dypsocus parvulus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 313.
Mepachycera parvula (Banks). Enderlein, 1925. *Konowia* 4: 106.
Coryphosmila (Mepachycera) parvula (Banks). Roesler, 1944. *Stettin. ent. Ztg.* 105: 155.

Genus **Dypsocus** Hagen

Dypsocus Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Type species: *Psocus coleoptratus* Hagen.
Protodypsocus Enderlein, 1903. *Ann. hist. -nat. Mus. hung* 1: 251.
Type species: *Protodypsocus fissiceps* Enderlein.
Coryphaca Enderlein, 1910. *Zool. Anz.* 36: 164.
Type species: *Coryphaca inka* Enderlein.
apicatus Banks. Philippines.
Dypsocus apicatus Banks, 1916. *Philipp. J. Sci.* 11: 203; pl. 2, figs. 14, 15.
coleoptratus (Hagen). Ceylon, Japan, Java.
Psocus coleoptratus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 474.
Dypsocus coleoptratus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
corporaali Navas. Sumatra.
Dypsocus corporaali Navas, 1924. *Broteria ser. Zool.* 21: 139, fig. 8.
fissiceps (Enderlein). New Guinea.
Protodypsocus fissiceps Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 251; pl. 13, fig. 66.
inka (Enderlein). Peru, Brazil.
Coryphaca inka Enderlein, 1910. *Zool. Anz.* 36: 164.
machadoi Badonnel. Angola.
Dypsocus machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 159, figs. 344-347.
misionarius Williner. Argentine.
Dypsocus misionarius Williner, 1943. *Rev. Soc. ent. argent.* 12: 118.
tappanensis Okamoto. Formosa.
Dypsocus tappanensis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 186; pl. 3, fig. 1.

Genus **Isophanes** Banks

Isophanes Banks, 1937. *Philipp. J. Sci.* 62: 256.
Type species: *Isophanes decipiens* Banks.

angolensis Badonnel. Angola.
Isophanes angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 161, figs. 348-352.

capeneri Smithers. South Africa.
Isophanes capeneri Smithers, 1956. *J. ent. Soc. S. Afr.* 19: 29, figs. 1-4.

decipiens Banks. Formosa.
Isophanes decipiens Banks, 1937. *Philipp. J. Sci.* 62: 256; pl. 3, fig. 30.

palliatus (Hagen). Ceylon.
Psocus palliatus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 203.
Copostigma palliatum (Hagen). Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 230.
Clematostigma palliatum (Hagen). Enderlein, 1925. *Konowia* 4: 103.
Isophanes palliatus (Hagen). Banks, 1937. *Philipp. J. Sci.* 62: 256.

Subfamily **CAECILIINAE**

Genus **Caecilioidus** Badonnel

Caecilioidus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 140.
Type species: *Caecilius oxystigma* Badonnel.

oxystigma (Badonnel). Ivory Coast, Angola.
Caecilius oxystigma Badonnel, 1949. *Rev. franc. Ent.* 16: 40, figs. 50-52.

Genus **Caecilius** Curtis

Caecilius Curtis, 1837. *British Entomology* 14: 648.
Type species: *Psocus flavidus* Stephens.

abjectus Costa. Sardinia.
Caecilius abjectus Costa, 1885. *Boll. Soc. ent. Ital.* 17: 243.

ademimensis Badonnel. Morocco.
Caecilius ademimensis Badonnel, 1945. *Rev. franc. Ent.* 12: 38, figs. 15-17.

africanus Ribaga. South Africa.
Caecilius africanus Ribaga, 1911. *Redia* 7: 169, fig. 11.

albiceps Pearman. Uganda, Congo, Angola.
Caecilius albiceps Pearman, 1934. *Stylops* 3: 129, fig. 8.

albomarginatus Enderlein. Brazil.
Caecilius albomarginatus Enderlein, 1910. *Zool. Anz.* 36: 166.

alcinus Banks. Santo Domingo.
Caecilius alcinus Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 390, fig. 2.

amaenus Navas. India.
Caecilius amaenus Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 44.

ambiguus Pearman. Kenya.
Caecilius ambiguus Pearman, 1932. *Stylops* 1: 93, fig. 4.

amicus Kolbe. Madagascar.
Caecilius amicus Kolbe, 1885. *Berl. ent. Z.* 29: 191.

analis Banks. Hawaii, Marquesas Is.
Caecilius analis Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 437; pl. 7, fig. 2; pl. 8, fig. 2; pl. 9, fig. 3.

andromimus Badonnel. Angola.
Caecilius andromimus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 133, figs. 276-280.

angustipennis Badonnel. Congo.
Caecilius angustipennis Badonnel, 1949. *Bull. Inst. sci. nat. Belg.* 25: 32, figs. 40-43.

angustus Enderlein. New Guinea, Bismarck Archipelago.
Caecilius angustus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 273; pl. 7, fig. 41.

annulicornis Enderlein. New Guinea.
Caecilius annulicornis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 270. (Not *Caecilius annulicornis* Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 204; pl. 4, fig. 4).

anomalus Badonnel. Congo.
Caecilius anomalus Badonnel, 1959. *Explor. Parc nat. Albert Mission G.F. de Witte* (1933-35). 95: 7, figs. 5-11.

antennalis Badonnel. Congo.
Caecilius antennalis Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 286, figs. 27, 36-38.

antillanus Banks. Cuba.
Caecilius antillanus Banks, 1958. *Rev. Ent. Rio de J.* 9: 288.

apicipunctatus Tillyard. New Zealand.
Caecilius apicipunctatus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 189; fig. 14; pl. 18, fig. 9.

aridus (Hagen). Philippines, Ceylon, Formosa.
Psocus aridus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 474.
Caecilius aridus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.

arotellus Banks. Guam.
Caecilius arotellus Banks, 1942. *Bull. Bishop Mus. Honolulu* 172: 26, figs. 1a, 1c.

atricornis McLachlan. Europe.
Caecilius atricornis McLachlan, 1869. *Ent. mon. Mag.* 5: 196.

aurantiacus (Hagen). North America.
Psocus aurantiacus Hagen, 1861. *Smithson. misc. Coll.* 4: 14.
Caecilius aurantiacus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.

australis Enderlein. Australia.
Caecilius australis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 275; pl. 7, fig. 39.

badiostigma Okamoto. Japan.
Caecilius badiostigma Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 206; pl. 4, fig. 6.

bamboutensis Badonnel. Cameroons.
Caecilius bamboutensis Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 144, figs. 14, 20.

bambusae Soehardjan and Hamann. Sumatra.
Caecilius bambusae Soehardjan and Hamann, 1959. *Idea* 2: 6; pl. 2, figs. 23, 24.

basidentatus Enderlein. East Africa.
Caecilius basidentatus Enderlein, 1907. *Schwed. Zool. Exp. Kilimandjaro* 15: 34; pl. 5, fig. 10.

bataviensis Enderlein. Java.
Caecilius bataviensis Enderlein, 1926. *Zool. Meded.* 9: 60.

bilineatus Williner. Bolivia.
Caecilius bilineatus Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 115, fig. 10.

boggianii Ribaga. Bolivia.
Caecilius boggianii Ribaga, 1908. *Redia* 5: 106; pl. 6, fig. 10.

borneensis Karny. Sarawak.
Caecilius borneensis Karny, 1925. *Sarawak Mus. J.* 3: 69; pl. 3, fig. 5.

brevihirtus Banks. Jamaica.
Caecilius brevihirtus Banks, 1938. *Rev. Ent. Rio de J.* 9: 287.

brunellus Tillyard. New Zealand, Tasmania.
Caecilius brunellus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 190, fig. 15; pl. 18, fig. 10.

brunneoflavus Badonnel. Madagascar.
Caecilius brunneoflavus Badonenl, 1935. *Bull. Acad. malgache N.S.* 18: 107; pl. 3, fig. 5.

brunneonitens Pearman. Kenya, Congo, Angola.
Caecilius brunneonitens Pearman, 1932. *Stylops* 1: 96, fig. 8.
Caecilius enigmaticus Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 146, figs. 13, 28A, B.
Caecilius brunneonitens subsp. **orophilus** Badonnel, 1959. *Explor. Parc nat. Albert, Mission G.F. de Witte* (1933-1935) 95: 5.

burmeisteri Brauer. Europe.
Psocus pedicularius Burmeister, 1839. *Handbuch der Entomologie* 2: 776.
! *Caecilius obsoletus* (Stephens). McLachlan, 1867. *Ent. mon. Mag.* 3: 271.
(Not *Caecilius obsoletus* (Stephens). McLachlan, 1883. *Ent. mon. Mag.* 19: 183).
Caecilius burmeisteri Brauer, 1876. *Festschr. zool. -bot. Ges. Wien* p. 293.
Caecilius (*Caecilius*) *burmeisteri* var. *helveticus* Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 121.
?*Caecilius abjectus* Costa, 1885. *Boll. Soc. ent. Ital.* 17: 243.
Caecilius rufus Tetens, 1891. *Ent. Nachr.* 17: 372, 381.
Caecilius minutus Reuter, 1894. *Acta Soc. Fauna Flora fenn.* 9: 15; pl. 1, fig. 2.
Caecilius burmeisteri ab. *lipsiensis* Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 541; pl. 35, fig. 5.

cabrerai Navas. Canary Island.
Caecilius cabrerai Navas, 1920. *Bol. Soc. ent. Esp.* 4: 39.

caligonus Banks. Santo Domingo.
Caecilius caligonus Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 390, fig. 5.

caloclypeus Mockford and Gurney. Texas.
Caecilius caloclypeus Mockford and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 361, figs. 33-38.

canei Williner. Argentine.
Caecilius canei Williner, 1944. *Act. zool. lilloana* 2: 294, fig. 1.

capella Navas. (from amber).
Caecilius capella Navas, 1914. *As. Esp. Progr. Cienc. Congr. de Madrid* 5: 41.

casarum Badonnel. Mozambique.
Caecilius casarum Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 234, figs. 6, 7.

castellus Banks. Philippines.
Caecilius castellus Banks, 1916. *Philipp. J. Sci.* 11: 202; pl. 2, fig. 11.

ceylonicus Enderlein. India, Ceylon.
Caecilius ceylonicus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 277; pl. 14, fig. 78.

cincticornis Banks. Philippines.
Caecilius cincticornis Badonnel, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 311.

claggi Banks. Philippines.
Caecilius claggi Banks, 1937. *Philipp. J. Sci.* 63: 130; pl. 1, fig. 4.

collarti Badonnel. Congo.
Caecilius collarti Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 151, figs. 21, 27, 30, 34, 35, 39, 40.

confluens (Walsh). North America.
Psocus confluens Walsh, 1863. *Proc. ent. Soc. Philad.* 2: 185.
Caecilius confluens (Walsh). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.
Caecilius umbrosus Banks, 1915. *Proc. Acad. Sci. Philad.* 66: 612.

confusus Banks. Formosa.
Caecilius confusus Banks, 1937. *Philipp. J. Sci.* 62: 263; pl. 3, fig. 28.

congolensis Badonnel. Congo, Natal, South Africa.
Caecilius congolensis Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 149, figs. 15, 17, 22, 23, 31A, 31B, 36, 37.

conspicuus Banks. Philippines.
Caecilius conspicuus Banks, 1937. *Philipp. J. Sci.* 63: 129; pl. 2, fig. 18.

cornutus Navas. Spain.
Caecilius cornutus Navas, 1915. *Bol. Soc. aragon. Cienc. nat.* 14: 44.
?Caecilius gynapterus ♂; cf. Badonnel, 1943. *Faune Fr.* 42: 151,

corsicus Kolbe. Corsica.
Caecilius corsicus Kolbe, 1882. *Ent. Nachr.* 8: 209.

crassicornis Enderlein. Seychelles.
Caecilius crassicornis Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool).* (2) 19: 215; pl. 14, figs. 58, 59.

cribrarius (Hagen). Ceylon.
Psocus cribrarius Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 202.
Caecilius cribrarius (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.

croesus Chapman. North America.
Caecilius croesus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 326; pl. 21, fig. 7.

dahli Badonnel. Azores.
Caecilius (?) *dahli* Badonnel, 1963. *Bol. Mus. Funchal* 17: 68, figs. 1-6.

dardanus Banks. Santo Domingo.
Caecilius dardanus Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 389, fig. 6.

debilis (Hagen). East Prussia (in amber).
Psocus debilis Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* p. 60; pl. 5, figs. 11, 11b.
Epipsocus debilis (Hagen). Hagen, 1866. *Verh. Zool. -bot. Ges. Wien* 16: 207.
Caecilius debilis (Hagen). Hagen, 1882. *Stettin. ent. Ztg.* 43: 284; pl. I, fig. 4.

deceptor Banks. Philippines.
Caecilius deceptor Banks, 1920. *Bull. Mus. Comp. Zool. Harv.* 64: 311.

delamarei Badonnel. Ivory Coast.
Caecilius delamarei Badonnel, 1949. *Rev. franc. Ent.* 16: 39, figs. 48, 49.

descolei Williner. Argentine.
Caecilius descolei Williner, 1944. *Acta Zool. lilloana* 2: 296, fig. 2.

despaxi Badonnel. Europe.
(Not *Psocus obsoletus* Stephens, 1836. *Illustrations of British Entomology* 6: 123).
(Not *Caecilius obsoletus* (Stephens). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 122).
! *Caecilius obsoletus* (Stephens). Enderlein, 1906. *Ber. westpreuss. bot. -zool. Ver.* 28: 80.
! *Caecilius obsoletus* (Stephens). Badonnel, 1931. *Bull. Soc. Zool. Fr.* 56: 104 (part).
! *Caecilius obsoletus* (Stephens). Holzapfel, 1936. *Rev. suisse Zool.* 43: 344.
Caecilius despaxi Badonnel, 1936. *Bull. Soc. ent. Fr.* 41: 25.

dubius Badonnel. Congo.
Caecilius dubius Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 154, figs. 18, 19, 26, 38, 42.

duies Navas. Costa Rica.
Caecilius duies Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 47.

dundoensis Badonnel. Angola.
Caecilius dundoensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 128, figs. 262-265.

elongatus Smithers. Madagascar.
Caecilius elongatus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 224, figs. 21-24.

falciferrens Williner. Bolivia.
Caecilius falciferrens Williner, 1949. *Rev. Invest. Mus. argent Cienc. nat.* 1: 113, fig. 9.

fallax Badonnel. Congo.
Caecilius fallax Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 283, figs. 27, 39-42.
fasciatus Enderlein. Brazil.
Caecilius fasciatus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 24: 82; pl. 6, fig. 2.
fastuosus Navas. Spain.
Caecilius fastuosus Navas, 1915. *Mem. R. Acad. Barcelona* 11: 479, fig. 10. (Species merits re-examination; cf. Badonnel, 1943. *Faune Fr.* 42: 151).
ferrugineus Badonnel. Morocco.
Caecilius ferrugineus Badonnel, 1945. *Rev. franc. Ent.* 12: 36, figs. 9-14.
(Not *Caecilius ferrugineus* Soehardjan and Hamann, 1959. *Idea* 12: 7; pl. 2, figs. 25, 26).
flavatus Navas. India.
Caecilius flavatus Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 41.
flavicosta Banks. Queensland.
Caecilius flavicosta Banks, 1939. *Bull. Mus. comp. Zool. Harv.* 85: 439, fig. 21.
flavidorsalis Okamoto. Japan, Formosa.
Caecilius flavidorsalis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 208; pl. 5, fig. 3.
flavidus (Stephens). Europe, Canary Islands.
Psocus flavidus Stephens, 1836. *Illustrations of British Entomology* 6: 122.
Psocus ochropterus Stephens, 1836. *Illustrations of British Entomology* 6: 122.
Psocus flavicans Stephens, 1836. *Illustrations of British Entomology* 6: 123.
Psocus subpunctatus Stephens, 1836. *Illustrations of British Entomology* 6: 126.
Caecilius strigosus Curtis, 1837. *British Entomology* p. 648.
Psocus boreellus Zetterstedt, 1840. *Insecta Lapponica* p. 1053.
Psocus striatus Zetterstedt, 1840. *Insecta Lapponica* p. 1053.
Caecilius flavidus (Stephens). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.
flavipennis Costa. Sardinia.
Caecilius flavipennis Costa, 1885. *Boll. Soc. ent. Ital.* 17: 243.
flavistigma Tillyard. New Zealand.
Caecilius flavistigma Tillyard, 1923. *Trans. N.Z. Inst.* 54: 189, fig. 13; pl. 18, fig. 8.
fortunatus Enderlein. Canary Islands.
Caecilius fortunatus Enderlein, 1929. *Zool. Anz.* 84: 233, fig. 2.
fraternus Banks. Formosa.
Caecilius fraternus Banks, 1937. *Philipp. J. Sci.* 62: 262.
furculatus Navas. India.
Caecilius furculatus Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 39.
fuscopterus (Latreille). Europe, Tonkin.
Psocus fuscopterus Latreille, 1799. *Illustr. Icon. Insect.* 1: 10; pl. 2, fig. 2.
Psocus vittatus Dalman, 1823. *Analecta Entomologica* p. 58.
Caecilius fenestratus Curtis, 1837. *British Entomology* p. 648, fig.
Caecilius fuscopterus (Latreille). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.
Caecilius vittatus (Dalman). Rostock, 1878. *Jber. Ver. Naturk. Zwickau* 1877-1878: 57.
Caecilius (*Caecilius*) *fuscopterus* var. *affinis* Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 123.
Caecilius fuscopterus var. *tonkinensis* Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 269.

gelaberti Navas. (in amber).
Caecilius gelaberti Navas, 1914. *As. Esp. Progr. Cienc. Congr. de Madrid* 5: 40.
ghesquierei Badonnel. Congo.
Caecilius ghesquierei Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 152, figs. 29A, 29B, 41.
gilvus Pearman. Kenya.
Caecilius gilvus Pearman, 1932. *Stylops* 1: 94, fig. 7.
globiclypeus Enderlein. Australia.
Caecilius globiclypeus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 275.
glossopterus Badonnel. Mozambique.
Caecilius glossopterus Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 230, figs. 2, 3.
gonostigma Enderlein. Japan, Formosa.
Caecilius gonostigma Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 253; pl. 11, fig. 12.
gracilis Okamoto. Japan.
Caecilius gracilis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 211; pl. 5, fig. 6.
gridelli Navas. Canary Islands.
Caecilius gridelli Navas, 1927. *Boll. Soc. ent. Ital.* 59: 150, fig. 1a, 1b, 1c.
guttulatus Banks. Philippines.
Caecilius guttulatus Banks, 1916. *Philipp. J. Sci.* 11: 202; pl. 2, fig. 12.
?*Aaroniella guttulatus* (Banks). Thornton, 1959. *Trans. R. ent. Soc. Lond.* 111: 344.
gynapterus Tetens. Europe.
Caecilius gynapterus Tetens, 1891. *Ent. Nachr.* 17: 372, 380.
hemipsocoides Badonnel. Madagascar.
Caecilius hemipsocoides Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 110; pl. 3, figs. 9, 10.
himalayanus Enderlein. Darjeeling.
Caecilius himalayanus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 268; pl. 7, fig. 79.
imbecillus (McLachlan). Mauritius, Seychelles.
Psocus imbecillus McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5:351.
Caecilius imbecillus (McLachlan). McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 352.
inaequalis Banks. Philippines.
Caecilius inaequalis Banks, 1916. *Philipp. J. Sci.* 11: 202; pl. 2, fig. 13.
indicus Navas. India.
Caecilius indicus Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 42.
inquinatus Enderlein. East Africa.
Caecilius inquinatus Enderlein, 1902. *Mitt. zool. Mus. Berl.* 2: 9.
interruptus Enderlein. Comoro Is., Seychelles.
Caecilius interruptus Enderlein, 1908. *Reise in Ostafrika* 2: 250; pl. 11, fig. 6.
jamaicensis Banks. Jamaica.
Caecilius jamaicensis Banks, 1938. *Rev. Ent. Rio de J.* 9: 288.
japanus Enderlein. Japan, Formosa.
Caecilius japanus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 254; pl. 10, fig. 9.
javanus Enderlein. Java.
Caecilius javanus Enderlein, 1907. *Notes Leyden Mus.* 29: 116.
kamakurensis Okamoto. Japan.
Caecilius kamakurensis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 210; pl. 5, fig. 5.
kamatambanus Badonnel. Congo.
Caecilius kamatambanus Badonnel, 1959. *Explor. Parc nat. Albert, Mission G.F. de Witte* (1933-35) 95: 6, figs. 1-4.

kansuensis Enderlein. South China.
Caecilius kansuensis Enderlein, 1936. *Ark. Zool.* 27 (A): 2, figs. 1, 2.

kivuensis Badonnel. Congo.
Caecilius kivuensis Badonnel, 1959. *Explor. Parc nat. Albert Mission G.F. de Witte* (1933-35) 95: 12, figs. 18-21.

klebsi Enderlein. East Prussia (in amber).
Caecilius klebsi Enderlein, 1911. *Palaeontographica* 58: 320, figs. 37, 40.

kolbei Tetens. Europe.
Caecilius kolbei Tetens, 1891. *Ent. Nachr.* 17: 372, 382.
! *Caecilius piceus* var. *brevipennis* Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 373.

kraepelini Navas. Costa Rica.
Caecilius kraepelini Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 48.

labratus Navas. India.
Caecilius labratus Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 40.

lateralis Badonnel. Angola, Congo.
Caecilius lateralis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 124, figs. 248, 249.

latistigma Navas. Argentine.
Caecilius latistigma Navas, 1922. *Estudios* 22: 366.

lemniscellus Enderlein. Java.
Caecilius lemniscellus Enderlein, 1907. *Notes Leyden Mus.* 29: 118.

linguipennis Badonnel. Cameroons.
Caecilius linguipennis Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 142, figs. 13, 31, 33.

longistylus Badonnel. Madagascar.
Caecilius longistylus Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 109; pl. 3, figs. 7, 8.

longulus Navas. Argentine.
Caecilius longulus Navas, 1933. *Rev. Acad. Cienc. Zaragoza* 16: 104.

luachimensis Badonnel. Angola.
Caecilius luachimensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 139, figs. 299-302.

lucidus Pearman. Kenya.
Caecilius lucidus Pearman, 1932. *Stylops* 1: 94, fig. 6.

lundensis Badonnel. Angola.
Caecilius lundensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 136, figs. 286-288.

luridus Enderlein. New Guinea.
Caecilius luridus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 274.

luteovenosus Okamoto. Japan.
Caecilius luteovenosus Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 210; pl. 5, fig. 4.

machadoi Badonnel. Angola.
Caecilius machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 125, figs. 250-257.

macrops Enderlein. Singapore, Java.
Caecilius macrops Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 273; pl. 7, fig. 42.

macrostigma Enderlein. Ceylon, Australia.
Caecilius macrostigma Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 272; pl. 7, fig. 37.
Caecilius macrostigma ab. *pedunculatus* Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 273.

maculistigma Enderlein. Ceylon, Java.
Caecilius maculistigma Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 265; pl. 6, fig. 33.

manteri Sommerman. Connecticut.
Caecilius manteri Sommerman, 1943. *Proc. ent. Soc. Wash.* 45: 29, figs. 1-15.

marcidus Banks. Philippines.
Caecilius marcidus Banks, 1937. *Philipp. J. Sci.* 63: 129.

marginalis Badonnel. Angola.
Caecilius marginalis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 134, figs. 281-285.

marmoratus (Hagen). Madeira.
Psocus marmoratus Hagen, 1865. *Ent. mon. Mag.* 2: 9.
Caecilius marmoratus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.

melanocnemis Enderlein. Java.
Caecilius melanocnemis Enderlein, 1907. *Notes Leyden Mus.* 29: 119.

mexicanus Enderlein. Mexico.
Caecilius mexicanus Enderlein, 1909. *Boll. Lab. Zool. Portici* 3: 333.

mjobergi Karny. Sarawak.
Caecilius mjobergi Karny, 1925. *Sarawak Mus. J.* 3: 70; pl. 3, fig. 5.

mokotensis Badonnel. Congo.
Caecilius mokotensis Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 33, figs. 44, 45, 48.

morosus Banks. Queensland.
Caecilius morosus Banks, 1939. *Bull. Mus. comp. Zool. Harv.* 85: 439.

muggenbergi Enderlein. Philippines, Formosa, Singapore, Java.
Caecilius muggenbergi Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 269; pl. 7, fig. 34.
Caecilius muggenbergi var. *attavisticus* Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 270.

nigricornis Okamoto. Japan.
Caecilius nigricornis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 208; pl. 5, fig. 2.

nigroticta Williner. Brazil.
Caecilius nigroticta Williner, 1946. *Act. zool. lilloana* 3: 233, 1 fig.

nigrotuberculatus Curran. Canada (in food from Argentine).
Caecilius nigrotuberculatus Curran, 1925. *Canad. Ent.* 57: 292, fig. 1.

nitoris Banks. Philippines.
Caecilius nitoris Banks, 1937. *Philipp. J. Sci.* 63: 130; pl. 1, fig. 2.

novoguineensis Enderlein. New Guinea, Fiji, Samoa.
Caecilius novoguineensis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 276; pl. 7, fig. 43.

obscurus Pearman. Kenya.
Caecilius obscurus Pearman, 1932. *Stylops* 1: 93, fig. 5.

occulatus Kolbe. Italy.
Caecilius occulatus Kolbe, 1884. *Berl. ent. Z.* 28: 381.

oculatus Navas. India.
Caecilius oculatus Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 43.

okamotoi Banks. Formosa.
Caecilius annulicornis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 204; pl. 4, fig. 4.
Caecilius okamotoi Banks, 1937. *Philipp. J. Sci.* 62: 262. (*Caecilius annulicornis* preocc.).

olitorius Banks. Puerto Rico.
Caecilius olitorius Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 389, fig. 15.

ornatipennis (Blanchard). Chile.
Psocus ornatipennis Blanchard, 1851. *In* Gay, C. *Historia fisica y politica de Chile* 6: 95.
Caecilius ornatipennis (Blanchard). Enderlein, 1923. *Zool. Anz.* 55: 245.

otiosus Banks. Philippines.
Caecilius otiosus Banks, 1937. *Philipp. J. Sci.* 63: 131; pl. 1, fig. 7.

oxycopeus Ribaga. South Africa.
Caecilius africanus var. *oxycopeus* Ribaga, 1911. *Redia* 7: 171, fig. 12.

oyamai Enderlein. Japan.
Caecilius oyamai Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 252; pl. 10, fig. 8.

pallicornis Badonnel. Angola.
Caecilius pallicornis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 129, figs. 266, 267.

pallidus Pearman. Kenya.
Caecilius pallidus Pearman, 1932. *Stylops* 1: 92, fig. 2.

palmarum Mockford and Gurney. Texas.
Caecilius palmarum Mockford and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 361, figs. 27-32.

paraguayensis Enderlein. Paraguay.
Caecilius paraguayensis Enderlein, 1910. *Zool. Anz.* 36: 166.

parviareola Enderlein. Java.
Caecilius parviareola Enderlein, 1926. *Zool. Meded.* 9: 59.

pectinatus Badonnel. Angola.
Caecilius pectinatus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 135, figs. 289-293.

perplexus Chapman. North America.
Caecilius perplexus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 326; pl. 21, fig. 6.

petchkovskya Badonnel. Angola.
Caecilius petchkovskya Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 132, figs. 271-275.

piceus Kolbe. Europe.
Caecilius piceus Kolbe, 1882. *Ent. Nachr.* 8: 210.
Caecilius piceus var. *megastylus* Reuter, 1894. *Act. Soc. Fauna Flor. fenn.* 9: 45.
(Not *Caecilius piceus* var. *brevipennis* Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 373).
Caecilius piceus ab. *pedunculata* Priesner, 1926. *Jber. oberost. Musealver* 81: 372.

pictipennis McLachlan. Ceylon.
Caecilius pictipennis McLachlan, 1872. *Ent. mon. Mag.* 9: 76.

pinicola Banks. North America.
Caecilius pinicola Banks, 1903. *J.N.Y. ent. Soc.* 11: 238.

plagogus Banks. Philippines.
Caecilius plagogus Banks, 1937. *Philipp. J. Sci.* 63: 131.

podacromelas Enderlein. Formosa.
Caecilius podacromelas Enderlein, 1908. *Zool. Anz.* 33: 768.

podacrophaeus Enderlein. Mexico.
Caecilius podacrophaeus Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 334.

posticus Banks. North America.
Caecilius posticus Banks, 1915. *Proc. Acad. nat. Sci. Philad.* 66: 612; pl. 28, fig. 15.

proavus (Hagen). East Prussia (in amber).
Psocus proavus Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* p. 59; pl. 8, fig. 7.
Caecilius proavus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 206.

prometheus Enderlein. East Prussia (in amber).
Caecilius prometheus Enderlein, 1911. *Palaeontographica* 58: 318, figs. 35, 41, fig. E.

protritus Enderlein. Seychelles.
Caecilius protritus Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 214.

psicensis Badonnel. Mozambique, Angola, Congo.
Caecilius psicensis Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 233, figs. 4, 5.

pubes Enderlein. Surinam.
Caecilius pubes Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 356; pl. 17, fig. 11.

pygmaeus Enderlein. New Guinea.
Caecilius pygmaeus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 276; pl. 7, fig. 40.

quercus Edwards. Tasmania.
Caecilius quercus Edwards, 1950. *Pap. Roy. Soc. Tasm.* 1949: 131, figs. 111-117.

quillayute Chapman. Washington.
Caecilius quillayute Chapman, 1930. *J.N.Y. ent. Soc.* 38: 330; pl. 16, fig. 1; pl. 21, fig. 21.

reductus Banks. Philippines.
Caecilius reductus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 310; pl. 1, fig. 6.

rhenanus Tetens. Europe.
Caecilius rhenanus Tetens, 1891. *Ent. Nachr.* 17: 372, 381.

rodriquezi Williner. Argentine.
Caecilius rodriquezi Williner, 1944. *Acta zool. lilloana* 2: 298, fig. 3.

rosor Navas. Costa Rica.
Caecilius rosor Navas, 1930. *Rev. chil. Hist. nat.* 34: 306.

rutshuruanus Badonnel. Congo.
Caecilius rutshuruansis Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 285, figs. 28, 43-45.

sanchezlabratori Williner. Bolivia.
Caecilius sanchezlabratori Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 117, fig. 11.

scriptus Enderlein. Japan.
Caecilius scriptus Enderlein, 1906. *Stettin. ent. Ztg.* 67: 312.

senepipedus Enderlein. East Prussia (in amber).
Caecilius senepipedus Enderlein, 1911. *Palaeontographica* 58: 316, figs. 46, 49.

seychellensis Enderlein. Seychelles.
Caecilius seychellensis Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (*2*) 19: 215, pl. 14, fig. 60.

seyrigi Badonnel. Madagascar.
Caecilius seyrigi Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 106; pl. 3, figs. 2-4.

signatipennis Enderlein. Kenya, Congo, Madagascar.
Caecilius signatipennis Enderlein, 1907. *Schwed. Zool. Exp. Kilimandjaro* 3 (15): 34.

similaris Banks. Formosa.
Caecilius similarus Banks, 1937. *Philipp. J. Sci.* 62: 263; pl. 3, fig. 23.

similis Badonnel. Congo.
Caecilius similis Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 35, figs. 46, 47, 49-51.

simplex Navas. Costa Rica.
Caecilius simplex Navas, 1930. *Rev. chil. Hist. nat.* 34: 305.

sinuofasciatus Badonnel. Madagascar.
Caecilius sinuofasciatus Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 108; pl. 3, fig. 6.

soehardjani Smithers. Bogor.
Caecilius ferrugineus Soehardjan and Hamann, 1959. *Idea* 12: 7; pl. 2, figs. 25, 26.
(Not *Caecilius ferrugineus* Badonnel, 1945. *Rev. franc. Ent.* 12: 36, figs. 9-14).
Caecilius soehardjani Smithers, 1965. *Aust. Zool.* 13: 136. (*Caecilius ferrugineus* preocc.).

soleili Badonnel. Congo.
Caecilius soleili Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 148, figs. 14, 20, 24, 33.

sommermanae Mockford. North America.
Caecilius aurantiacus (Hagen). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 320; pl. 16, fig. 2; pl. 21, fig. 14 (part.).
(Not *Caecilius aurantiacus* (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205).
Caecilius sommermanae Mockford, 1955. *Amer. Mid. Nat.* 53: 438; pl. 2, figs. 1-4.

spissicornis Badonnel. Cameroons.
Caecilius spissicornis Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 145, figs. 17, 21, 30.

stigmaticus Okamoto. Japan, Formosa.
Caecilius stigmaticus Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 207; pl. 5, fig. 1.

subflavus Aaron. Texas.
Caecilius subflavus Aaron, 1886. *Proc. Acad. nat. Sci. Philad.* 38: 13.

sucinicaptus Enderlein. East Prussia (in amber).
Caecilius sucinicaptus Enderlein, 1911. *Palaeontographica* 58: 320, figs. 38, 44.

suffusus Navas. Argentine.
Caecilius suffusus Navas, 1931. *Rev. Soc. ent. argent.* 3: 320.

suturalis Badonnel. Angola.
Caecilius suturalis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 138, figs. 294-298.

tenuicornis Karny. Sarawak.
Caecilius tenuicornis Karny, 1925. *Sarawak Mus. J.* 3: 68; pl. 3, fig. 4.

thiemi Enderlein. Columbia.
Caecilius thiemi Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 356; pl. 17, fig. 10.

transversalis Badonnel. Congo.
Caecilius transversalis Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 281, figs. 26, 31-35.

trigonostigma Enderlein. Java.
Caecilius trigonostigma Enderlein, 1907. *Notes Leyden Mus.* 29: 117.

umbratus Navas. Chile.
Caecilius umbratus Navas, 1922. *Estudios* 22: 366.

umbripennis Navas. Argentine.
Caecilius umbripennis Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 165.

unicolor Enderlein. Singapore, Java.
Caecilius unicolor Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 271; pl. 7, fig. 35.
Caecilius unicolor ab. *transversalis* Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 272.

varians Badonnel. Angola.
Caecilius varians Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 131, figs. 268-270.

vau Enderlein. Seychelles.
Caecilius vau Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 213.

vilhenai Badonnel. Angola.
Caecilius vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 127, figs. 258-261.

villiersi Badonnel. Cameroons.
Caecilius villiersi Badonnel, 1943. *Rev. Uool. Bot. afr.* 37: 143, figs. 15, 16, 29, 32.

vittidorsum Enderlein. Java.
Caecilius vittidorsum Enderlein, 1907. *Notes Leyden Mus.* 29: 119.

voov Enderlein. Seychelles.
Caecilius voov Enderlein, 1931. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) 19: 212; pl. 14, fig. 57.

wittei Badonnel. Congo.
Caecilius wittei Badonnel, 1959. *Explor. Parc nat. Albert Mission G.F. de Witte* (1933-1935) 95: 9, figs. 12, 13.

wolfhugelianus Enderlein. Argentine.
Caecilius wolfhugelianus Enderlein, 1906. *Stettin. ent. Ztg.* 67: 313.

zelandicus Tillyard. New Zealand.
Caecilius zelandicus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 188, fig. 12; pl. 18, fig. 7.

Genus **Dasydemella** Enderlein

Dasydemella Enderlein, 1909. *Bol. Lab. zool. Portici* 3: 329.
Type species: *Dasydemella silvestrii* Enderlein.

gynopeza Roesler. Brazil.
Dasydemella gynopeza Roesler, 1940. *Zool. Anz.* 130: 19, figs. 91, 92.
Dasydemella gynopeza ab. *defasciata* Roesler, 1940. *Zool. Anz.* 130: 19.

setosa Roesler. Brazil.
Dasydemella setosa Roesler, 1940. *Zool. Anz.* 130: 18.

silvestrii Enderlein. Mexico, Brazil.
Dasydemella silvestrii Enderlein, 1909. *Bol. Lab. zool. Portici* 3: 332.

Genus **Enderleinella** Badonnel

Enderleinella Badonnel, 1932. *Bull. Soc. ent. Fr.* 37: 77.
Type species: *Caecilius perlatus* Kolbe.

obsoleta (Stephens). Europe.
Psocus obsoletus Stephens, 1836. *Illustrations of British Entomology* 6: 123.
Caecilius (*Caecilius*) *obsoletus* (Stephens). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 122.
Caecilius (*Caecilius*) *obsoletus* var. *perlatus* Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 122.
Caecilius perlatus Kolbe, 1882. *Ent. Nachr.* 8: 210.
Enderleinella perlata (Kolbe). Badonnel, 1932. *Bull. Soc. ent. Fr.* 37: 77, figs. 1-4.
(Not *Caecilius obsoletus* (Stephens). Holzapfel, 1936. *Rev. suisse Zool.* 43: 344).
Enderleinella obsoleta (Stephens). Badonnel, 1943. *Faune de Fr.* 42: 125, figs. 300, 324, 325, 329, 330.

Genus **Eocaecilius** Badonnel

Eocaecilius Badonnel, 1959. *Explor. Parc nat. Albert, Mission G.F. de Witte* (1933-1935) 95: 13.
Type species: *Eocaecilius wittei* Badonnel.

wittei Badonnel. Congo.
Eocaecilius wittei Badonnel, 1959. *Explor. Parc nat. Albert, Mission G.F. de Witte* (1933-1935) 95: 13, figs. 22-25.

Genus **Fulleborniella** Enderlein

Fulleborniella Enderlein, 1902. *Mitt. zool. Mus. Berl.* 2: 10.
Type species: *Fulleborniella nyassica* Enderlein.

anomala Badonnel. Congo.
Fulleborniella anomala Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 39, figs. 55-58.

capensis Enderlein. South Africa.
Fulleborniella capensis Enderlein, 1925. *Konowia* 4: 106.

comorensis Enderlein. Comoros, Seychelles.
Fulleborniella comorensis Enderlein, 1908. *Reise in Ostafrika* 2: 249; pl. 11, fig. 4.

distincta Badonnel. Angola.
Fulleborniella distincta Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 152, figs. 323-326.

dubia Badonnel. Angola.
Fulleborniella dubia Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 149, figs. 321, 322.

fulva Badonnel. Cameroons, Congo.
Fulleborniella fulva Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 148, figs. 23-28.
Fulleborniella fulva var. *congolensis* Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 289, figs. 47-49A, 50A.

fusca Badonnel. Angola.
Fulleborniella fusca Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 155, figs. 338-339.

intermedia Badonnel. Congo, Ivory Coast, Angola, Uganda.
Fulleborniella intermedia Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 160, fig. 52.
Fulleborniella intermedia Badonnel. Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 38. (♂, *not* ♀).
maculistigma Enderlein. Java.
Fulleborniella maculistigma Enderlein, 1926. *Zool. Meded.* 9: 56.
nigricornis Badonnel. Angola.
Fulleborniella nigricornis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 153, figs. 335-337, 340.
nimbensis Badonnel. French Guinea, Angola.
Fulleborniella nimbensis Badonnel, 1948. *Rev. franc. Ent.* 15: 83, fig. 6.
nyassica Enderlein. East Africa, Angola.
Fulleborniella nyassica Enderlein, 1902. *Mitt. Mus. zool. Berl.* 2: 11, fig. 14.
parva Badonnel. Congo, French Guinea, Angola.
Fulleborniella parva Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 159, fig. 51.
Fulleborniella intermedia Badonnel. Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 38, figs. 52-54. (♀ *not* ♂).
parviramosa Enderlein. Australia.
Fulleborniella parviramosa Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 281.
serpentina Enderlein. Java.
Fulleborniella serpentina Enderlein, 1926. *Zool. Meded.* 9: 55.
singaporensis Enderlein. Singapore.
Fulleborniella singaporensis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 28; pl. VIII, fig. 36.
tuberculata Badonnel. Angola.
Fulleborniella tuberculata Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 153, figs. 329-334.

Genus **Lacroixiella** Badonnel

Lacroixiella Badonnel, 1943. *Faune de Fr.* 42: 126.
Type species: *Caecilius martini* Lacroix.
martini (Lacroix). France.
Caecilius martini Lacroix, 1919. *Bull. Soc. ent. Fr.* 1919: 80, 1 fig.
Lacroxiella martini (Lacroix). Badonnel, 1943. *Faune de Fr.* 42: 126, fig. 331.

Genus **Maoripsocus** Tillyard

Maoripsocus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 191.
Type species: *Maoripsocus semifuscatus* Tillyard.
semifuscatus Tillyard. New Zealand.
Maoripsocus semifuscatus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 191, fig. 16; pl. 18, fig. 11.

Genus **Mepleres** Enderlein

Mepleres Enderlein, 1926. *Zool. Meded.* 9: 61.
Type species: *Mepleres maeandricus* Enderlein.
Subgenera:
(Mepleres) Enderlein, 1926. *Zool. Meded.* 9: 61.
Type species: *Mepleres maeandricus* Enderlein. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 158.
(Hageniola) Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 438.
Type species: *Hageniola solitaria* Banks. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 158.
angolensis Badonnel. **(Mepleres).** Angola.
Mepleres angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 141, figs. 308-310.

lanatus (Hagen). **(Mepleres).** Ceylon.
Psocus lanatus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 202.
Epipsocus lanatus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Hageniella lanata (Hagen). Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 259.
Hemicaecilius lanatus (Hagen). Banks, 1931. *Proc. Hawaii ent. Soc.* 7: 438.
Mepleres lanatus (Hagen). Roesler, 1944. *Stettin. ent. Ztg.* 105: 124.

limbatus (Enderlein). **(Mepleres).** Formosa.
Hemicaecilius limbatus Enderlein, 1908. *Zool. Anz.* 33: 770.
Mepleres limbatus (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 124.

maeandricus Enderlein. **(Mepleres).** Java.
Mepleres maeandricus Enderlein, 1926. *Zool. Meded.* 9: 61.
Mepleres (Mepleres) maeandricus Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 158.

medialis (Banks). **(Mepleres).** Queensland.
Hemicaecilius medialis Banks, 1939. *Bull. Mus. comp. Zool. Harv.* 85: 440, fig. 1.
Mepleres medialis (Banks). Roesler, 1944. *Stettin. ent. Ztg.* 105: 124.

nigroguttatus (Karny). **(Mepleres).** Sarawak.
Hemicaecilius nigroguttatus Karny, 1925. *Sarawak Mus. J.* 3: 73; pl. 3, fig. 7.
Mepleres nigroguttatus (Karny). Karny, 1932. *Ins. Samoa* 4: 128.

ornatus Banks. **(Mepleres).** Guam.
Mepleres ornatus Banks, 1942. *Bull. Bishop Mus. Honolulu* 172: 27, fig. 1h.

solitaria (Banks). **(Hageniola).** Hawaii.
Hageniola solitaria Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 438; pl. VII, fig. 5.
Mepleres solitaria (Banks). Roesler, 1944. *Stettin. ent. Ztg.* 105: 124.
Mepleres (Hageniola) solitaria (Banks). Roesler, 1944. *Stettin. ent. Ztg.* 105: 158.

submarginalis Karny. **(Mepleres).** Samoa.
Mepleres submarginalis Karny, 1932. *Ins. Samoa* 7 (4): 127, fig. 8.

suzukii (Okamoto). **(Mepleres).** Japan.
Hemicaecilius suzukii Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 193; pl. 3, fig. 5.
Mepleres suzukii (Okamoto). Roesler, 1944. *Stettin. ent. Ztg.* 105: 124.

transversus (Banks). **(Mepleres).** Formosa, Thailand.
Hemicaecilius transversus Banks, 1937. *Philipp. J. Sci.* 62: 265; pl. 3, fig. 27.
Mepleres transversus (Banks). Roesler, 1944. *Stettin. ent. Ztg.* 105: 124.

Genus **Paracaecilius** Badonnel

Paracaecilius Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 235.
Type species: *Paracaecilius berlandi* Badonnel.

berlandi Badonnel. Mozambique.
Paracaecilius berlandi Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 237, figs. 8, 9.

Genus **Ptenolasia** Enderlein

Ptenolasia Enderlein, 1911. *Palaeontographica* 58: 321.
Type species: *Caecilius pilosus* Hagen.

pilosa (Hagen). East Prussia (in amber).
Caecilius pilosus Hagen, 1882. *Stettin. ent. Ztg.* 43: 283; pl. 1, fig. 3.
Ptenolasia pilosa (Hagen). Enderlein, 1911. *Palaeontographica* 58: 321, figs. F, 45.

Genus **Ptenopsila** Enderlein

Ptenopsila Enderlein, 1923. *Zool. Anz.* 55: 246.
Type species: *Psocus delicatellus* Blanchard.

delicatella (Blanchard). Chile.

Psocus delicatellus Blanchard, 1851. In Gay, C. *Historia fisica y politica de Chile* 6: 94; pl. 2, fig. 1.

Psocus costalis Blanchard, 1851. In Gay, C. *Historia fisica y politica de Chile* 6: 94.

Caecilius altus Navas, 1922. *Rev. Chil. Hist. nat.* 21: 444.

Ptenopsila delicatella (Blanchard). Enderlein, 1923. *Zool. Anz.* 55: 247, 1 fig.

Genus **Tagalopsocus** Banks

Tagalopsocus Banks, 1916. *Philipp. J. Sci.* 11: 201.

Type species: *Tagalopsocus luzonensis* Banks.

hyalinus Banks. Philippines.

Tagalopsocus hyalinus Banks, 1931. *Psyche, Camb. Mass.* 38: 58.

luzonensis Banks. Philippines.

Tagalopsocus luzonensis Banks, 1916. *Philipp. J. Sci.* 11: 201; pl. I, figs. 9, 10.

Genus **Teliapsocus** Chapman

Teliapsocus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 334.

Type species: *Psocus conterminus* Walsh.

conterminus (Walsh). North America.

Psocus conterminus Walsh, 1863. *Proc. ent. Soc. Philad.* 2: 185.

Elipsocus conterminus (Walsh). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.

Psocus canadensis Provancher, 1876. *Nat. canad.* 8: 177.

Caecilius definitis Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 38; pl. 9, fig. 4.

Teliapsocus conterminus (Walsh). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 334; pl. 16, figs. 4, 8; pl. 20, fig. 29.

Genus **Ypsiloneura** Pearman

Ypsiloneura Pearman, 1932. *Stylops* 1: 91.

Type species: *Ypsiloneura kirkpatricki* Pearman.

kirkpatricki Pearman. East Africa.

Ypsiloneura kirkpatricki Pearman, 1932. *Stylops* 1: 91, fig. 1.

monostyla Badonnel. Angola.

Ypsiloneura monostyla Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 157, figs. 341-343.

Subfamily **SCHIZOPECHINAE**

Genus **Schizopechus** Pearman

Schizopechus Pearman, 1934. *Stylops* 3: 131.

Type species: *Schizopechus marshalli* Pearman.

marshalli Pearman. Uganda, French Guinea, Congo.

Schizopechus marshalli Pearman, 1934. *Stylops* 3: 132, fig. 12.

Subfamily **STENOPSOCINAE**

Genus **Epikodamaius** Kuwayama

Epikodamaius Kuwayama, 1961. *Nature and Life in S.E. Asia* 1: 203.

Type species: *Epikodamaius ikomai* Kuwayama.

ikomai Kuwayama. Thailand.

Epikodamaius ikomai Kuwayama, 1961. *Nature and Life in S.E. Asia* 1: 203, fig. 1.

Genus **Graphopsocus** Kolbe

Graphopsocus Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 124.

Type species: *Hemerobius cruciatus* Linnaeus.

Teratopsocus Reuter, 1894. *Act. Soc. Fauna Flora fenn.* 9: 43.

Type species: *Teratopsocus maculipennis* Reuter.

cruciatus (Linnaeus). Europe, Morocco, Angola, Canary Islands, North America, Japan, China.
Hemerobius cruciatus Linnaeus, 1768. *Syst. nat.* Ed. XIII, 3: 225.
Hemerobius quadripunctatus Fabricius, 1787. *Mantissa Insectorum* 1: 248.
Psocus quadripunctatus (Fabricius). Fabricius, 1798. *Suppl. Ent. syst.* p. 204.
Psocus subocellatus Stephens, 1836. *Illustrations of British Entomology* 6: 124.
Psocus costalis Stephens, 1836. *Illustrations of British Entomology* 6: 126.
Psocus nervosus Stephens, 1836. *Illustrations of British Entomology* 6: 126.
Psocus cruciatus (Linnaeus). Brauer, 1857. *Neuroptera austriaca* p. 32.
Stenopsocus cruciatus (Linnaeus). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 219.
Graphopsocus cruciatus (Linnaeus). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 125, fig. 18.
Teratopsocus maculipennis Reuter, 1893. *Act. Soc. Fauna Flora fenn.* 9: 29, 44, fig. 5.
Stenopsocus cruciatus var. *nervosus* (Stephens). McLachlan, 1881. *Zool. Rec.* 1880: 211.
Graphopsocus cruciatus var. *brevipennis* Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 372.

infirmus Banks. Philippines.
Graphopsocus infirmus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 308.

mexicanus Enderlein. Mexico, Brazil.
Graphopsocus mexicanus Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 331.

subaequalis Banks. Singapore.
Graphopsocus subaequalis Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 308.

uniformis (Hagen). Philippines, Ceylon, Java.
Psocus uniformis Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 200.
Stenopsocus uniformis (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 218, 219.
Graphopsocus uniformis (Hagen). Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 242; pl. V, fig. 20.
Graphopsocus uniformis var. *frontalis* Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 309.

Genus **Kodamaius** Okamoto

Kodamaius Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 138.
Type species: *Kodamaius brevicornis* Okamoto.
Stenepipsocus Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 155.
Type species: *Stenepipsocus collarti* Badonnel.

angolensis (Badonnel). Angola.
Stenepipsocus angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 162, figs. 353, 354.

brevicornis Okamoto. Formosa, Japan.
Kodamaius brevicornis Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 139; pl. II, fig. 2.
Kodamaius pilosus Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 140; pl. II, fig. 7.

collarti (Badonnel). Congo.
Stenepipsocus collarti Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 155, figs. 43-48.

curvatus (Navas). Congo.
Amphigerontia nervata Navas, 1932. *Rev. Zool. Bot. afr.* 22: 282, fig. 81.
Amphigerontia curvata Navas, 1932. *Rev. Zool. Bot. afr.* 22: 282, fig. 81. (Multiple original spelling).

Stenepipsocus curvatus (Navas). Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 157 (footnote).

lamottei (Badonnel). French Guinea.
Stenepipsocus lamottei Badonnel, 1948. *Rev. franc. Ent.* 15: 81, figs. 1-4.

Genus **Matsumuraiella** Enderlein

Matsumuraiella Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 248.
Type species: *Matsumuraiella radiopicta* Enderlein.

enderleini Banks. Formosa.
Matsumuraiella enderleini Banks, 1937. *Philipp. J. Sci.* 62: 260.

radiopicta Enderlein. Japan.
Matsumuraiella radiopicta Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 248; pl. 10, fig. 3.

Genus **Stenopsocus** Hagen

Stenopsocus Hagen, 1886. *Verh. zool. -bot. Ges. Wien* 16: 203.
Type species: *Psocus immaculatus* Stephens.

apertus (Hagen). Ceylon.
Psocus apertus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 204.
Stenopsocus apertus (Hagen). Hagen, 1886. *Verh. zool. -bot. Ges. Wien* 16: 219.

aphidiformis Enderlein. Japan, Formosa.
Stenopsocus aphidiformis Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 249; pl. 10, fig. 5.

bicoloripes Enderlein. South China.
Stenopsocus bicoloripes Enderlein, 1936. *Ark. Zool.* 27A: 2.

chusamensis Navas. China.
Stenopsocus chusamensis Navas, 1933. *Notes Ent. chin.* 9: 14.

dissimilis Banks. Philippines.
Stenopsocus dissimilis Banks, 1937. *Philipp. J. Sci.* 63: 127.

externus Banks. Formosa.
Stenopsocus externus Banks, 1937. *Philipp. J. Sci.* 62: 259; pl. 3, fig. 22.

formosanus Banks. Formosa.
Stenopsocus formosanus Banks, 1937. *Philipp. J. Sci.* 62: 259.

immaculatus (Stephens). Europe.
Psocus immaculatus Stephens, 1836. *Illustrations of British Entomology* 6: 125.
Psocus rufescens Stephens, 1836. *Illustrations of British Entomology* 6: 125.
Psocus flavescens Stephens, 1836. *Illustrations of British Entomology* 6: 125.
Psocus venosus Stephens, 1836. *Illustrations of British Entomology* 6: 121.
Psocus strigosus Burmeister, 1839. *Handbuch der Entomologie* p. 776.
Psocus subfumipennis Zetterstedt, 1840. *Insecta Lapponica* p. 1053.
Psocus flavicans Zetterstedt, 1840. *Insecta Lapponica* p. 1054.
Stenopsocus immaculatus (Stephens). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 219.

jocosus Banks. Philippines.
Stenopsocus jocosus Banks, 1939. *Philipp. J. Sci.* 69: 135, fig. 9.

lachlani Kolbe. Europe.
Stenopsocus lachlani Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 127; pl. III, fig. 17.
Stenopsocus immaculatus var. *lachlani* Enderlein, 1906. *Ber. westpreuss. bot. -zool. Ver.* 28: 79.

makii Takahashi. Formosa.
Stenopsocus makii Takahashi, 1938. *Mushi* 11: 14.

niger Enderlein. Japan.
Stenopsocus niger Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 249; pl. 10, fig. 7.

nigricellus Okamoto. Japan.
Stenopsocus nigricellus Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 141.
pilosus Enderlein. Japan.
Stenopsocus pilosus Enderlein, 1926. *Zool. Meded.* 9: 54.
pygmaeus Enderlein. Japan.
Stenopsocus pygmaeus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 250; pl. 10, fig. 6.
stigmaticus Imhoff and Labram. Europe.
Hemerobius striatulus Fabricius, 1775. *Systema Entomologiae* p. 310.
Psocus stigmaticus Imhoff and Labrum, 1846. *Insecten der Schweiz* p.
Stenopsocus striatulus (Fabricius). *Verh. zool. -bot. Ges. Wien* 16: 219.
Stenopsocus lineolatus Navas, 1916. *Rev. Acad. Madrid* 14: 598, fig. 3.
Stenopsocus stigmaticus (Imhoff and Labrum). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 13.
striatifrons (McLachlan). South Australia.
Psocus striatifrons McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 351.
Stenopsocus striatifrons (McLachlan). McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 352.
tibialis Banks. Formosa.
Stenopsocus tibialis Banks, 1937. *Philipp. J. Sci.* 62: 259; pl. 3, fig. 25.
tonkinensis Enderlein. Tonkin.
Stenopsocus tonkinensis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 240; pl. V, fig. 19.

Genus **Taeniostigma** Enderlein

Taeniostigma Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 546.
Type species: *Psocus elongatus* Hagen.
bimaculatum Banks. Philippines.
Taeniostigma bimaculata Banks, 1913. *Proc. ent. Soc. Wash.* 15: 171.
elongatum (Hagen). Ceylon, Singapore, Java, Bismarck Archipelago.
Psocus elongatus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 474.
Psocus clarus McLachlan, 1872. *Ent. mon. Mag.* 9: 75.
Taeniostigma clarum (McLachlan). Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 546.
Taeniostigma elongatum (Hagen). Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 546; pl. 35, fig. 9.
ingens Enderlein. Tonkin, China, Formosa, Japan.
Taeniostigma ingens Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 238; pl. V, fig. 18.
malayanum (McLachlan). Sula.
Psocus malayanus McLachlan, 1872. *Ent. mon. Mag.* 9: 75.
Taeniostigma malayanum (McLachlan). Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 546.
perkinsi Banks. Queensland.
Taeniostigma perkinsi Banks, 1918. *Bull. Mus. comp. Zool. Harv.* 62: 5; pl. II, fig. 23.
tibiale Navas. Tonkin.
Taeniostigma tibiale Navas, 1924. *Mem. Pont. Accad. Sci. Nuovi Lincei* 7: 215.

Family **AMPHIPSOCIDAE**

Subfamily **AMPHIPSOCINAE**

Genus **Amphipsocopsis** Smithers

Amphipsocopsis Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 225.
Type species: *Amphipsocopsis surculosus* Smithers.
surculosus Smithers. Madagascar.
Amphipsocopsis surculosus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 226, figs. 25, 26.

Genus **Amphipsocus** McLachlan

Amphipsocus McLachlan, 1872. *Ent. mon. Mag.* 9: 77.
Type species: *Amphipsocus pilosus* McLachlan.
Rosega Navas, 1931. *Rev. Zool. Bot. afr.* 21: 132.
Type species: *Rosega picta* Navas.

amplus Smithers. Madagascar.
Amphipsocus amplus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 230.

callani Smithers. Madagascar.
Amphipsocus callani Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 236, fig. 35.

camerunus Badonnel. Cameroons, Congo, Tanganyika.
Amphipsocus camerunus Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 147, figs. 18, 19, 22.

cognatus Smithers. Madagascar.
Amphipsocus cognatus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 231, fig. 29.

confusus Smithers. Madagascar.
Amphipsocus confusus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 237, fig. 33.

connexus Banks. Philippines.
Amphipsocus connexus Banks, 1916. *Philipp. J. Sci.* 11: 200; pl. I, fig. 6.

disgregus Smithers. Uganda.
Amphipsocus disgregus Smithers, 1960. *Ann. Mus. Congo Belge 8vo.* 88: 367, figs. 3-5.

dispar Smithers. Madagascar.
Amphipsocus dispar Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 232, figs. 27, 28.

erythrostigma Badonnel. Madagascar.
Amphipsocus erythrostigma Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 111; pl. IV, figs. 1, 2.

facetus Smithers. Madagascar.
Amphipsocus facetus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 242, figs. 36-40.

fasciatus Badonnel. Congo, Angola.
Amphipsocus fasciatus Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 157, figs. 49, 50.

flavidus Smithers. Madagascar.
Amphipsocus flavidus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 239, fig. 34.

formosanus Okamoto. Formosa, China.
Amphipsocus formosanus Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 195; pl. IV, fig. 2.

ghesquierei Badonnel. Congo.
Amphipsocus ghesquierei Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 287, figs. 46A, 46B.

hildebrandti Kolbe. Madagascar.
Amphipsocus hildebrandti Kolbe, 1885. *Berl. ent. Z.* 29: 189, figs. 3a-3c.

hyalinus Smithers. Madagascar.
Amphipsocus hyalinus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 234, figs. 31, 32.

iridescens Enderlein. East Africa.
Amphipsocus iridescens Enderlein, 1906. *Stettin. ent. Ztg.* 67: 311.

limbatus Badonnel. Madagascar.
Amphipsocus limbatus Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 112; pl. III, fig. 11.

madagascariensis Smithers. Madagascar.
Amphipsocus madagascariensis Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 241.

montanus Enderlein. East Africa.
Amphipsocus montanus Enderlein, 1902. *Mitt. Mus. Berl.* 2: 9; pl. 5, figs. 5, 5a.

pallidus Navas. East Africa.
Amphipsocus pallidus Navas, 1936. *Rev. Zool. Bot. afr.* 28: 363, fig. 118.
pictus (Navas). Congo, Uganda.
Rosega picta Navas, 1931. *Rev. Zool. Bot. afr.* 21: 132, fig. 69.
Amphipsocus pictus (Navas). Pearman, 1934. *Stylops* 3: 129.
pilosus McLachlan. India, Java.
Amphipsocus pilosus McLachlan, 1872. *Ent. mon. Mag.* 9: 77.
rubrostigma Okamoto. Japan.
Amphipsocus rubrostigma Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 194; pl. IV, fig. 1.
similis Badonnel. Madagascar.
Amphipsocus similis Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 112; pl. III, fig. 12.
unitus Banks. Philippines.
Amphipsocus unitus Banks, 1916. *Philipp. J. Sci.* 11: 201; pl. I, fig. 7.
vittatus Smithers. Madagascar.
Amphipsocus vittatus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 240, figs. 41, 42.

Genus **Harpezoneura** Enderlein

Harpezoneura Enderlein, 1909. *Stettin. ent. Ztg.* 70: 270.
Type species: *Harpezoneura multifurcata* Enderlein.
ambigua Badonnel. Congo, Angola.
Harpezoneura ambigua Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 161, figs. 53-56.
difficilis Badonnel. Congo.
Harpezoneura difficilis Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 291, fig. 51.
distincta Badonnel. Madagascar.
Harpezoneura distincta Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 116; pl. IV, fig. 5.
intermedia Badonnel. Congo.
Harpezoneura intermedia Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 161.
lateralis Badonnel. Congo.
Harpezoneura lateralis Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 165, fig. 57.
limbata Badonnel. Congo, French Guinea.
Harpezoneura limbata Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 167, fig. 58.
madagascariensis Badonnel. Madagascar.
Harpezoneura madagascariensis Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 114; pl. IV, fig. 6.
multifurcata Enderlein. East Africa.
Harpezoneura multifurcata Enderlein, 1909. *Stettin. ent. Ztg.* 70: 270, fig. 2.
pallens Pearman. Sierra Leone, Congo.
Harpezoneura pallens Pearman, 1934. *Stylops* 3: 130, fig. 11.
pilosa Badonnel. Congo.
Harpezoneura pilosa Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 167, fig. 59.
speciosa Pearman. Uganda, Congo.
Harpezoneura speciosa Pearman, 1934. *Stylops* 3: 130, fig. 10.
stigmalis Pearman. Uganda.
Harpezoneura stigmalis Pearman, 1934. *Stylops* 3: 130.

Genus **Pentathyrsus** Enderlein

Pentathyrsus Enderlein, 1912. *Zool. Anz.* 39: 300.
Type species: *Pentathyrsus vespertilio* Enderlein.
vespertilio Enderlein. Madagascar.
Pentathyrsus vespertilio Enderlein, 1912. *Zool. Anz.* 39: 300.

Genus **Xenopsocus** Kolbe

Xenopsocus Kolbe, 1885. *Berl. ent. Z.* 29: 187.
Type species: *Xenopsocus hageni* Kolbe.

affinis Badonnel. Madagascar.
Xenopsocus affinis Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 113; pl. IV, fig. 3.

hageni Kolbe. Madagascar.
Xenopsocus hageni Kolbe, 1885. *Berl. ent. Z.* 29: 188; pl. IVB, fig. 2.

Subfamily **KOLBEINAE**

Genus **Dasypsocus** Enderlein

Dasypsocus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 250.
Type species: *Kolbea solox* Enderlein.

angolensis Badonnel. Angola.
Dasypsocus angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 165, figs. 355-361.

brunneus Badonnel. Angola, Congo.
Dasypsocus brunneus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 167, figs. 363, 364.

congolensis Badonnel. Congo.
Dasypsocus congolensis Badonnel, 1959. *Explor. Parc nat. Albert, Mission G. F. de Witte* (1933-1935) 95: 16, figs. 26-28.

japonicus Enderlein. Japan.
Dasypsocus japonicus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 251; pl. 11, fig. 10.

pilosus Badonnel. Angola.
Dasypsocus pilosus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 170, figs. 374, 375.

solox (Enderlein). Singapore.
Kolbea solox Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 278; pl. V, fig. 32.
Dasypsocus solox (Enderlein). Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 250.

tibialis Badonnel. Angola.
Dasypsocus tibialis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 169, figs. 365-373.

Genus **Kolbea** Bertkau

Kolbia Bertkau, 1883. *Verh. naturh. Ver. preuss. Rheinl.* 39: 129.
Type species: *Kolbia quisquiliarum* Bertkau.
Kolbea Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 538 (footnote emends spelling).

ava Enderlein. East Prussia (in amber).
Kolbea ava Enderlein, 1911. *Palaeontographica* 58: 313, fig. 39.

bakeri Banks. Philippines.
Kolbea bakeri Banks, 1916. *Philipp. J. Sci.* 11: 201; pl. I, fig. 8.

fusconervosa Enderlein. Japan, Formosa.
Kolbea fusconervosa Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 252; pl. 11, fig. 11.

hummeli Enderlein. China.
Kolbea hummeli Enderlein, 1936. *Ark. Zool.* 27 (A): 4, fig. 3.

kogoshimensis Okamoto. Japan.
Kolbea kogoshimensis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 198; pl. IV, fig. 3.

maculipennis Karny. Sarawak.
Kolbea maculipennis Karny, 1925. *Sarawak Mus. J.* 3: 71; pl. 3, fig. 6.

nigrifrons Roesler. Brazil.
Kolbea nigrifrons Roesler, 1940. *Zool. Anz.* 130: 17.

punctata Banks. India.
Kolbea punctata Banks, 1914. *Rec. Indian Mus.* 8: 352; pl. XXV, fig. 5.

quisquiliarum (Bertkau). Europe.
Kolbia quisquiliarum Bertkau, 1883. *Verh. naturh. Ver. preuss. Rheinl.* 39: 129.
Kolbea quisquiliarum (Bertkau). Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 538.

serialis Banks. Formosa.
Kolbea serialis Banks, 1937. *Philipp. J. Sci.* 62: 261; pl. 2, fig. 16.
?*Aaroniella serialis* (Banks). Thornton, 1962. *N.Z.J. Sci.* 5: 241.

Family **POLYPSOCIDAE**

Genus **Monocladellus** Enderlein

Monocladellus Enderlein, 1909. *Stettin. ent. Ztg.* 70: 266.
Type species: *Monocladellus ohausianus* Enderlein.

ohausianus Enderlein. Ecuador.
Monocladellus ohausianus Enderlein, 1909. *Stettin. ent. Ztg.* 70: 267, fig. 1.

Genus **Polypsocus** Hagen

Polypsocus Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 203.
Type species: *Psocus corruptus* Hagen.
Ptilopsocus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 140.
Type species: *Ptilopsocus fuscus* Enderlein.

bimaculatus Enderlein. Chile.
Polypsocus bimaculatus Enderlein, 1925. *Konowia* 4: 105.

coleoptratus Roesler. Brazil.
Polypsocus coleoptratus Roesler, 1940. *Zool. Anz.* 130: 20, figs. 95-98.

corruptus (Hagen). North America.
Psocus corruptus Hagen, 1861. *Smithson. misc. Coll.* 4: 13.
Psocus abruptus Hagen, 1861. *Smithson. misc. Coll.* 4: 13.
Polypsocus abruptus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 211.
Polypsocus corruptus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 211.
Ptilopsocus annulicornis Banks, 1903. *J.N.Y. ent. Soc.* 11: 238.
Polypsocus corruptus var. *pictilis* Banks, 1938. *Psyche, Camb. Mass.* 45: 72.

delunatus Roesler. Brazil.
Polypsocus delunatus Roesler, 1940. *Zool. Anz.* 130: 23, fig. 100.
Polypsocus delunatus ab. *tenebrellus* Roesler, 1940. *Zool. Anz.* 130: 24, fig. 101.

desertus (Enderlein). Peru.
Ptilopsocus desertus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 151; pl. 9, fig. 18.
Polypsocus desertus (Enderlein). Enderlein, 1906. *Stettin. ent. Ztg.* 67: 320.

falcifer Roesler. Brazil.
Polypsocus falcifer Roesler, 1940. *Zool. Anz.* 130: 32.

fasciatus Banks. Cuba, Porto Rica.
Polypsocus fasciatus Banks, 1908. *Trans. Amer. ent. Soc.* 34: 258.

fastosus Roesler. Brazil.
Polypsocus fastosus Roesler, 1940. *Zool. Anz.* 130: 22, fig. 99.

fuscus (Enderlein). Peru, Bolivia.
Ptilopsocus fuscus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 151; pl. 9, fig. 17.
Polypsocus fuscus (Enderlein). Enderlein, 1906. *Stettin. ent. Ztg.* 67: 320.

griseolineatus (Enderlein). Peru.
Ptilopsocus griseolineatus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 152; pl. 9, fig. 20.
Polypsocus griseolineatus (Enderlein). Enderlein, 1906. *Stettin. ent. Ztg.* 67: 320.

lunulatus Enderlein. Peru.
Polypsocus lunulatus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 154; pl. 9, fig. 21.

nervulosus Enderlein. Ecuador.
Polypsocus nervulosus Enderlein, 1909. *Stettin. ent. Ztg.* 70: 269.

omissus Banks. North America.
Polypsocus omissus Banks, 1938. *Psyche, Camb. Mass.* 45: 72.

quadriguttatus (Enderlein). Peru.
Ptilopsocus quadriguttatus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 152; pl. 9, fig. 19.
Polypsocus quadriguttatus (Enderlein). Enderlein, 1906. *Stettin. ent. Ztg.* 67: 320.

selenius Roesler. Brazil.
Polypsocus selenius Roesler, 1940. *Zool. Anz.* 130: 22, fig. 94.

suffusus Roesler. Brazil.
Polypsocus suffusus Roesler, 1940. *Zool. Anz.* 130: 20.

unicolor Roesler. Brazil.
Polypsocus unicolor Roesler, 1940. *Zool. Anz.* 130: 19, fig. 93.

Group **HOMILOPSOCIDEA**

Family **LACHESILLIDAE**

Genus **Lachesilla** Westwood

Lachesilla Westwood, 1840. *Synopsis of the genera of British Insects* p. 47.
Type species: *Termes fatidicum* Linnaeus.

Pterodela Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 118.
Type species: *Hemerobius pedicularius* Linnaeus.

Leptopsocus Reuter, 1899. *Act. Soc. Fauna Flora fenn.* 17: 5.
Type species: *Leptopsocus exiguus* Reuter.

Terracaecilius Chapman, 1930. *J.N.Y. ent. Soc.* 38: 343.
Type species: *Terracaecilius pallidus* Chapman.

aethiopica Enderlein. East Africa, Congo, Angola.
Lachesilla pedicularia var. *aethiopica* Enderlein, 1902. *Mitt. zool. Mus. Berl.* 2: 11; pls. 2, 3.

andra Sommerman. North America.
Lachesilla andra Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 635; figs. 17, 32.

anna Sommerman. North America.
Lachesilla anna Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 636, figs. 1, 22.

annulata Smithers. Madagascar.
Lachesilla annulata Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 245, figs. 43-47.

anomala Badonnel. Congo.
Lachesilla anomala Badonnel, 1959. *Explor. Parc nat. Albert, Mission de Witte* (1933-1935) 95: 19, figs. 29-32.

anura Badonnel. Mozambique, French Guinea.
Lachesilla anura Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 242, fig. 14.

aquilina Badonnel. Cameroons, Congo.
Lachesilla aquilina Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 151, figs. 36-38, 40, 44-46.

arida Chapman. Arizona.
Lachesilla arida Chapman, 1930. *J.N.Y. ent. Soc.* 38: 346; pl. XVII, fig. 8.

arnae Sommerman. Canada.
Lachesilla arnae Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 638, figs. 14, 34.

badonneli Williner. Bolivia.
Lachesilla badonneli Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 125, fig. 15.

bellula (Banks). Honduras.
Terracaecilius bellulus Banks, 1930. *Psyche, Camb. Mass.* 37: 185.

bernardi Badonnel. Europe.
Lachesilla bernardi Badonnel, 1938. *Bull. Soc. ent. Fr.* 43: 19.

bicolor Smithers. Madagascar.
Lachesilla bicolor Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 246, figs. 48-52.

bottimeri Mockford and Gurney. Texas.
Lachesilla bottimeri Mockford and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 365, figs. 48-51.

bugiriana Smithers. Uganda.
Lachesilla bugiriana Smithers, 1960. *Ann. Mus. Congo belge 8vo.* 88: 368, figs. 6, 7.

cameruna Badonnel. Cameroons.
Lachesilla cameruna Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 150, figs. 34, 35, 39, 41-43.

castrii Badonnel. Chile.
Lachesilla castrii Badonnel, 1963. *Biol. l'Amerique australe* 2: 336, figs. 85-88.

chapmani Sommerman. Florida.
Lachesilla chapmani Somerman, 1946. *Ann. ent. Soc. Amer.* 39: 639, figs. 39, 42.

chilensis Enderlein. Chile.
Lachesilla chilensis Enderlein, 1926. *Zool. Anz.* 46: 192.

contraforcepata Chapman. North America.
Lachesilla contraforcepata Chapman, 1930. *J.N.Y. ent. Soc.* 38: 348; pl. XVII, fig. 10; pl. XVIII, fig. 4.

cornuta Badonnel. Congo, Angola.
Lachesilla cornuta Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 309, figs. 96-103.

corona Chapman. North America.
Lachesilla corona Chapman, 1930. *J.N.Y. ent. Soc.* 38: 350; pl. XVII, fig. 4; pl. XVIII, fig. 11.

dona Sommerman. California.
Lachesilla dona Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 641, figs. 16, 29.

forcepata Chapman. North America.
Lachesilla forcepata Chapman, 1930. *J.N.Y. ent. Soc.* 38: 348; pl. XVII, fig. 2; pl. XVIII, fig. 1.

furcata Badonnel. Congo.
Lachesilla furcata Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 55, fig. 73.

fusca Badonnel. Ivory Coast, Angola, Congo.
Lachesilla fusca Badonnel, 1949. *Rev. franc. Ent.* 16: 41, fig. 53.

gigantea Badonnel. Ruwenzori.
Lachesilla gigantea Badonnel, 1935. *Rev. franc. Ent.* 2: 79, figs. 5-9.

gobiernoi (Navas). Spain.
Pterodela gobiernoi Navas, 1913. *Rev. Acad. Madrid* 12: 331, figs. 3a, 3b, 3c.
Lachesilla gobiernoi (Navas). Badonnel, 1943. *Faune de Fr.* 42: 151.

grandis Badonnel. Mozambique.
Lachesilla grandis Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 240, figs. 12, 13.

greeni (Pearman). Europe.
Terracaecilius greeni Pearman, 1933. *Ent. mon. Mag.* 69: 81, figs. 1, 2.
Lachesilla (Terracaecilius) greeni (Pearman). Roesler, 1939. *Zool. Anz.* 125: 169.
Lachesilla greeni f. *longipennis* Roesler, 1939. *Zool. Anz.* 125: 176, fig. 11.

jeanae Sommerman. Colorado.
Lachesilla jeanae Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 643, figs. 11, 26.

kahuziana Badonnel. Congo.
Lachesilla kahuziana Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 178, figs. 82, 85, 90-92.

kathrynae Mockford and Gurney. Texas.
Lachesilla kathrynae Mockford and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 365, figs. 44-47.

kikurensis Badonnel. Congo.
Lachesilla kikurensis Badonnel, 1959. *Explor. Parc nat. Albert, Mission G. F. de Witte* (1933-1935) 95: 21, figs. 33-35.

kola Sommerman. California.
Lachesilla kola Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 644, figs. 10, 31.

lactea Williner. Bolivia.
Lachesilla lactea Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 123, fig. 14.

latinerva Badonnel. Angola.
Lachesilla latinerva Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 210, figs. 490-491.

livida (Enderlein). Europe.
Pterodela livida Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 374, figs. 3, 4, 6, 9.
Lachesilla livida (Enderlein). Enderlein, 1927. *Die Tierwelt Mitteleuropas* 42, (2): 8.

machi (Navas). Spain.
Pterodela machi Navas, 1913. *Rev. Acad. Madrid* 12: 330, figs. 2a, 2b.
Lachesilla machi (Navas). Badonnel, 1943. *Faune de Fr.* 43: 151.

major Chapman. North America.
Lachesilla forcepata var. *major* Chapman, 1930. *J.N.Y. ent. Soc.* 38: 349; pl. XVIII, fig. 6.
Lachesilla major Chapman. Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 645, figs. 3, 19.

micrura Badonnel. Angola.
Lachesilla micrura Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 213, figs. 497-500.

mucronata Badonnel. Congo, Angola, Uganda.
Lachesilla mucronata Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 175, figs. 80, 81, 83, 84, 86, 89.

muncunilli (Navas). Spain.
Pterodela muncunilli Navas, 1913. *Rev. Acad. Madrid* 12: 329, figs. 1a, 1b.
Lachesilla muncunilli (Navas). Badonnel, 1943. *Faune de Fr.* 43: 151.

nita Sommerman. Florida.
Lachesilla nita Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 646, figs. 40, 43.

nubilis (Aaron). North America.
Caecilius nubilis Aaron, 1886. *Proc. Acad. nat. Sci. Philad.* 38: 13; pl. 1, fig. 3.
Lachesilla nubilis (Aaron). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 351; pl. XVII, fig. 1; pl. XVIII, fig. 5; pl. XXI, fig. 8.

pachyura Badonnel. Angola.
Lachesilla pachyura Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 211, figs. 492-496.

pacifica Chapman. North America.
Lachesilla pacifica Chapman, 1930. *J.N.Y. ent. Soc.* 38: 353; pl. XVII, fig. 5.

pallida (Chapman). North America.
Terracaecilius pallidus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 343; pl. XVII, fig. 7.
Lachesilla pallida (Chapman). Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 649, figs. 7, 35.

pedicularia (Linnaeus). Europe, North America, East Africa, Canary Islands, Comoros, Japan, Argentine.

Hemerobius flavicans Linnaeus, 1746. *Fauna Suecica* p. 223.
Hemerobius pedicularius Linnaeus, 1758. *Systema Naturae* p. 551.
Termes fatidicum Linnaeus, 1758. *Systema Naturae* p. 610.
Hemerobius abdominalis Fabricius, 1775. *Systema Entomologiae* p. 310.
Hemerobius fatidicus (Linnaeus). Fabricius, 1775. *Systema Entomologiae* p. 311.
Hemerobius pusillus Műller, 1776. *Zoologiae Danicae prodromus* p. 146.
Psocus pedicularius (Linnaeus). Latreille, 1794. *Bull. Soc. philom. Paris* 1: 85.
Psocus flavicans (Linnaeus). Fabricius, 1798. *Supplementum Entomologiae* p. 203.
Psocus abdominalis (Fabricius). Fabricius, 1798. *Supplementum Entomologiae* p. 204.
Psocus fatidicus (Linnaeus). Fabricius, 1798. *Supplementum Entomologiae* p. 204.
Atropos fatidicus (Linnaeus). Stephens, 1829. *Systematic Catalogue of British Insects* p. 314.
Psocus nigricans Stephens, 1836. *Illustrations of British Entomology* 6: 127.
Psocus dubius Stephens, 1836. *Illustrations of British Entomology* 6: 127.
Psocus pulsatorius (Linnaeus). Zetterstedt, 1840. *Insecta Lapponica* p. 1054.
Lachesilla fatidica (Linnaeus). Westwood, 1840. *Introd. Classif. Insects* 2: 19; figs. 59, 18.
Psocus binotatus Rambur, 1842. *Histoire naturelle des Insectes, Neuropteres.* p. 324.
Psocus domesticus Burmeister, 1839. *Handbuch der Entomologie* 2: 777.
Lachesis fatidica (Linnaeus). Hagen, 1861. *Entomologist's Annual* 1861: 22.
Psocus salicis Hagen, 1861. *Smithson. misc. Coll.* 4: 13.
Psocus geologus Walsh, 1862. *Proc. Acad. nat. Sci. Philad.* 14: 362.
Caecilius salicis (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 206.
Caecilius pedicularius (Linnaeus). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 206.
Caecilius pusillus (Műller). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 206.
Elipsocus flavicans (Linnaeus). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Psocus pusillus Harris, 1869. *Occ. Pap. Boston Soc. nat. Hist.* 1: 331.
Caecilius (Pterodela) pedicularia (Linnaeus). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 118.
Hyperetes fatidicus (Linnaeus). Hagen, 1883. *Stettin. ent. Ztg.* 44: 320.
Leptopsocus exiguus Reuter, 1899. *Act. Soc. Fauna Flora fenn.* 17: 5, 6.
Pterodela pedicularia ab. *giardi* Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 546; pl. 35, fig. 10.
Pterodela pedicularia var. *brevipennis* Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 381.
Lachesilla pedicularia (Linnaeus). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 16.
Lachesilla limbata Enderlein, 1924. *S.B. Ges. naturf. Fr. Berl.* 31: 36.
Lachesilla stigmalis Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 106, fig.

penta Sommerman Texas.

Lachesilla penta Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 465, figs. 38, 41.

pretiosa (Banks). Panama.

Terracaecilius pretiosa Banks, 1930. Psyche, Camb. Mass. 37: 185.

punctata (Banks). North America.
Elipsocus punctatus Banks, 1905. *Trans. Amer. ent. Soc.* 32: 1.
Lachesilla punctata (Banks). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 357; pl. XVII, fig. 12; pl. XVIII, fig. 8.

quercus (Kolbe). Europe, Morocco.
Caecilius (*Pterodela*) *quercus* Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 120; pl. III, fig. 13.
Lachesilla quercus (Kolbe). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 19.

rena Sommerman. Arizona, Texas.
Lachesilla rena Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 653, figs. 9, 37.

riegeli Sommerman. Florida.
Lachesilla riegeli Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 654, fig. 5.

rossica Roesler. Russia.
Lachesilla rossica Roesler, 1953. *Ent. Ber. Amst.* 14: 295, figs. 1-9.

rufa (Walsh). North America.
Psocus rufus Walsh, 1863. *Proc. ent. Soc. Philad.* 2: 185.
Caecilius rufus (Walsh), Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 206.
Caecilius impacatus Aaron, 1886. *Proc. Acad. nat. Sci. Philad.* 38: 14.
Pterodela rufa (Walsh). Enderlein, 1906. *Stettin. ent. Ztg.* 67: 319.
Lachesilla rufa (Walsh). Chapman, 1919. *J.N.Y. ent. Soc.* 38: 358; pl. XVII, fig. 9, pl. XVIII, fig. 3; pl. XXI, fig. 16.

silvicola Chapman. North America.
Lachesilla silvicola Chapman, 1930. *J.N.Y. ent. Soc.* 38: 361; pl. XVII, fig. 3; pl. XVIII, fig. 12; pl. XXI, fig. 9.

tanaidana Roesler. Russia.
Lachesilla tanaidana Roesler, 1953. *Ent. Ber. Amst.* 14: 297, figs. 10-15.

tectorum Badonnel. Mozambique.
Lachesilla tectorum Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 238, fig. 11.

telsa Sommerman. California.
Lachesilla telsa Sommerman, 1946. *Ann. ent. Soc. Amer.* 39: 656, fig. 24.

Family **PERIPSOCIDAE**

Subfamily **ECTOPSOCINAE**

Genus **Ectopsocopsis** Badonnel

Ectopsocopsis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 185, 193.
Type species: *Ectopsocus balli* Badonnel.

annulatus Badonnel. Angola.
Ectopsocopsis annulatus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 193, figs. 438-442.

anurus Badonnel. Angola.
Ectopsocopsis anurus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 196, figs. 448-454.

badonneli (Ball). Congo.
Ectopsocus badonneli Ball, 1943. *Bull. Mus. Hist. nat. Belg.* 19: 17, figs. 12, 13.
Ectopsocopsis badonneli (Ball). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 185.

balli (Badonnel). Ivory Coast, Congo, Angola, Nigeria.
! *Ectopsocus mozambicus* Badonnel. Ball, 1943. *Bull. Mus. Hist. nat. Belg.* 19: 15, figs. 9-11.
Ectopsocus balli Badonnel, 1949. *Rev. franc. Ent.* 16: 44, figs. 54-, 61.
Ectopsocopsis balli (Badonnel). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 185.

cryptomeriae (Enderlein). Japan, Formosa, Hong Kong.
Ectopsocus cryptomeriae Enderlein, 1907. *Stettin. ent. Ztg.* 68: 100.

(Not *Ectopsocus cryptomeriae* Enderlein. Takahashi, 1938. *Mushi* 11: 13).
(Not *Ectopsocus cryptomeriae* Enderlein. Jentsch, 1939. *Zool. Jb. Abt. Syst.* 73: 116, 125, figs. 4, 15-18).
Ectopsocopsis cryptomeriae (Enderlein). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 185.

lepnevae (Danks). Caucasus.
Ectopsocus lepnevae Danks, 1955. *Ent. Obozr.* 34: 181, figs. 1-6.
Ectopsocopsis lepnevae (Danks). Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 298.
? = Ectopsocopsis cryptomeriae (Enderlein). Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 298.

mozambicus (Badonnel). Mozambique, Natal, Congo.
Ectopsocus mozambicus Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 243, figs. 15-18.
(Not *Ectopsocus mozambicus* Badonnel. Ball, 1943. *Bull. Mus. Hist. nat. Belge* 19: 15, figs. 9-11).
Ectopsocopsis mozambicus (Badonnel). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 185.

pumilis (Banks). North America.
Peripsocus pumilis Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 313; pl. VI, fig. 79.
Ectopsocus pumilis (Banks). Chapman, 1930. *J.N.Y. ent. Soc.* 78: 380; pl. XXI, fig. 15; pl. XIX, fig. 12; pl. XIX, fig. 4, 11.
Ectopsocopsis pumilis (Banks). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 185.
? = Ectopsocopsis cryptomeriae (Enderlein). Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 298.

spathulatus (Ball). Congo.
Ectopsocus spathulatus Ball, 1943. *Bull. Mus. Hist. nat. Belg.* 19: 20, figs. 14, 15.
Ectopsocopsis spathulatus (Ball). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 185.

terricolis Badonnel. Angola.
Ectopsocopsis terricolis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 195, figs. 443-447.

Genus **Ectopsocus** McLachlan

Ectopsocus McLachlan, 1899. *Ent. mon. Mag.* 35: 277.
Type species: *Ectopsocus briggsi* McLachlan.
Micropsocus Enderlein, 1903. *Zool. Jb. Abt. Syst.* 14: 546.
Type species: *Micropsocus waterstradti* Enderlein.
Chaetopsocus Pearman, 1929. *Ent. mon. Mag.* 65: 105.
Type species: *Chaetopsocus richardsi* Pearman.

Note: As insufficient is known of some of the species originally described in the genus *Ectopsocus*, some of them may, in fact, belong to the subsequently described genus *Ectopsocopsis*. Species known to be true *Ectopsocus* spp. are marked with an asterisk (*) in this list; those without need further investigation.

aethiops (Hagen). Ceylon, Philippines.
Psocus aethiops Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 204.
Peripsocus aethiops (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 210.
Ectopsocus aethiops var. *bakeri* Banks, 1931. *Psyche, Camb. Mass.* 38: 58, fig. 3.

basalis Banks. Philippines.
Ectopsocus basalis Banks, 1937. *Philipp. J. Sci.* 63: 133; pl. 1, fig. 6.

berlesei Ribaga. Italy, Portuguese Guinea.
Ectopsocus berlesei Ribaga, 1900. *Riv. Pat. veg., Padova* 8: 364.

bicaudatus Badonnel. * Madagascar.
Ectopsocus bicaudatus Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 118, pl. IV.

briggsi McLachlan. * Europe, North America, Canary Islands, Morocco, Mexico, Chile, Congo, Rhodesia, India, Natal, Australia, New Zealand.
Ectopsocus briggsi McLachlan, 1899. *Ent. mon. Mag.* 35: 277, figs. 1, 1a, 2, 2a, 2b, 3, 4.
(Not *Ectopsocus briggsi* McLachlan. Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 294, pl. 7, fig. 47).
Ectopsocus limbatus Navas, 1909. *Mem. Prim. Congr. Natur. Espan.* (5) 1:?
! *Ectopsocus parvulus* Enderlein, 1929. *Zool. Anz.* 84: 224.
(Not *Ectopsocus briggsi* McLachlan. Titschack, 1930. *Verh. Ver. naturw. Unterh. (Heimatforsch.) Hamb.* 21: 111).
(Not *Ectopsocus briggsi* McLachlan. Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 243).
(Not *Ectopsocus briggsi* McLachlan. Badonnel, 1935. *Bull. Soc. zool. Fr.* 60: 112).
(Not *Ectopsocus briggsi* McLachlan. Badonnel, 1935. *Mém. Mus. Hist -nat. Paris* 4: 155).
(Not *Ectopsocus briggsi* McLachlan. Badonnel, 1936. *Livre jubil. Bouvier Paris* p. 101, fig. 1).
(Not *Ectopsocus briggsi* McLachlan. Weber, 1936. *Biol. der Tiere Deutschlands* 39 (27)).

brunneus Vishnyakova. * Armenia.
Ectopsocus brunneus Vishnyakova, 1963. *Acad. Sci. Armenian S.S.R.* 16: 92, 8 figs.

californicus (Banks). * North America.
Peripsocus californicus Banks, 1903. *J.N.Y. ent. Soc.* 11: 237.
Ectopsocus californicus (Banks). Peck, 1951. *In* Muesebeck, C. *Dep. Mon. U.S. Dep. Agric.* 2: 413.

cinctus Thornton. * Hong Kong.
Ectopsocus cinctus Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 305, figs. 40-45.

coccophilus Ball. * Congo.
Ectopsocus coccophilus Ball, 1943. *Bull. Mus. Hist. nat. Belg.* 19: 22, figs. 16-20.

congener Tillyard. New Zealand, Tasmania.
Ectopsocus congener Tillyard, 1923. *Trans. N.Z. Inst.* 54: 192, fig. 17.

denudatus Enderlein. India.
Ectopsocus denudatus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 295, fig. 2; pl. XIV, fig. 75.

erosus (Enderlein). New Guinea.
Micropsocus erosus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 297; pl. VII, figs. 48a, 48b.

ferrugineiceps Enderlein. Comoros, Seychelles.
Ectopsocus ferrugineiceps Enderlein, 1908. *Reise in Ostafrika* 2: 251; pl. 11, fig. 8.

flaviceps (Okamoto). Japan.
Micropsocus flaviceps Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 190; pl. 3, fig. 3.

froggatti Enderlein. Australia.
! *Ectopsocus briggsi* McLachlan. Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 294; pl. 7, fig. 47.
Ectopsocus froggatti Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 407.

fullawayi Enderlein. Hawaii, Laysan, Tutuila, Samoa, Austral Is., Pitcairn Is., Henderson Is., Mangarena Is.
Ectopsocus fullawayi Enderlein, 1913. *Zool. Anz.* 41: 356.

gabelensis Badonnel. * Angola.
Ectopsocus gabelensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 185, figs. 411-414.

ghesquierei Ball. * Congo, East Africa, Hong Kong.
Ectopsocus ghesquierei Ball, 1943. *Bull. Mus. Hist. nat. Belg.* 19: 11, figs. 6-8.

halcrowi Pearman. * East Africa.
Ectopsocus halcrowi Pearman, 1960. *Entomologist* 93: 248, figs. 1-6.
hawaiiensis Enderlein. Hawaii, Guam, Tutuila, Samoa.
Ectopsocus hawaiiensis Enderlein, 1913. *Zool. Anz.* 41: 356.
heurni (Navas). Java.
Micropsocus heurni Navas, 1924. *Broteria ser. zool.* 21: 140, fig. 10.
hirsutus Thornton. * Hong Kong.
Ectopsocus hirsutus Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 303, figs. 34-39.
machadoi Badonnel. * Angola.
Ectopsocus machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 187, figs. 415-421.
maculatus Smithers. * Madagascar.
Ectopsocus maculatus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 249, figs. 60-64.
maindroni Badonnel. * England, Ivory Coast, Congo, Angola, Arabia, Hong Kong, Malaya.
Ectopsocus maindroni Badonnel, 1935. *Rev. franc. Ent.* 2: 76, 81, figs. 11-15.
! *Ectopsocus cryptomeriae* Enderlein. Takahashi, 1938. *Mushi* 11: 13.
! *Ectopsocus cryptomeriae* Enderlein. Jentsch, 1939. *Zool. Jb. Abt. Syst.* 73: 116, 125, figs. 4, 15-18.
meridionalis Ribaga. * Europe, North America, Mexico, Columbia, Japan, Mozambique, Cameroons, Morocco, Congo, Angola, Tanganyika, Hong Kong, Chile.
Ectopsocus briggsi var. *meridionalis* Ribaga, 1904. *Redia* 1: 296.
Ectopsocus meridionalis Ribaga. Enderlein, 1907. *Stettin. ent. Ztg.* 68: 101.
! *Ectopsocus parvulus* (Kolbe). Weber, 1931. *Z. wiss. Zool.* 138: 457, 18 figs.
! *Ectopsocus briggsi* McLachlan. Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 243.
! *Ectopsocus briggsi* McLachlan. Badonnel, 1935. *Bull. Soc. zool. Fr.* 60: 112.
! *Ectopsocus briggsi* McLachlan. Badonnel, 1935. *Mém. Mus. Hist. nat. Paris* 4: 155.
! *Ectopsocus briggsi* McLachlan. Badonnel, 1936. *Livre jubil. Bouvier Paris* p. 101, fig. 1.
! *Ectopsocus briggsi* McLachlan. Weber, 1936. *Biol. der Tiere Deutschlands* 39 (27).
Ectopsocus meridionalis subsp. **tridentatus** Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 300, figs. 30-33.
musae (Kunstler and Chaine). France (on bananas).
Kiefferia musae Kunstler and Chaine, 1903. *Bull. Soc. sci. Arachon* 1902: 1, 3 figs.
Micropsocus musae (Kunstler and Chaine). Enderlein, 1903. *Zool. Jb. Abt. Syst.* 19: 288.
myrmecophilus (Enderlein). Fiji, Bismarck Archipelago, India.
Micropsocus myrmecophilus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 298, figs. 3, 4; pl. XIV, fig. 77.
Ectopsocus (*Micropsocus*) *myrmecophilus* (Enderlein). Karny, 1926. *Bull. ent. Res.* 16: 290.
nerens (Hickman). Tasmania.
Micropsocus nerens Hickman, 1934. *Pap. roy. Soc. Tasm.* 1933: 88, figs. 6a-6c.
ornatus Thornton. * Hong Kong.
Ectopsocus ornatus Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 308, figs. 43-48.
pearmani Ball. * Congo, Nigeria.
Ectopsocus pearmani Ball, 1943. *Bull. Mus. Hist. nat. Belg.* 19: 8, figs. 3-5.

pectinatus Smithers. * Madagascar.
Ectopsocus pectinatus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 248, figs. 53-59.
perkinsi Banks. Hawaii, Fiji, Kure Island.
Ectopsocus perkinsi Banks, 1931. *Proc. Hawaii ent. Soc.* 7: 438; pl. VII, fig. 4.
piger (Hagen). Ceylon.
Psocus piger Hagen, 1869. *Verh. zool. -bot. Ges. Wien* 9: 202.
Peripsocus piger (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 210.
Ectopsocus piger (Hagen). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 44.
ribagai Enderlein. Brazil, Porto Rica.
Ectopsocus ribagai Enderlein, 1906. *Zool. Jb. Abt. Syst.* 24: 83.
richardsi (Pearman). * West Africa, England, Texas, Hawaii, Hong Kong.
Chaetopsocus richardsi Pearman, 1929. *Ent. mon. Mag.* 65: 105, figs. 1a-1d.
Ectopsocus richardsi (Pearman). Pearman, 1942. *Ent. mon. Mag.* 78: 290.
similis Badonnel. * Angola.
Ectopsocus similis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 191, figs. 432-437.
strauchi Enderlein. * Canary Islands, Azores.
Ectopsocus strauchi Enderlein, 1906. *Stettin. ent. Ztg.* 67: 315.
Peripsocus opulentus Navas, 1908. *Mem. R. Acad. Barcelona* (3) 6: 411, fig. 13.
striatellus Navas. Argentine.
Ectopsocus striatellus Navas, 1931. *Rev. Soc. ent. Argent* 3: 321.
stricticus Navas. Argentine.
Ectopsocus stricticus Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 109.
tinctus Navas. Java.
Ectopsocus tinctus Navas, 1924. *Broteria ser. zool.* 21: 140, fig. 9.
titschacki Jentsch. * Ivory Coast, Congo, Venezuela.
! *Ectopsocus briggsi* McLachlan. Titschalk, 1939. *Verh. ver. naturw. Unterh. (Heimatforsch.) Hamb.* 21: 111
Ectopsocus titschacki Jentsch, 1929. *Zool. Jb. Abt. Syst.* 73: 120, figs. 11-14a, 14b.
vachoni Badonnel. * Morocco, England, France, Argentine, Texas, Georgia, Chile.
Ectopsocus vachoni Badonnel, 1945. *Rev. ent. franc.* 12: 44, figs. 28-34.
Ectopsocus dimorphus Mockford and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 363, figs. 39-43.
vilhenai Badonnel. * Angola, Nigeria.
Ectopsocus vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 189, figs. 422-431.
waterstradti (Enderlein). Borneo, Guam, Java, New Guinea, Bismarck Archipelago.
Micropsocus waterstradti Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 547; pl. 35, figs. 11, 12.
Ectopsocus waterstradti (Enderlein). Enderlein, 1907. *Notes Leyden Mus.* 29: 120.

Genus **Interpsocus** Edwards

Interpsocus Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 126.
Type species: *Interpsocus brunneus* Edwards.
brunneus Edwards. Tasmania.
Interpsocus brunneus Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 126, figs. 95-102.

Subfamily **PERIPSOCINAE**

Genus **Kaestneriella** Roesler

Kaestneriella Roesler, 1943. *Stettin. ent. Ztg.* 104: 10.
Type species: *Kaestneriella pilosa* Roesler.

pilosa Roesler. Costa Rica.
Kaestneriella pilosa Roesler, 1943. *Stettin. ent· Ztg.* 104: 10, figs. 12-13.

Genus **Notiopsocus** Banks

Notiopsocus Banks, 1913. *Psyche, Camb. Mass.* 20: 84.
Type species: *Notiopsocus simplex* Banks.

machadoi Badonnel. Angola.
Notiopsocus machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 198, figs. 455-459.

simplex Banks. Brazil.
Notiopsocus simplex Banks, 1913· *Psyche, Camb. Mass.* 20: 84; pl. 4, figs. 2, 14.

vilhenai Badonnel. Angola.
Notiopsocus vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 199, figs. 460-463.

Genus **Peripsocus** Hagen

Peripsocus Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 203.
Type species: *Psocus phaeopterus* Stephens·
Peripsocopsis Tillyard, 1923. *Trans. N.Z. Inst.* 54: 193.
Type species: *Peripsocopsis maoricus* Tillyard.

africanus Enderlein. East Africa.
Peripsocus africanus Enderlein, 1902. *Mitt. Zool. Mus. Berl.* 2: 12; pl. 5, fig. 12·

alboguttatus (Dalman). Europe, Madeira.
Psocus alboguttatus Dalman, 1823. *Analecta Entomologica* p. 98.
Psocus quadrimaculatus Stephens, 1836. *Illustrations of British Entomology* 6: 124.
Psocus pupillatus Walker, 1853. *Catalogue of Neuropterous insects* p. 493.
Peripsocus pupillatus (Walker). Hagen, 1866. *Verh. zool. -bot· Ges. Wien* 16: 210.
Peripsocus abloguttatus (Dalman). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 210.
Peripsocus alboguttatus (Dalman). McLachlan, 1867. *Ent. mon. Mag·* 3: 273 (part.).

angolensis Smithers. Angola.
Peripsocus similis Badonnel. 1955. *Pub. cult. Cia. Diamant Angola* 26: 180, figs. 398-401.
(Not *Peripsocus similis* Enderlein, 1903. *Ann. hist· -nat. Mus. hung.* 1: 290; pl. VII, fig. 44).
Peripsocus angolensis Smithers, 1959. *Ent. mon. Mag.* 94: 274. (*Peripsocus similis* preocc.).

badonneli Smithers. Angola.
Peripsocus oculatus Badonnel, 1955. *Pub. cult. Cia· Diamant Angola* 26: 179, figs. 396-397.
(Not *Peripsocus oculatus* Enderlein, 1926. *Zool. Meded.* 9: 62).
Peripsocus badonneli Smithers, 1959. *Ent. mon. Mag.* 94: 274 (*Peripsocus oculatus* preocc.).

balli Badonnel. Congo.
Peripsocus balli Badonnel, 1948· *Rev. Zool. Bot. afr.* 40: 311, figs. 104-106.

bicornis Thornton. Hong Kong.
Peripsocus bicornis Thorton, 1962. *Trans. R ent. Soc. Lond.* 114: 292, figs. 16-20.

camerunus Badonnel. Cameroons.
Peripsocus camerunus Badonnel, 1943. *Rev. Zool. Bot. afr·* 37: 153, figs. 47-51.

coccophagus Badonnel. Madagascar.
Peripsocus coccophagus Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 117; pl. IV, figs. 7-11.

consobrinus Pearman. England.
Peripsocus consobrinus Pearman, 1951. *Ent. mon. Mag.* 87: 89, fig. 7.

didymus Roesler. Europe.
Peripsocus didymus Roesler, 1939. *Zool. Anz.* 125: 170, figs. 12A, 13A, 14A, 15A.
Peripsocus didymus subsp. **truncatus** Badonnel, 1943. *Faune de France* 42: 93, figs. 230B, 234B.
Peripsocus didymus subsp. **silesiaca** Obr, 1948. *Sborn. Kl. prír. Brnĕ* 28: 55, figs. 1-2.
Peripsocus truncatus Pearman, 1951. *Ent. mon. Mag.* 87: 88, fig 5.

eucalypti Edwards. Tasmania.
! *Peripsocopsis milleri* Tillyard. Hickman, 1934. *Pap. roy. Soc. Tasm.* 1933: 87.
Peripsocus eucalypti Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 122, figs. 83-88.

fasciatus Thornton. Hong Kong.
Peripsocus fasciatus Thornton, 1959. *Proc. ent. Soc. Lond.* (*B*) 28: 45, figs. 9, 10, 13-17.

fortunatus Navas. Canary Islands.
Peripsocus fortunatus Navas, 1916. *Mem. Accad. Nuovi Lincei* (2) 2: 58, fig. 34.

fulvescens Navas. Tonkin.
Peripsocus fulvescens Navas, 1920. *Bol. Soc. ent. Esp.* 4: 93, fig. 3.

fumosus Banks. North America.
Peripsocus fumosus Banks, 1903. *J.N.Y. ent. Soc.* 11: 237.

ghesquierei Badonnel. Congo.
Peripsocus ghesquierei Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 313, figs. 107-109.

hedinianus Enderlein. South China.
Peripsocus hedinianus Enderlein, 1936. *Ark. Zool.* 27 (A): 5, figs. 4, 5.

hyalinus Enderlein. Australia.
Peripsocus hyalinus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 291.

ignis Okamoto. Japan, Sarawak.
Peripsocus ignis Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 189; pl. III, fig. 2.
Ectopsocus ignis (Okamoto). Thornton, 1959. *Proc. R. ent. Soc. Lond.* (*B*) 28: 37.

intricatus Smithers. Madagascar.
Peripsocus intricatus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 251, figs. 65-69.

machadoi Badonnel. Angola.
Peripsocus machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 183, figs. 408-410.

macropterus Edwards. Tasmania.
Peripsocus macropterus Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 124, figs. 89-94.

madescens (Walsh). North America.
Psocus madescens Walsh, 1863. *Proc. ent. Soc. Philad.* 2: 186.
Peripsocus madescens (Walsh). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 210.
?*Peripocus alboguttatus* (Dalman). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 368.

madidus (Hagen). North America.
Psocus madidus Hagen, 1861. *Smithson. misc. Coll.* 4: 12 (part.).
Psocus permadidus Walsh, 1863. *Proc. ent. Soc. Philad.* 2: 185.
Caecilius permadidus (Walsh). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 206.
Peripsocus madidus (Walsh). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 210.

maoricus (Tillyard). New Zealand.
Peripsocopsis maoricus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 194, fig. 18; pl. 18, fig. 2.

milleri (Tillyard). New Zealand.
Peripsocopsis milleri Tillyard, 1923. *Trans. N.Z. Inst.* 54: 195, fig. 20; pl. 18, fig. 20.
(Not *Peripsocopsis milleri* Tillyard. Hickman, 1934. *Pap. roy. Soc. Tasm.* 1933: 87).

minutus Banks. Porto Rica.
Peripsocus minutus Banks, 1924. *Bull. Mus. comp. Zool. Harv.* 65: 423.

mokotensis Badonnel. Congo.
Peripsocus mokotensis Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 315, figs. 110-112.

morulops (Tillyard). New Zealand.
Peripsocopsis morulops Tillyard, 1923. *Trans. N.Z. Inst.* 54: 194, fig. 19; pl. 18, fig. 13.

nanus Navas. Tonkin.
Peripsocus nanus Navas, 1922. *Broteria ser. zool.* 20: 60.

nebulosus Navas. Argentine.
Peripsocus nebulosus Navas, 1933. *Rev. Acad. Cienc. Zaragoza* 16: 103.

nigrescens Williner. Bolivia.
Peripsocus nigrescens Williner, 1947. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 111, fig. 7.

oculatus Enderlein. Java.
Peripsocus oculatus Enderlein, 1926. *Zool. Meded.* 9: 62.
(Not *Peripsocus oculatus* Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 179, figs. 396, 397).

parvulus Kolbe. Europe.
Peripsocus alboguttatus var. *parvulus* Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 130.
Peripsocus parvulus Kolbe, 1882. *Ent. Nachr.* 8: 211.
(Not *Ectopsocus parvulus* (Kolbe). Weber, 1931. *Z. wiss. Zool.* 138: 457, 18 figs.).
Peripsocus parvulus f. *longipennis* Roesler, 1939. *Zool. Anz.* 125: 172, fig. 16.

pauliani Badonnel. Ivory Coast.
Peripsocus pauliani Badonnel, 1949. *Rev. franc. Ent.* 16: 42, figs. 56-58.

pembanus Enderlein. Fundu Island.
Peripsocus pembanus Enderlein, 1908. *Reise in Ostafrika* 2: 250; pl. 11, fig. 7.

peruanus Banks. Peru, Bolivia.
Peripsocus peruanus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 313.

phaeopterus (Stephens). Europe.
Psocus nigricornis Stephens, 1836. *Illustrations of British Entomology* 6: 126.
(Not *Psocus nigricornis* Brauer, 1865. *Verh. zool. -bot. Ges. Wien* 15: 908).
Psocus phaeopterus Stephens, 1836. *Illustrations of British Entomology* 6: 127.
Psocus obscurus Rambur, 1842. *Histoire naturelle des Insectes* p. 322.
Peripsocus phaeopterus (Stephens). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 210.

pictus Thornton. Hong Kong.
Peripsocus pictus Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 290, figs. 5, 6, 11-14.

pseudoquercicola Thornton. Hong Kong.
Peripsocus pseudoquercicola Thornton, 1962. *Trans. R. ent. Soc. Lond.* 114: 288, figs. 4, 7, 9, 15.

pumilis Enderlein. Japan.
Peripsocus pumilis Enderlein, 1907. *Stettin. ent. Ztg.* 68: 99.

quadrifasciatus (Harris). North America.
Psocus madidus Hagen, 1866. *Smithson. misc. Coll.* 4: 12 (part.).
Psocus quadrifasciatus Harris, 1869. *Occ. Pap. Boston Soc. nat. Hist.* 1: 331.
Peripsocus quadrifasciatus (Harris). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 372; pl. XIX, figs. 2, 7; pl. XXI, fig. 3.

quadripunctatus Badonnel. Angola.
Peripsocus quadripunctatus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 181, figs. 402-404.
Peripsocus quadripunctatus f. *brachypterus* Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 183, figs. 405-407.

quercicola Enderlein. Hong Kong, Japan, Formosa.
Peripsocus quercicola Enderlein, 1906. *Stettin. ent. Ztg.* 67: 316.

reductus Badonnel. France, England.
Peripsocus reductus Badonnel, 1943. *Faune de France* 42: 98, figs. 238-240.

reicherti Enderlein. Singapore, Seychelles, Bogor.
Peripsocus reicherti Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 290; pl. VII, fig. 46.

setosus Smithers. South Africa.
Peripsocus setosus Smithers, 1960. *J. ent. Soc. S. afr.* 23: 219, figs. 1-3.

similis Enderlein. Singapore, Hong Kong.
Peripsocus similis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 290; pl. VII, fig. 44.
(Not *Peripsocus similis* Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 180, figs. 398-401).

singularis Banks. Formosa.
Peripsocus singularis Banks, 1937. *Philip. J. Sci.* 62: 267; pl. 2, fig. 12.

spinosus Thornton. Hong Kong.
Peripsocus spinosus Thornton, 1959. *Proc. R. ent. Soc. Lond.* (*B*) 28: 42, figs. 5, 8, 11, 12, 18.

stagnivagus Chapman. North America.
Peripsocus stagnivagus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 376; pl. XIX, fig. 5; pl. XXI, fig. 5.

subfasciatus (Rambur). Europe.
Psocus subfasciatus Rambur, 1842. *Histoire naturelle des Insectes* p. 322.
Peripsocus alboguttatus (Dalman). McLachlan, 1867. *Ent. mon. Mag.* 3: 373 (part.).
Peripsocus subpupillatus McLachlan, 1883. *Ent. mon. Mag.* 19: 183.
Peripsocus subpupillatus ab. *quadriramosus* Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 541.
Peripsocus subfasciatus (Rambur). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 20.

suffitus Enderlein. New Guinea, ? Guam.
Peripsocus suffitus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 293; pl. XIV, fig. 71.

sydneyensis Enderlein. Australia.
Peripsocus sydneyensis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 292; pl. VII, fig. 45.

umbrosus Navas. Spain.
Peripsocus umbrosus Navas, 1911. *Bol. Soc. aragon. Cienc. nat.* 10: 210; pl. IV, fig. 5.

variatus Soehardjan and Hamann. Bogor.
Peripsocus variatus Soehardjan and Hamann, 1959. *Idea* 12: 4; pl. 1, figs. 9-11.

Family **HEMIPSOCIDAE**

Genus **Anopistoscena** Enderlein

Anopistoscena Enderlein, 1912. *Zool. Anz.* 39: 298.
Type species: *Anopistoscena specularifrons* Enderlein.

specularifrons Enderlein. Seychelles.
Anopistoscena specularifrons Enderlein, 1912. *Zool. Anz.* 39: 298.

Genus **Hemipsocus** Selys-Longchamps

Hemipsocus Selys-Longchamps, 1872. *Ent. mon. Mag.* 9: 146.
Type species: *Psocus chloroticus* Hagen.

africanus Enderlein. East Africa, Seychelles, Congo, Angola.
Hemipsocus africanus Enderlein, 1907. *Schwed. zool. Exped. Kilimandjaro* 3 (15): 33; pl. 5, fig. 3.

chloroticus (Hagen). Ceylon, Japan, Philippines, Formosa, Sarawak, Java, Sumatra.
Psocus chloroticus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 474.
Hemipsocus chloroticus (Hagen). Selys-Longchamps, 1872. *Ent. mon. Mag.* 9: 146, fig. A.
(Not *Hemipsocus chloroticus* (Hagen). Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 234; pl. IV, figs. 17b-17c; pl. VI, figs. 17d-17f).
Hemipsocus hyalinus Enderlein, 1906. *Stettin. ent. Ztg.* 67: 311.
Hemipsocus chloroticus var. *stenostigmus* Banks, 1942. *Bull. Mus. comp. Zool. Harv.* 172: 25, fig. 1d.

luridus Enderlein. New Guinea, Samoa, Singapore.
! *Hemipsocus chloroticus* (Hagen). Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 234; pl. IV, figs. 17b-17c; pl. VI, figs. 17d-17f.
Hemipsocus chloroticus var. *luridus* Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 235; pl. IV, fig. 17a.
Hemipsocus selysianus Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 40.
Hemipsocus luridus Enderlein. Karny, 1932. *Ins. Samoa* 7 (4): 125.
Hemipsocus luridus selysianus Enderlein. Karny, 1932. *Ins. Samoa* 7 (4): 126.
Hemipsocus luridus luridus Enderlein. Karny, 1932. *Ins. Samoa* 7 (4): 126.

pardus Smithers. Madagascar.
Hemipsocus pardus Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 252, figs. 70-72.

pretiosus Banks. Cuba, Florida.
Hemipsocus pretiosus Banks, 1930. *Psyche, Camb. Mass.* 37: 184; pl. 9, fig. 5.

roseus (Hagen). Ceylon, Philippines, Thailand, Hawaii, Central America, West Indies.
Psocus roseus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 203.
Epipsocus roseus (Hagen). McLachlan, 1872. *Ent. mon. Mag.* 9: 78.
Pseudocaecilius roseus (Hagen). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 41.
Hemipsocus roseus (Hagen). Banks, 1931. *Proc. Hawaii. ent. Soc.* 7: 438; pl. VIII, fig. 1; pl. IX, figs. 1, 2.

rubellis Navas. India.
Hemipsocus rubellis Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 38.

selysi Banks. Queensland.
Hemipsocus selysi Banks, 1918. *Bull. Mus. comp. Zool.* 62: 5; pl. II, fig. 19.

Family **PSEUDOCAECILIIDAE**

Subfamily **PSEUDOCAECILIINAE**

Genus **Cladioneura** Enderlein

Cladioneura Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 404.
Type species: *Cladioneura pulchripennis* Enderlein.

Subgenera:

(Cladioneura) Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 404.
Type species: *Cladioneura pulchripennis* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 151.

(Scytopsocus) Roesler, 1940. *Zool. Anz.* 130: 11.
Type species: *Scytopsocus coriaceus* Roesler.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 151.

coriaceus (Roesler). **(Scytopsocus).** Brazil.
Scytopsocus coriaceus Roesler, 1940. *Zool. Anz.* 130: 12, figs. 68-73, 75, 76.
Cladioneura (Scytopsocus) coriaceus (Roesler). Roesler, 1944. *Stettin. ent. Ztg.* 105: 151.

difficilis (Roesler). **(Scytopsocus).** Brazil.
Scytopsocus difficilis Roesler, 1940. *Zool. Anz.* 120: 13, figs. 74, 77, 78.

pulchripennis Enderlein. **(Cladioneura).** Australia.
Cladioneura pulchripennis Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 405; pl. 23, fig. 5.
Cladioneura (Cladioneura) pulchripennis Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 151.

Genus **Mesocaecilius** Okamoto

Mesocaecilius Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 197.
Type species: *Mesocaecilius quadrimaculatus* Okamoto.

quadrimaculatus Okamoto. Formosa.
Mesocaecilius quadrimaculatus Okamoto, 1910. *Ann. hist. -nat. Mus. hung.* 8: 198; pl. III, fig. 6.

Genus **Pseudocaecilius** Enderlein

Pseudocaecilius Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 260.
Type species: *Pseudocaecilius elutus* Enderlein.
Hageniella Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 258.
Type species: *Epipsocus zonatus* (Hagen).
(Not *Hageniella* Meunier, 1898. *Arch. Mus. Teyler* (2) 5: 228).

Subgenera:

(Pseudocaecilius) Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 260.
Type species: *Pseudocaecilius elutus* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 152.

(Ophiodopelma) Enderlein, 1908. *Zool. Anz.* 33: 767.
Type species: *Ophiodopelma ornatipenne* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 152.

anomalus Thornton. **(Pseudocaecilius).** Hong Kong.
Pseudocaecilius anomalus Thornton, 1961. *Proc. R. ent. Soc. Lond.* (*B*) 30: 146, figs. 2, 10-15.

brevicornis Enderlein. **(Pseudocaecilius).** Seychelles.
Pseudocaecilius brevicornis Enderlein, 1931. *Trans. Linn. Soc. Lond. Zool.* (2) 19: 212; pl. 14, fig. 56.

citricola (Ashmead). **(Pseudocaecilius).** Porto Rica, North America.
Psocus citricola Ashmead, 1879. *Canad. Ent.* 11: 228.
Caecilius pretiosus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 311.
Pseudocaecilius wolcotti Banks, 1924. *Bull. Mus. comp. Zool. Harv.* 65: 423.
Caecilius citricola (Ashmead). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 331.
Pseudocaecilius pretiosus (Banks). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 332; pl. XVII, fig. 6; pl. XXI, fig. 1.
Pseudocaecilius citricola (Ashmead). Mockford and Gurney, 1956. *J. Wash. Acad. Sci.* 46: 364.

clarus (Banks). **(Pseudocaecilius).** North America.
Caecilius clarus Banks, 1908. *Trans. Amer. ent. Soc.* 34: 258.
Pseudocaecilius (?) *clarus* (Banks). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 334.

delicatus (Hagen). **(Pseudocaecilius).** Philippines, Ceylon.
Psocus delicatus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 203.
Epipsocus delicatus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207, 213.
Epipsocus completus Banks, 1916. *Philipp. J. Sci.* 11: 200; pl. I, fig. 5.
Pseudocaecilius delicatus (Hagen). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 41.

elutus Enderlein. **(Pseudocaecilius).** Singapore, India, Angola, Java, Malaya, Congo, South Afica, Madagascar, Mozambique.
Pseudocaecilius elutus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 261.
Pseudocaecilius elutus var. *africanus* Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 230, fig. 1.
Trichopsocus indicatus Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 45, fig.
Pseudocaecilius (*Pseudocaecilius*) *elutus* Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 152.

formosanus (Banks). **(Pseudocaecilius).** Formosa.
Hageniella formosana Banks, 1937. *Philipp. J. Sci.* 62: 265; pl. 2, fig. 15.

funestus (Enderlein). **(Pseudocaecilius).** Queensland.
Epipsocus funestus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 256; pl. V, fig. 26.
Hageniella funesta (Enderlein). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 41.

greenwoodi Karny. **(Pseudocaecilius).** Fiji.
Pseudocaecilius greenwoodi Karny, 1926. *Bull. ent. Res.* 16: 290, fig. 5.

hieroglyphicus (Enderlein). **(Opiodopelma).** Ceylon.
Kolbea hieroglyphica Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 279; pl. XIV, fig. 72.
Ophiodopelma hieroglyphica (Enderlein). Enderlein, 1908. *Zool. Anz.* 33: 766.

hirsutus Thornton. **(Pseudocaecilius).** Hong Kong.
Pseudocaecilius hirsutus Thornton, 1961. *Proc. R. ent. Soc. Lond.* (*B*) 30: 148; figs. 3, 16-19.

hispidus Enderlein. **(Pseudocaecilius).** East Africa.
Pseudocaecilius hispidus Enderlein, 1913. *Zool. Anz.* 41: 359.

innotatus Banks. **(Pseudocaecilius).** Philippines.
Pseudocaecilius innotatus Banks, 1937. *Philipp. J. Sci.* 63: 132; pl. 2, fig. 19.

lachlani Enderlein. **(Pseudocaecilius).** Australia.
Pseudocaecilius lachlani Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 263; pl. V, fig. 30.

machadoi Badonnel. **(Pseudocaecilius).** Angola.
Pseudocaecilius machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 202, figs. 468-470.

maculifrons Thornton. **(Pseudocaecilius).** Hong Kong.
Pseudocaecilius maculifrons Thornton, 1961. *Proc. R. ent. Soc. Lond.* (*B*) 30: 142, figs. 1, 5-9.

maculosus Enderlein. **(Pseudocaecilius).** Japan.
Pseudocaecilius maculosus Enderlein, 1907. *Stettin. ent. Ztg.* 68: 94.

marginatus (Enderlein). **(Pseudocaecilius).** New Guinea.
Epipsocus marginatus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 255; pl. V, fig. 25.
Hageniella marginata (Enderlein). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 41.
Graphopsocus marginatus (Enderlein). Soehardjan, 1958. *Idea* 11: 30.

marshalli Karny. **(Pseudocaecilius).** Fiji, Guam.
Pseudocaecilius marshalli Karny, 1926. *Bull. ent. Res.* 16: 288, fig. 3.

molestus (Hagen). **(Pseudocaecilius).** Ceylon.
Psocus molestus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 203.
Epipsocus molestus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Hageniella molesta (Hagen). Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 259.

morstatti Enderlein. **(Pseudocaecilius).** East Africa, Congo.
Pseudocaecilius morstatti Enderlein, 1913. *Zool. Anz.* 41: 358.

multipunctatus (Hagen). **(Ophiodopelma).** Ceylon, Philippines.
Psocus multipunctatus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 204.
Caecilius multipunctatus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.
Ophiodopelma multipunctata (Hagen). Banks, 1937. *Philipp. J. Sci.* 63: 127; pl. I, fig. 1.

ornatipennis (Enderlein). **(Ophiodopelma).** Formosa.
Ophiodopelma ornatipenne Enderlein, 1908. *Zool. Anz.* 33: 767.
Pseudocaecilius (*Ophiodopelma*) *ornatipenne* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 152.

ornatus Enderlein. **(Pseudocaecilius).** Singapore, Java.
Pseudocaecilius ornatus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 262; pl. V, fig. 29.

pinnatus (Enderlein). Java.
Hageniella pinnata Enderlein, 1926. *Zool. Meded.* 9: 58.

pusellus (Banks). **(Pseudocaecilius).** Philippines.
Hageniella pusellus Banks, 1931. *Psyche, Camb. Mass.* 38: 56.

solocipennis Enderlein. **(Pseudocaecilius).** Japan.
Pseudocaecilius solocipennis Enderlein, 1907. *Stettin. ent. Ztg.* 68: 95.

tenellus Enderlein. **(Pseudocaecilius).** Java.
Pseudocaecilius tenellus Enderlein, 1926. *Zool. Meded.* 9: 59.

testaceus Enderlein. **(Pseudocaecilius).** New Guinea, Celebes.
Pseudocaecilius testaceus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 262; pl. V, fig. 28.

veitchi Karny. **(Pseudocaecilius).** Fiji.
Pseudocaecilius veitchi Karny, 1926. *Bull. ent. Res.* 16: 289, fig. 4.

viiv (Enderlein). **(Pseudocaecilius).** Java.
Hageniella viiv Enderlein, 1926. *Zool. Meded.* 9: 57.

villosus (Enderlein). **(Pseudocaecilius).** Australia.
Epipsocus villosus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 256; pl. V, fig. 27.
Hageniella villosa (Enderlein). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 41.

zonatus (Hagen). **(Pseudocaecilius).** Ceylon.
Psocus zonatus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 204.
Epipsocus zonatus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Hageniella zonata (Hagen). Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 258.
Epipsocus fuscofasciatus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 254.
(Not *Psocus zonatus* Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 103, fig. 10).

Genus **Pseudoscottiella** Badonnel

Pseudoscottiella Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 170.
Type species: *Pseudoscottiella megops* Badonnel.

decolor Badonnel. Angola.
Pseudoscottiella decolor Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 206, figs. 483-486.

hyalina Badonnel. Angola.
Pseudoscottiella hyalina Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 205, figs. 476-478.

immaculata Badonnel. Angola.
Pseudoscottiella immaculata Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 206, figs. 479-482.

megops Badonnel. Congo.
Pseudoscottiella megops Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 170, figs. 63-67.

tuberculata Badonnel. Angola.
Pseudoscottiella tuberculata Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 203, figs. 471-475.

Genus **Scottiella** Enderlein

Scottiella Enderlein, 1931. *Trans. Linn. Soc. Lond. Zool.* (2) 19: 216.
Type species: *Scottiella micans* Enderlein.

compta Enderlein. Seychelles.
Scottiella compta Enderlein, 1931. *Trans. Linn. Soc. Lond. Zool.* (2) 19: 217.

hirsuticornis Enderlein. Seychelles.
Scottiella hirsuticornis Enderlein, 1931. *Trans. Linn. Soc. Lond. Zool.* (2) 19: 217.

micans Enderlein. Seychelles.
Scottiella micans Enderlein, 1931. *Trans. Linn. Soc. Lond. Zool.* (2) 19: 216, fig. 2; pl. 14, fig. 61.

Subfamily **ELECTROPSOCINAE**

Genus **Electropsocus** Roesler

Electropsocus Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 244.
Type species: *Electropsocus unguidens* Roesler.

unguidens Roesler. East Prussia (in amber).
Electropsocus unguidens Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 244.

Family **TRICHOPSOCIDAE**

Genus **Palaeopsocus** Kolbe

Palaeopsocus Kolbe, 1883. *Stettin. ent. Ztg.* 44: 190.
Type species: *Psocus tener* Hagen.

tener (Hagen). East Prussia (in amber).
Psocus tener Hagen, 1856. *Die in Bernstein befiindlichen organischen Reste* (2) 1: 60; pl. 8, fig. 8.
Epipsocus tener (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Archipsocus ? *tener* (Hagen). Hagen, 1882. *Stettin. ent. Ztg.* 43: 293.
Palaeopsocus tener (Hagen). Kolbe, 1883. *Stettin. ent. Ztg.* 44: 190.

Genus **Trichopsocus** Kolbe

Trichopsocus Kolbe, 1882. *Jber. westf. ProvVer. Wiss. Kunst* 10: 25.
Type species: *Caecilius hirtellus* McLachlan.

acuminatus Badonnel. Europe, Canary Islands.
Trichopsocus hirtellus (McLachlan). Auct.
(Not *Caecilius hirtellus* McLachlan, 1877. *C. R. Seances Soc. ent. Belgique* 20: 54).
(Not *Trichopsocus hirtellus* var. *angulata* Navas, 1916. *Rev. Acad. Madrid* 14: 599, fig. 4).
(Not *Trichopsocus hirtellus* (McLachlan). Badonnel, 1938. *Bull. Soc. ent. Fr.* 43: 18).
! *Trichopsocus dalii* McLachlan. Badonnel, 1938. *Bull. Soc. ent. Fr.* 43: 18.
Trichopsocus acuminatus Badonnel, 1943. *Faune de France* 42: 89, figs. 213, 214, 220.

australis Edwards. Tasmania.
Trichopsocus australis Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 119, figs. 76-82.

brincki Badonnel. Madeira.
Trichopsocus brincki Badonnel, 1963. *Bol. Mus. Funchal* 17: 75, figs. 15-19.

dalii (McLachlan). Europe, Algeria, Morocco, Canary Islands.
Caecilius dalii McLachlan, 1867. *Ent. mon. Mag.* 3: 272; pl. 2, fig. 6.
Caecilius hirtellus McLachlan, 1877. *C. R. Seances Soc. ent. Belgique* 20: 54.
Trichopsocus hirtellus var. *angulata* Navas, 1916. *Rev. Acad. Madrid* 14: 599, fig. 4.

(Not *Trichopsocus dalii* (McLachlan). Badonnel, 1938. *Bull. Soc. ent. Fr.* 43: 18).
Trichopsocus hirtellus (McLachlan). Badonnel, 1938. *Bull. Soc. ent. Fr.* 43: 18.
Trichopsocus dalii (McLachlan). Badonnel, 1943. *Faune de Fr.* 42: 87, figs. 215-217.

kolosvaryi Danks. Latvia, Caucasus.
Trichopsocus kolosvaryi Danks, 1950. *Gos. Musei Prirod.* 2: 1, figs. 1-4.

Family **ARCHIPSOCIDAE**

Genus **Archipsocus** Hagen

Archipsocus Hagen, 1882. *Stettin. ent. Ztg.* 43: 225.
Type species: *Archipsocus puber* Hagen.

Subgenera:

(Archipsocus) Hagen, 1882. *Stettin. ent. Ztg.* 43: 225.
Type species: *Archipsocus puber* Hagen.
Subgeneric status: Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 294.

(Archipsocopsis) Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 294.
Type species: *Archipsocus mendax* Badonnel.
Subgeneric status: Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 294.

Note: The type species of this genus has been insufficiently studied but has been assumed to have characters similar to those species associated with it in the subgenus *Archipsocus*. (Cf. Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 294. (footnote)).

albofasciatus Badonnel. **(Archipsocopsis).** Congo, Angola.
Archipsocus albofasciatus Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 49, figs. 61-63.

aneura Badonnel. **(Archipsocopsis).** Congo, Angola.
Archipsocus aneura Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 308, figs. 73-75, 87, 88, 95B.

balli Badonnel. **(Archipsocopsis).** Congo.
Archipsocus balli Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 306, figs. 68-72, 95A.

bicolor Badonnel. **(Archipsocopsis).** Congo.
Archipsocus bicolor Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 50, figs. 64-68.

bifurcatus Smithers. **(Archipsocopsis).** Nigeria.
Archipsocus (Archipsocopsis) bifurcatus Smithers, 1958. *Ent. mon. Mag.* 94: 56, fig. 2.

biguttatus Pearman. **(Archipsocopsis).** Ceylon.
Archipsocus biguttatus Pearman, 1936. *Spolia zeylan.* 20: 1; pl. I, figs. 1-6.

brasilianus Enderlein. **(Archipsocopsis).** Brazil, Porto Rica, Paraguay.
Archipsocus brasilianus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 24: 83; pl. 6, figs. 3-5, 7, 12, 15-17, 19.

corbetae Smithers. **(Archipsocus).** Queensland.
Archipsocus corbetae Smithers, 1964. *J. ent. Soc. Qd.* 3: 81, figs. 5-11.

fernandi Pearman. **(Archipsocopsis).** Ceylon.
Archipsocus fernandi Pearman, 1934. *Stylops* 3: 112, figs. 1-7.

floridanus Mockford. **(Archipsocus).** North America.
Archipsocus (Archipsocus) floridanus Mockford, 1953. *Florida Ent.* 36: 116, figs. 1, 5, 7, 11-13, 19, 22-24.

frater Mockford. **(Archipsocopsis).** Florida.
Archipsocus frater Mockford, 1957. *Florida Ent.* 40: 33, 6 figs.

fuscopalpus Badonnel. **(Archipsocus).** Angola, Congo.
Archipsocus fuscopalpus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 216, fig. 501C.

ghesquierei Badonnel. **(Archipsocus).** Ivory Coast, Angola, Congo.
Archipsocus ghesquierei Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 173, figs. 72-74.

! *Archipsocus neens* f. *macropterus* Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 172, figs. 68-71.
Archipsocus ghesquierei subsp. *oligochaetus* Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 47.
Archipsocus ghesquierei subsp. *longicornis* Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 215, fig. 501B.
Archipsocus ghesquierei subsp. *albomaculatus* Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 215, fig. 501A.

gurneyi Mockford. **(Archipsocus).** North America.
Archipsocus (*Archipsocus*) *gurneyi* Mockford, 1953. *Florida Ent.* 36: 120, figs. 3, 8, 14-16, 20, 25-27.

intermedius Smithers. **(Archipsocopsis).** Queensland.
Archipsocus (*Archipsocopsis*) *intermedius* Smithers, 1964. *J. ent. Soc. Qd.* 3: 79, figs. 1-4.

machadoi Badonnel. Angola.
Archipsocus (*Archipsocus*) *machadoi* Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 220, figs. 503-505, 506B.

mendax Badonnel. **(Archipsocopsis).** Congo, Angola.
Archipsocus mendax Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 303, figs. 84B, 85, 86, 91-93.

minutus Badonnel. **(Archipsocopsis).** Angola.
Archipsocus minutus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 221, fig. 506C.

neens Enderlein. **(Archipsocus).** Gold Coast, Congo.
Archipsocus neens Enderlein, 1914. *Boll. Lab. Zool. Portici* 8: 240, figs. 1, 2.
(Not *Archipsocus neens* f. *macropterus* Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 172 figs. 68-71).
Archipsocus neens var. *congolensis* Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 301, figs. 76-83, 84A.

nomas Gurney. **(Archipsocus).** North America.
Archipsocus nomas Gurney, 1939. *J. Wash. Acad. Sci.* 29: 502, figs. 1-14.

panama Gurney. **(Archipsocus).** Florida, Barro Colorado Island.
Archipsocus panama Gurney, 1939. *J. Wash. Acad. Sci.* 29: 505, fig. 15.

parvulus Mockford. **(Archipsocopsis).** North America.
Archipsocus (*Archipsocopsis*) *parvulus* Mockford, 1953. *Florida Ent.* 36: 123, figs. 2, 4, 17, 18, 28, 30.

puber Hagen. **(Archipsocus).** East Prussia (in amber).
Archipsocus puber Hagen, 1882. *Stettin. ent. Ztg.* 43: 222; pl. I, fig. 10.

recens Enderlein. **(Archipsocus).** Singapore, Java, Formosa.
Archipsocus recens Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 286, fig. 1; pl. VIII, figs. 50a-50i.
Archipsocus recens f. *brevipennis* Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 287, pl. VIII, figs. 50a-50i.

textor Enderlein. **(Archipsocus).** East Africa, French Guinea.
Archipsocus textor Enderlein, 1911. *Zool. Anz.* 37: 143, figs. 1, 2.

Family **ELIPSOCIDAE**

Subfamily **ELIPSOCINAE**

Genus **Cuneopalpus** Badonnel

Cuneopalpus Badonnel, 1943. *Faune de France* 42: 76.
Type species: *Elipsocus cyanops* Rostock.

cyanops (Rostock). Europe.
Elipsocus cyanops Rostock, 1876. *Ent. Nachr.* 2: 192.

Genus **Drymopsocus** Smithers

Drymopsocus Smithers, 1963. *Proc. R. ent. Soc. Lond.* (*B*) 32: 36.
Type species: *Drymopsocus brunneus* Smithers.

brunneus Smithers. Australia.
Drymopsocus brunneus Smithers, 1963. *Proc. R. ent. Soc. Lond.* (*B*) 32: 36, figs. 7-12.

Genus **Elipsocus** Hagen

Elipsocus Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 203.
Type species: *Elipsocus westwoodii* McLachlan, 1867. *Ent. mon. Mag.* 3: 274.
Cabarer Navas, 1908. *Mem. R. Acad. Barcelona* (3) 6: 410.
Type species: *Cabarer fasciatus* Navas.

abnormis (Hagen). East Prussia (in amber).
Psocus abnormis Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* (2) 1: 61; pl. 8, figs. 9a, 9b, 9c.
Caecilius abnormis (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 204.
Elipsocus abnormis (Hagen). Hagen, 1882. *Stettin. ent. Ztg.* 43: 287; pl. 1, fig. 7.
Philotarsus abnormis (Hagen). Kolbe, 1883. *Stettin. ent. Ztg.* 44: 190.
Elipsocus kuhli Kolbe, 1883. *Stettin. ent. Ztg.* 44: 188.

alettae Smithers. Northern Rhodesia.
Elipsocus alettae Smithers, 1962. *J. ent. Soc. S. afr.* 25: 258, figs. 10-15.

alpinus Smithers. Tanganyika.
Elipsocus alpinus Smithers, 1962. *J. ent. Soc. S. afr.* 25: 255, figs. 1-5.

annulatus Roesler. Germany.
Elipsocus annulatus Roesler, 1954. *Beit. Ent.* 4: 563, fig. 1.

boops (Hagen). Ceylon.
Psocus boops Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 201.
Elipsocus boops (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.

brincki Badonnel. Azores.
Elipsocus brincki Badonnel, 1963. *Bol. Mus. Funchal* 17: 71, figs. 7-14.

capensis Smithers. South Africa.
Elipsocus capensis Smithers, 1962. *J. ent. Soc. S. afr.* 25: 260, figs. 16-19.

consimilis McLachlan. England, Finland.
Elipsocus consimilis McLachlan, 1890. *Ent. mon. Mag.* 26: 269.
Elipsocus cyanops var. *consimilis* Bastmann, 1913. *Medd. Soc. Fauna Flora fenn.* 39: 73.

fasciatus (Navas). Canary Islands.
Cabarer fasciatus Navas, 1908. *Mem. R. Acad. Barcelona* (3) 6: 410, figs. 12a, 12b.
Elipsocus fasciatus (Navas). Badonnel, 1944. *Rev. franc. Ent.* 11: 55, figs. 11-19.

hyalinus (Stephens). Europe.
Psocus hyalinus Stephens, 1836. *Illustrations of British Entomology* 6: 123.
Psocus bipunctatus Stephens, 1836. *Illustrations of British Entomology* 6: 123.
(Not *Psocus hyalinus* Hagen, 1861. *Ent. Ann.* 1861: 26).
Elipsocus westwoodii McLachlan, 1867. *Ent. mon. Mag.* 3: 274 (part).
(Not *Elipsocus hyalinus* (Stephens). McLachlan, 1867. *Ent. mon. Mag.* 3: 275).
Elipsocus abietis Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 114, fig. 8.
Elipsocus abietis ab. *thorandtensis* Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 543.
Elipsocus hyalinus (Stephens). Kimmins, 1941. *Ann. Mag. nat. Hist.* (11) 7: 522, figs. 1, 2.

impressus (Hagen). Ceylon.
Psocus impressus Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 201.
Elipsocus impressus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.

marplatensis Williner. Argentine.
Elipsocus marplatensis Williner, 1943. *Rev. Soc. ent. argent.* 12: 477.

mbizianus Smithers. Tanganyika.
Elipsocus mbizianus Smithers, 1962. *J. ent. Soc. S. afr.* 25: 256, figs. 6-9.

mclachlani Kimmins. Europe.
! *Elipsocus hyalinus* (Stephens). McLachlan, 1867. *Ent. mon. Mag.* 3: 275.
Elipsocus hyalinus (Stephens). Auct.
?*Elipsocus brevistylis* Reuter, 1893. *Act. Soc. Fauna Flora fenn.* 9: 44.
Elipsocus hyalinus var. *abdominalis* Reuter, 1904. *Act. Soc. Fauna Flora fenn.* 26: 6.
Elipsocus mclachlani Kimmins, 1941. *Ann. Mag. nat. Hist.* (11) 7: 528, fig. 5.

modestus Banks. Haiti.
Elipsocus modestus Banks, 1938. *Rev. Ent. Rio de J.* 9: 286.

nevermanni Navas. Costa Rica.
Elipsocus nevermanni Navas, 1933. *Broteria ser. zool.* 2: 108.

nuptialis Roesler. Germany, France.
Elipsocus nuptialis Roesler, 1954. *Beit. Ent.* 4: 565, fig. 2.
Elipsocus abietis Kolbe. Badonnel, 1943. *Faune de France* 42: 76 (partim).

occidentalis Banks. British Columbia.
Elipsocus occidentalis Banks, 1907. *J.N.Y. ent. Soc.* 15: 166.

oligotrichus Thornton. Hong Kong.
Elipsocus oligotrichus Thornton, 1959. *Trans. R. ent. Soc. Lond.* 111: 345, figs. 17-20.

pallidus Jentsch. Germany, France, Switzerland.
Elipsocus pallidus Jentsch, 1938. *Abh. westfal. Prov. Mus. naturk.* 9: 27.

pumilis (Hagen). North America.
Psocus pumilis Hagen, 1861. *Smithson. misc. Coll.* 4: 9.
Elipsocus pumilis (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.

rubrostigma Navas. India.
Elipsocus rubrostigma Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 48.

ustulatus Smithers. Southern Rhodesia.
Elipsocus ustulatus Smithers, 1965. *J. ent. Soc. S. afr.* 27: 216, figs. 1-5.

valdiviensis (Blanchard). Chile.
Psocus valdiviensis Blanchard, 1851. *In* Gay, E. *Historia fisica y politica de Chile* 6: 95.
Elipsocus valdiviensis (Blanchard). Enderlein, 1923. *Zool. Anz.* 55: 248.

viridimicans Enderlein. Peru.
Elipsocus viridimicans Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 155; pl. 9, fig. 22.

westwoodii McLachlan. Europe.
Psocus quadrimaculatus Westwood, 1840. *Introduction to modern Classification of Insects* 2: 19, fig. 59.
(Not *Psocus quadrimaculatus* Latreille, 1794. *Bull. Soc. philom. Paris* 1: 85).
Elipsocus quadrimaculatus (Westwood). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Elipsocus westwoodii McLachlan, 1867. *Ent. mon. Mag.* 3: 274 (part).
Elipsocus moebiusi Tetens, 1891. *Ent. Nachr.* 17: 372, 379.
?*Elipsocus balmesi* Navas, 1909. *Rev. Montser.* 1907: 1-2, 1 fig.

Genus **Hemineura** Tetens

Hemineura Tetens, 1891. *Ent. Nachr.* 17: 372.
Type species: *Hemineura dispar* Tetens.
Actenotarsus Enderlein, 1907. *Zool. Jb. Abt. Syst.* 25: 503.
Type species: *Actenotarsus hispanicus* Enderlein.

dispar Tetens. Europe.
Hemineura dispar Tetens, 1891. *Ent. Nachr.* 17: 379.
Hemineura fusca Reuter, 1904. *Act. Soc. Fauna Flora fenn.* 9: 3; pl. III, figs. 2-4.
Hemineura dispar var. *fusca* Reuter, 1909. *Medd. Soc. Fauna Flora fenn.* 35: 208.

hispanica (Enderlein). France, Spain, America.
Actenotarsus hispanicus Enderlein, 1907. *Zool. Jb. Abt. Syst.* 25: 504; pl. 19, figs. 1-5.
Elipsocus (*Actenotarsus*) *hispanicus* (Enderlein). Badonnel, 1935. *Bull. Soc. ent. Fr.* 40: 201.

Genus **Kilauella** Enderlein

Kilauella Enderlein, 1913. *Zool. Anz.* 41: 357.
Type species: *Elipsocus erythrostictus* Perkins.
Note: The synonymies of the species of this genus are discussed by Zimmerman, 1948. *Insects of Hawaii* 2: 217-255, figs. 121-131.

criniger (Perkins). Hawaii.
Elipsocus criniger Perkins, 1899. *Fauna Hawaiiensis* 2: 85.
Kilauella criniger (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357.

debilis (Perkins). Hawaii.
Elipsocus debilis Perkins, 1899. *Fauna Hawaiiensis* 2: 85.
Kilauella debilis (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357.
Kilauella vinosa var. *debilis* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 455; pl. 6, fig. 12.

erythrosticta (Perkins). Hawaii.
Elipsocus erythrostictus Perkins, 1899. *Fauna Hawaiiensis* 2: 86.
Kilauella erythrosticta (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357.
Kilauella vinosa var. *erythrosticta* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 454; pl. 6, fig. 9.

frigida (Perkins). Hawaii.
Elipsocus frigidus Perkins, 1899. *Fauna Hawaiiensis* 2: 87.
Kilauella frigida (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357.
(Not *Kilauella micramura* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 455).

inaequifusca (Perkins). Hawaii.
Elipsocus inaequifuscus Perkins, 1899. *Fauna Hawaiiensis* 2: 86.
Kilauella inaequifusca (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357.
Kilauella vinosa var. *inaequifusca* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 456; pl. 6, fig. 11.

micramura (Perkins). Hawaii.
Elipsocus micramura Perkins, 1899. *Fauna Hawaiiensis* 2: 87.
(Not *Kilauella frigida* (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357).
Kilauella micramura (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357.
Kilauella vinosa var. *micramura* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 455; pl. 6, fig. 10.

psylloides (Perkins). Hawaii.
Elipsocus psylloides Perkins, 1899. *Fauna Hawaiiensis* 2: 85.
Kilauella psylloides (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357.
Kilauella vinosa var. *psylloides* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 456; pl. 6, fig. 13.
(Not *Kilauella criniger* (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 357).

vinosa (McLachlan). Hawaii.
Elipsocus vinosa McLachlan, 1883. *Ann. Mag. nat. Hist.* (5) 12: 228.
Kilauella vinosa (McLachlan). Enderlein, 1913. *Zool. Anz.* 41: 357.
(Not *Kilauella vinosa* vars. *erythrosticta* (Perkins), *micramura* (Perkins), *inaequifusca* (Perkins), *psylloides* (Perkins), *debilis* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 454-457, figs. 9-13).

Genus **Palistreptus** Enderlein

Palistreptus Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 457.
Type species: *Elipsocus inconstans* Perkins.

inconstans (Perkins). Hawaii.
Elipsocus inconstans Perkins, 1899. *Fauna Hawaiiensis* 2: 84.
Kilauella inconstans (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 307.
Palistreptus inconstans (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 457, figs. 14, 15.
(Not *Palistreptus inconstans* var. *montanus* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 458; pl. 6, fig. 16).

montanus (Perkins). Hawaii.
Elipsocus montanus Perkins, 1899. *Fauna Hawaiiensis* 2: 83.
Kilauella montana (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 359.
! *Palistreptus inconstans* var. *montanus* (Perkins). Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 458; pl. 6, fig. 16.
Palistreptus montanus (Perkins). Zimmerman, 1948. *Ins. Hawaii* 2: 244, fig. 130d.

Subfamily **PSEUDOPSOCINAE**

Genus **Palmicola** Mockford

Palmicola Mockford, 1955. *Proc. ent. Soc. Wash.* 57: 102.
Type species: *Palmicola aphrodite* Mockford.

aphrodite Mockford. Florida.
Palmicola aphrodite Mockford, 1955. *Proc. ent. Soc. Wash.* 57: 102, figs. 2a, 2b, 4-6, 9.

robinae Mockford. Jamaica.
Palmicola robinae Mockford, 1955. *Proc. ent. Soc. Wash.* 57: 106, figs. 12-14, 17.

solitaria Mockford. Florida.
Palmicola solitaria Mockford, 1955. *Proc. ent. Soc. Wash.* 57: 105, figs. 1a, 1b, 3, 8.

Genus **Pseudopsocus** Kolbe

Pseudopsocus Kolbe, 1882. *Ent. Nachr.* 8: 208.
Type species: *Pseudopsocus rostocki* Kolbe.
(Not *Pseudopsocus* Chapman, 1930. *J.N.Y. ent. Soc.* 38: 287.
Type species: *Psocus amabilis* Walsh).

Leptella Reuter, 1894. *Act. Soc. Fauna Flora fenn.* 9: 45.
Type species: *Leptella fusciceps* Reuter.
(Not *Leptella* Hall and Clark, 1892. *Geol. Surv. St. N.Y.* 1: 293).

Leptodella Reuter, 1904. *Act. Soc. Fauna Flora fenn.* 26: 11. (*Leptella* preocc.).

Anisopsocus Ribaga, 1910. *Redia* 6: 272.
Type species: *Anisopsocus lichenophilus* Ribaga.

fusciceps (Reuter). Europe.
Leptella fusciceps Reuter, 1894. *Act. Soc. Fauna Flora fenn.* 9: 37, fig. 8.
Leptodella fusciceps (Reuter). Reuter, 1904. *Act. Soc. Fauna Flora fenn.* 26: 13; pl. 1, figs. 3-12; pl. 2, fig. 1.
Elipsocus reyi Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 542; pl. 35, figs. 6, 7.
Pseudopsocus (*Leptodella*) *fusciceps* (Reuter). Badonnel, 1943. *Faune de France* 42: 81, figs. 200, 201, 205, 206, 208.

lichenophilus (Ribaga). Italy.
Anisopsocus lichenophilus Ribaga, 1910. *Redia* 6: 274, figs. 1-8.
?*Pseudopsocus* (*Leptodella*) *meridionalis* (Badonnel). Badonnel, 1943. *Faune de France* 42: 84.
Pseudopsocus (*Anisopsocus*) *lichenophilus* (Ribaga). Badonnel, 1943. *Faune de France* 42: 84.

meridionalis Badonnel. Europe.
Pseudopsocus meridionalis Badonnel, 1936. *Bull. Soc. ent. Fr.* 41: 27, figs. 1, 2.
?*Pseudopsocus* (*Anisopsocus*) *lichenophilus* (Ribaga). Badonnel, 1943. *Faune de France* 42: 84.

rostocki Kolbe. Europe.
Pseudopsocus rostocki Kolbe, 1882. *Ent. Nachr.* 8: 209.

Genus **Reuterella** Enderlein

Reuterella Enderlein, 1903. *Zool. Anz.* 27: 132.
Type species: *Leptella helvimacula* Enderlein.

helvimacula (Enderlein). Europe.
Leptella helvimacula Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 539; pl. 35, figs. 1-4.
Reuterella helvimacula (Enderlein). Enderlein, 1903. *Zool. Anz.* 27: 132.
Reuterella helvimacula var. *enderleini* Schille, 1904. *Zool. Anz.* 27: 475.
Caecilius corticis Pearman, 1924. *Ent. mon. Mag.* 60: 58, 3 figs.

Subfamily **PROPSOCINAE**

Genus **Antarctopsocus** Badonnel

Antarctopsocus Badonnel, 1947. *Mém. Mus. Hist. nat. Paris. N.S.* 20: 26.
Type species: *Antarctopsocus jeanneli* Badonnel.

jeanneli Badonnel. Marion Island.
Antarctopsocus jeanneli Badonnel, 1947. *Mém. Mus. Hist. nat. Paris N.S.* 20: 27, figs. 1-5.

Genus **Pentacladus** Enderlein

Pentacladus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 408.
Type species: *Pentacladus eucalypti* Enderlein.

eucalypti Enderlein. Australia.
Pentacladus eucalypti Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 408; pl. 23, fig. 7.

Genus **Propsocus** McLachlan

Propsocus McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 352.
Type species: *Psocus pallipes* McLachlan.
Tricladus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 410.
Type species: *Tricladus froggatti* Enderlein.
(Not *Tricladus* Fairmairne, 1903. *Ann. ent. Soc. Fr.* 71: 563).
Tricladellus Enderlein, 1909. *Stettin. ent. Ztg.* 70: 273. (*Tricladus* preocc.).

pallipes (McLachlan). Australia.
Psocus pallipes McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 349.
Propsocus pallipes (McLachlan). McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 352.
Tricladus froggatti Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 410; pl. 23, fig. 6.
Tricladellus froggatti (Enderlein). Enderlein, 1909. *Stettin. ent. Ztg.* 70: 273.

pulchripennis (Perkins). Hawaii, Australia, Rhodesia, South Africa, Chile.
Stenopsocus pulchripennis Perkins, 1899. *Fauna Hawaiiensis* 2: 83.
Myopsocus nitens Hickman, 1934. *Pap. roy. Soc. Tasm.* 1933: 81, figs. 5A, 5B.
Tricladellus nitens (Hickman). Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 113, figs. 60-65, 67.
Tricladellus nitens var. *brachypterus* Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 115, fig. 66.
Propsocus pulchripennis (Perkins). Smithers, 1963. *Pacific Ins.* 5: 891, figs. 13-18.

Genus **Spilopsocus** Smithers

Spilopsocus Smithers, 1963. *Pacific Ins.* 5: 894.
Type species: *Spilopsocus ruidis* Smithers.

avius Smithers. Campbell Island.
Spilopsocus avius Smithers, 1964. *Pacific Ins. Monogr.* 7: 226, figs. 1-7.

ruidis Smithers. Australia.
Spilopsocus ruidis Smithers, 1963. *Pacific Ins.* 5: 894 figs. 19-25.

stigmaticus (Tillyard). New Zealand.
Mesopsocus stigmaticus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 185, fig. 11; pl. 18, fig. 4.
Spilopsocus stigmaticus (Tillyard). Smithers, 1963. *Pacific Ins.* 5: 894.

Subfamily **NEPIOMORPHINAE**

Genus **Nepiomorpha** Pearman

Nepiomorpha Pearman, 1936. *Spolia zeylan.* 20: 4.
Type species: *Nepiomorpha crucifera* Pearman.

annulata Badonnel. Angola.
Nepiomorpha annulata Badonnel, 1955. *Pub. cult. Cia Diamant Angola* 26: 177, figs. 389-395.

crucifera Pearman. Ceylon, Angola.
Nepiomorpha crucifera Pearman, 1936. *Spolia zeylan.* 20: 4; pl. 1, figs. 4-12.
Nepiomorpha crucifera subsp. **angolensis** Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 174, figs. 383-388.

peripsocoides Mockford. Florida.
Nepiomorpha peripsocoides Mockford, 1955. *Proc. ent. Soc. Wash.* 57: 98, figs. 7, 11a, 11b, 15.

Genus **Paedomorpha** Smithers

Paedormorpha Smithers, 1963. *Proc. R. ent. Soc. Lond.* (*B*) 32: 32.
Type species: *Paedomorpha gayi* Smithers.

gayi Smithers. Australia.
Paedomorpha gayi Smithers, 1963. *Proc. R. ent. Soc. Lond.* (*B*) 32: 32, figs. 1-6.

Genus **Roesleria** Badonnel

Roesleria Badonnel, 1963. *Biol. l'Amerique australe* 2: 331.
Type species: *Roesleria chilensis* Badonnel.

chilensis Badonnel. Chile.
Roesleria chilensis Badonnel, 1963. *Biol. l'Amerique australe* 2: 331, figs. 76-84.

Subfamily **LESNEIINAE**

Genus **Lesneia** Badonnel

Lesneia Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 247.
Type species: *Lesneia capensis* Badonenl.

capensis Badonnel. South Africa.
Lesneia capensis Badonnel, 1931. *Ann. Sci. nat. Zool.* (10) 14: 248, figs. 19-21.

stuckenbergi Badonnel. South Africa.
Lesneia stuckenbergi Badonnel, 1963. *Arch. Zool. exp. gén.* 102: 41, figs. 1-9, 11-14.

Note: The following genus, *Lenkoella,* was described as being in the subfamily Reuterellinae prior to the rearrangement of the family by Smithers (1964, *Trans. R. ent. Soc. Lond.* 116: 211-224).

Genus **Lenkoella** Machado-Allison and Papavero

Lenkoella Machado-Allison and Papavero, 1964. *Pap. Dept. Zool. Sec. Agric., Sao Paulo* 15: 312.
Type species: *Lenkoella neotropica* Machado-Allison and Papavero.

neotropica Machado-Allison and Papavero. Brazil.
Lenkoella neotropica Machado-Allison and Papavero, 1962. *Pap. Dep. Zool. Sec. Agric., Sao Paulo* 15: 312, figs.

Note: The following two genera, *Graphocaecilius* and *Hemicaecilius,* may not be properly placed in the Elipsocidae.

Genus **Graphocaecilius** Enderlein

Graphocaecilius Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 155.
Type species: *Graphocaecilius trypetoides* Enderlein.

achrysus Banks. Santo Domingo.
Graphocaecilius achrysus Banks, 1941. *Mem. Soc. cubana Hist. -nat.* 15: 391, fig. 16.

citramans Williner. Bolivia.
Graphocaecilius citramans Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 119, fig. 12.

enderleini Williner. Bolivia.
Graphocaecilius enderleini Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 121, fig. 13.

interpretatus Roesler. Brazil.
Graphocaecilius interpretatus Roesler, 1940. *Zool. Anz.* 130: 14, figs. 79-83.

luridus Enderlein. Peru.
Graphocaecilius luridus Enderlein, 1906. *Stettin. ent. Ztg.* 67: 314.

trypetoides Enderlein. Peru.
Graphocaecilius trypetoides Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 156; pl. 9, fig. 23.

Genus **Hemicaecilius** Enderlein

Hemicaecilius Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 357.
Type species: *Hemicaecilius bogotanus* Enderlein.

bogotanus Enderlein. Columbia.
Hemicaecilius bogotanus Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 358; pl. 17, fig. 9.

Family **PSOCULIDAE**

Genus **Psoculus** Roesler

Psoculus Roesler, 1954. *Beit. Ent.* 4: 570.
Type species: *Reuterella neglecta* Roesler.

neglectus (Roesler). Germany.
Reuterella neglecta Roesler, 1935. *Arch. Mecklenberg. Naturf.* 9: 22. (Brief description).
Reuterella neglecta Roesler, 1935. *Zool. Anz.* 111: 95, figs. 1, 2B, 3A, 4, 5A, 6A, 7A, 8B.
Psoculus neglectus (Roesler). Roesler, 1954. *Beit. Ent.* 4: 571, figs. 14-16.

Family **PHILOTARSIDAE**

Genus **Aaroniella** Mockford

Aaroniella Mockford, 1951. *Psyche, Camb. Mass.* 58: 102.
Type species: *Elipsocus maculosus* Aaron.

badonneli (Danks). Latvia, Caucasus.
Philotarsus badonneli Danks, 1950. *Goz. Muzei Prirody Riga LSSR* 1, 6 figs.
Aaroniella badonneli (Danks). Thornton, 1959. *Trans. R. ent. Soc. Lond.* 111: 344.

maculosa (Aaron). North America.
Elipsocus maculosus Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 40; pl. 9, fig. 8.

Philotarsus maculosus (Aaron). Chapman and Nadler, 1928. *Mem. Cornell agric. Exp. Sta.* 101: 62.
Aaroniella maculosa (Aaron). Mockford, 1951. *Psyche, Camb. Mass.* 58: 103.

pulchra Thornton. Hong Kong.
Aaroniella pulchra Thornton, 1959. *Trans. R. ent. Soc. Lond.* 111: 342, figs. 14-16.

Genus **Austropsocus** Smithers

Austropsocus Smithers, 1962. *Pacific Ins.* 4: 929.
Type species: *Austropsocus insularis* Smithers.

insularis Smithers. Macquarie Island, Campbell Island.
Austropsocus insularis Smithers, 1962. *Pacific Ins.* 4: 930, figs. 1-6.

Genus **Haplophallus** Thornton

Haplophallus Thornton, 1959. *Trans. R. ent. Soc. Lond.* 111: 336.
Type species: *Haplophallus orientalis* Thornton.

basilewskyi (Smithers). Tanganyika.
Aaroniella basilewskyi Smithers, 1960. *Ann. Mus. Congo belge 8vo* 88: 371, figs. 8-10.
Haplophallus basilewskyi (Smithers). Smithers, 1963. *J. ent. Soc. Qd.* 2: 60.

fenestristigma (Enderlein). Seychelles.
Kolbia fenestristigma Enderlein, 1931. *Trans. Linn. Soc. Lond.* (2) *Zool.* 19: 211; pl. 14, fig. 55.
Haplophallus fenestristigma (Enderlein). Thornton, 1959. *Trans. R. ent. Soc. Lond.* 111: 340.

greyi (Edwards). Tasmania.
Philotarsus greyi Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 116, figs. 68-75.
Haplophallus greyi (Edwards). Smithers, 1963. *J. ent. Soc. Qd.* 2: 60.

maculatus (Tillyard). New Zealand.
Philotarsus maculatus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 181, fig. 7; pl. 18, fig. 2.
Haplophallus maculatus (Tillyard). Thornton, 1962. *N.Z. J. Sci.* 5: 342, figs. 3-8.

orientalis Thornton. Hong Kong.
Haplophallus orientalis Thornton, 1959. *Trans. R. ent. Soc. Lond.* 111: 336, fig. 7a, 8-13.

Genus **Philotarsopsis** Tillyard

Philotarsopsis Tillyard, 1923. *Trans. N.Z. Inst.* 54: 182.
Type species: *Philotarsopsis delicatus* Tillyard.

delicatus Tillyard. New Zealand.
Philotarsopsis delicatus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 182, fig. 9.

Genus **Philotarsus** Kolbe

Philotarsus Kolbe, 1880. *Jber westf. ProvVer. Wiss. Kunst* 8: 116.
Type species: *Psocus picicornis* Fabricius.

antiquus Kolbe. East Prussia (in amber).
Philotarsus antiquus Kolbe, 1883. *Stettin. ent. Ztg.* 44: 187.

bruchi Williner. Argentine.
Philotarsus bruchi Williner, 1943. *Rev. Soc. ent. argent.* 12: 119.

bullicornis Enderlein. East Prussia (in amber).
Philotarsus bullicornis Enderlein, 1911. *Palaeontographica* 50: 331, figs. 64-66.

fraternus Enderlein. Bolivia.
Philotarsus fraternus Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 547.

froggatti Enderlein. Australia.
Philotarsus froggatti Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 308, 52b-c; pl. IX, fig. 52a.

glossopterus Roesler. Costa Rica.
Philotarsus glossopterus Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 242.

guttatus Tillyard. New Zealand.
Philotarsus guttatus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 181, fig. 8.
?Aaroniella guttatus (Tillyard). Thornton, 1962. *N.Z.J. Sci.* 5: 242, figs. 1, 2.

kwakiutl Mockford. Washington.
Philotarsus kwakiutl Mockford, 1951. *Psyche, Camb. Mass.* 58: 104; pl. 8, figs. 2, 3, 6, 8; pl. 9, figs. 1, 2, 7.

leopardina Williner. Argentine.
Philotarsus leopardina Williner, 1943. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 11: 474.

parviceps Roesler. Germany.
Philotarsus parviceps Roesler, 1954. *Beit. Ent.* 4: 568, figs. 6, 9, 10, 12.

picicornis (Fabricius). North America, Europe.
Hemerobius picicornis Fabricius, 1793. *Entomologia systematica* 2: 86.
Psocus picicornis (Fabricius). Fabricius, 1798. *Supplementum Entomologiae Systematicae* 8: 204.
(Not *Psocus picicornis* Stephens, 1836. *Illustrations of British Entomology* 6: 118).
Psocus flaviceps Stephens, 1836. *Illustrations of British Entomology* 6: 124.
Psocus striatulus Stephens, 1836. *Illustrations of British Entomology* 6: 124.
Caecilius irroratus Curtis, 1837. *British Entomology* 14: 648.
Psocus lasiopterus Burmeister, 1839. *Handbuch der Entomologie* 2: 777.
Psocus pusillus Zetterstedt, 1840. *Insecta Lapponica* p. 1053.
Caecilius lasiopterus (Burmeister). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.
Caecilius flaviceps (Stephens). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 205.
Elipsocus flaviceps (Stephens). McLachlan, 1867. *Ent. mon. Mag.* 3: 275; pl. 2, figs. 9, 10.
Philotarsus picicornis (Fabricius). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 117; pl. 2, fig. 10.
Philotarsus flaviceps (Stephens). Auct.
Philotarsus picicornis var. *stigma* Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 117.
Philotarsus flaviceps var. *fuscoguttata* Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 543.
Mesopsocus poecilopterus Navas, 1913. *Bol. Soc. aragon. Cienc. nat.* 12: 87, fig. 2.

samoanus Karny. Samoa.
Philotarsus samoanus Karny, 1932. *Ins. Samoa* 8: 126, fig. 7.
?Aaroniella samoana (Karny). Thornton, 1962. *N.Z.J. Sci.* 5: 241.

sticticus (Navas). Argentine.
Elipsocus sticticus Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 109.
Philotarsus sticticus (Navas). Williner, 1944. *Rev. Soc. ent. argent.* 2: 41.

triangulus (Blanchard). Chile, Falkland Islands, Malvinas Island.
Psocus triangulum Blanchard, 1851. *In* Gay, C. *Historia fisica y politica de Chile* 6: 96.
Philotarsus triangulum (Blanchard). Enderlein, 1923. *Zool. Anz.* 55: 247.
Philotarsus falklandicus Enderlein, 1905. *Zool. Anz.* 29: 126.

viridis Enderlein. Australia.
Philotarsus viridis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 209; pl. IX, fig. 53.

Genus **Zelandopsocus** Tillyard

Zelandopsocus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 183.
Type species: *Zelandopsocus formosellus* Tillyard.

formosellus Tillyard. New Zealand.
Zelandopsocus formosellus Tillyard, 1923. *Trans. N.Z. Inst.* 54: 184, fig. 10; pl. 18, fig. 3.

sinuosus Banks. South Australia.
Zelandopsocus sinuosus Banks, 1939. *Bull. Mus. comp. Zool. Harv.* 85: 441, fig. 12.

Family **MESOPSOCIDAE**

Genus **Hexacyrtoma** Enderlein

Hexacyrtoma Enderlein, 1908. *Denkschr. med. -naturw. Ges. Jena* 13: 349.
Type species: *Hexacyrtoma capensis* Enderlein.

capensis Enderlein. South-west Africa.
Hexacyrtoma capensis Enderlein, 1908. *Denkschr. med. -naturw. Ges. Jena* 13: 350, figs. 1, 2; pl. XIX, fig. 1.

Genus **Labocoria** Enderlein

Labocoria Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 71.
Type species: *Mesopsocus diopsis* Enderlein.

diopsis (Enderlein). East Africa.
Mesopsocus diopsis Enderlein, 1902. *Mitt. zool. Mus. Berl.* 2: 13; pl. V, figs. 7, 9.
Labocoria diopsis (Enderlein). Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 71.

Genus **Mesopsocus** Kolbe

Mesopsocus Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 112.
Type species: *Elipsocus unipunctatus* (Műller)
Trocticus Bertkau, 1883. *Arch. Naturgesch.* 49: 99.
Type species: *Trocticus gibbulus* Bertkau.
Cyrtopsocus, Costa, 1885. *Boll. Soc. ent. Ital.* 17: 243.
Type species: *Cyrtopsocus irroratus* Costa.
Holoneura Tetens, 1891. *Ent. Nachr.* 17: 372, 378.
Type species: *Elipsocus unipunctatus* (Műller).

achocallae Williner. Bolivia.
Mesopsocus achocallae Williner, 1949. *Rev. Inst. Invest. Mus. argent. Cienc. nat.* 1: 108, fig. 6.

alienatus Smithers. Southern Rhodesia.
Mesopsocus alienatus Smithers, 1957. *Trans. R. ent. Soc. Lond.* 109: 255, figs. 4, 14, 15.

atlasicus Badonnel. Morocco.
Mesopsocus atlasicus Badonnel, 1945. *Rev. franc. Ent.* 12: 40, figs. 18, 20, 22-24, 42.

distinctus Smithers. Cape Province.
Mesopsocus distinctus Smithers, 1957. *Trans. R. ent. Soc. Lond.* 109: 248, figs. 5-9.

dromedarius Ball. Morocco.
Mesopsocus dromedarius Ball, 1937. *Bull. Mus. Hist. nat. Belg.* 13: 7; pl. III, figs. 1, 2; pl. IV, fig. 1; pl. V, figs. 3, 4.

dubosqui Badonnel. France.
! *Mesopsocus unipunctatus* (Műller). Badonnel, 1931. *Bull. Soc. zool. Fr.* 56: 341.
Mesopsocus dubosqui Badonnel, 1938. *Bull. Soc. ent. Fr.* 43: 20.

hiemalis Marikowskii. Kazakhstan.
Mesopsocus hiemalis Marikowskii, 1957. *Zool. Zh.* 36: 1028, 4 figs.

hongkongensis Thornton. Hong Kong.
Mesopsocus hongkongensis Thornton, 1959. *Trans. R. ent. Soc. Lond.* 111: 331, figs. 1-6.

immunis (Stephens). Europe, Morocco.
Psocus immunis Stephens, 1836. *Illustrations of British Entomology* 6: 121.

Elipsocus aphidioides (Schrank). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 214.
! *Mesopsocus unipunctatus* (Müller). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 112; pl. 1, fig. 5.
Mesopsocus immunis (Stephens). Badonnel, 1936. *Bull. Soc. ent. Fr.* 41: 26.

incomitatus Smithers. South Africa.
Mesopsocus incomitatus Smithers, 1957. *Trans. R. ent. Soc. Lond.* 109: 251, fig. 3.

laterimaculatus Ball. Morocco.
Mesopsocus laterimaculatus Ball, 1937. *Bull. Mus. Hist. nat. Belg.* 13: 5; pl. II, fig. 1; pl. V, fig. 2.

laticeps (Kolbe). Europe, North America.
Elipsocus laticeps Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 114, fig. 6.
Holoneura laticeps (Kolbe). Tetens, 1891. *Ent. Nachr.* 17: 372, 378.
Mesopsocus laticeps ab. *pedunculata* Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 541.
Mesopsocus laticeps (Kolbe). Gurney, 1949. *J. Wash. Acad. Sci.* 39: 62.

maroccanus Badonnel. Morocco.
Mesopsocus maroccanus Badonnel, 1945. *Rev. franc. Ent.* 12: 42, figs. 19, 21, 26, 27.

montinus Enderlein. East Africa.
Mesopsocus montinus Enderlein, 1907. *Schwed. Zool. Exped. Kilimandjaro* 15 (2): 35; pl. 5, figs. 4, 5, 9.

nasutus Enderlein. Southern Tunis.
Mesopsocus nasutus Enderlein, 1907. *Ann. hist. -nat. Mus. hung.* 5: 728; pl. IX, figs. 1-3.

shiffi Smithers. Cape Province.
Mesopsocus shiffi Smithers, 1957. *Trans. R. ent. Soc. Lond.* 109: 245, figs. 2, 10, 11.

tumorosus Smithers. Southern Rhodesia.
Mesopsocus tumorosus Smithers, 1957. *Trans. R. ent. Soc. Lond.* 109: 252; figs. 1, 12, 13.

unipunctatus (Müller). Europe, North America, Japan, Canary Islands.
Hemerobius unipunctatus Müller, 1764. *Fauna insectorum Friedrichsdalina* p. 66.
Hemerobius aphidioides Schrank, 1781. *Enumeratio insectorum Austriae* p. 314.
Psocus longicornis Stephens, 1836. *Illustrations of British Entomology* 6: 121.
Caecilius vitripennis Curtis, 1837. *British Entomology* 14: 648.
Psocus obliteratus Zetterstedt, 1840. *Insecta Lapponica* 5: 1053.
Psocus oculatus Zetterstedt, 1840. *Insecta Lapponica* 5: 1053.
Psocus naso Rambur, 1842. *Histoire naturelle des Insectes* p. 320.
Psocus signatus Hagen, 1861. *Smithson. misc. Coll.* 4: 9.
Elipsocus aphidioides (Schrank). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Elipsocus signatus (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 207.
Mesopsocus unipunctatus (Müller). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 112; pl. I, fig. 5.
Trocticus gibbulus Bertkau, 1883. *Arch. Naturgesch.* 49: 99; pl. I, figs. 2a, 2b.
Cyrtopsocus irroratus Costa, 1855. *Boll. Soc. ent. Ital.* 17: 243.
Holoneura unipunctatus (Müller). Tetens, 1891. *Ent. Nachr.* 17: 372.
Elipsocus unipunctatus (Müller). Tetens, 1891. *Ent. Nachr.* 17: 378.
Mesopsocus unipunctatus var. *fasciatus* Enderlein, 1906. *Ber. westpreuss. bot. -zool. Ver.* 28: 84.
Mesopsocus unipunctatus var. *bifasciatus* Enderlein, 1906. *Ber. westpreuss. bot. -zool. Ver.* 28: 84.

Mesopsocus unipunctatus var. *subfuscus* Enderlein, 1906. *Ber. westpreuss bot. -zool. Ver.* 28: 85.
Mesopsocus unipunctatus var. *borealis* Enderlein, 1910. *Nyt. Mag. Naturw.* 48: 320.
(Not *Mesopsocus unipunctatus* (Műller). Badonnel, 1931. *Bull. Soc. zool. Fr.* 56: 341).

ypsilon Ball. Morocco.
Mesopsocus ypsilon Ball, 1937. *Bull. Mus. Hist. nat. Belg.* 13: 2; pl. I, fig. 1; pl. V, fig. 1.

Group PSOCETAE

Family PSOCIDAE

Subfamily AMPHIGERONTIINAE

Genus Amphigerontia Kolbe

Amphigerontia Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 104.
Type species: *Psocus bifasciatus* Latreille.

Note: The references to *Amphigerontia bifasciata* (Latreille) and *A. contaminata* (Stephens) in the literature are very confused. (cf. Badonnel, 1943. *Faune de France* 42: 53, 54).

bicolor Enderlein. Peru.
Amphigerontia bicolor Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 144; pl. IX, fig. 9.
Loensia bicolor (Enderlein). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113:2.

bifasciata (Latreille). Europe, North America.
Psocus bifasciatus Latreille, 1799. *Illustrata Iconographica Insectorum* p. 11; pl. 2, fig. 4.
Psocus subfasciatus Zetterstedt, 1840. *Insecta Lapponica* p. 1053.
Psocus quadrimaculatus Westwood, 1840. *Introduction to the modern classification of Insects* 2: 19, fig. 59.
Psocus semistriatus Walsh, 1862. *Proc. Acad. nat. Sci. Philad.* 14: 361 (part).
Amphigerontia subnebulosa Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 104.
(Not *Amphigerontia bifasciata* (Latreille). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 104).
Psocus confraternus Banks, 1905. *Trans. Amer. ent. Soc.* 32: 2.
Psocus moderatus Banks, 1907. *J.N.Y. ent. Soc.* 15: 165.
Psocus additus Banks, 1918. *Bull. Mus. comp. Zool. Harv.* 62: 3.
Amphigerontia confraterna (Banks). Enderlein, 1924. *S.B. Ges. naturf. Fr. Berl.* 31: 35.
Amphigerontia bifasciata (Latreille). Ball, 1926. *Bull. (Ann.) Soc. ent. Belg.* 66: 332; pl. II, figs. 1, 2.
Amphigerontia bifasciata (Latreille). Pearman, 1932. *Ent. mon. Mag.* 68: 204.
Amphigerontia bifasciata (Latreille). Jentsch, 1938. *Zool. Anz.* 122: 87-90, 91, figs. 1b, 3b, 4b, 5b.
(Not *Amphigerontia bifasciata* (Latreille). Auct.).
Amphigerontia pearmani Roesler, 1943. *Stettin. ent. Ztg.* 104: 12.

birabeni Williner. Argentine.
Amphigerontia birabeni Williner, 1944. *Notes Mus. La Plata (Zool.)* 9: 445, fig. 5.

boliviana Navas. Bolivia.
Amphigerontia boliviana Navas, 1930. *Rev. chil. Hist. nat.* 34: 304, fig.

contaminata (Stephens). Europe.
Psocus contaminatus Stephens, 1836. *Illustrations of British Entomology* 6: 120.
Psocus megastigmus Stephens, 1836. *Illustrations of British Entomology* 6: 120.
Amphigerontia bifasciata (Latreille). Kolbe, 1880. *Jber. westf. ProVer. Wiss. Kunst* 8: 104.

Amphigerontia bifasciata (Latreille). Auct.
! *Amphigerontia bifasciata* (Latreille). Roesler, 1943. *Stettin. ent. Ztg.* 104: 12.
Amphigerontia contaminata (Stephens). Badonnel, 1943. *Faune de Fr.* 42: 54, figs. 110-118.

denticulata Enderlein. Paraguay.
Amphigerontia denticulata Enderlein, 1910. *Zool. Anz.* 36: 163, figs. 1, 2.
Loensia denticulata (Enderlein). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 2.

diffusa Navas. China.
Amphigerontia diffusa Navas, 1933. *Notes Ent. chin.* 13: 6.

feai Ribaga. Burma.
Amphigerontia feai Ribaga, 1908. *Redia* 5: 103; pl. VI, fig. 8.

formosa Banks. Queensland.
Amphigerontia formosa Banks, 1918. *Bull. Mus. comp. Zool. Harv.* 62: 4; pl. II, fig. 24.
Loensia formosa (Banks). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 2.

hemiphaeoptera Enderlein. Peru.
Amphigerontia hemiphaeoptera Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 145; pl. 9, fig. 11.
Amphigerontia hemiphaeoptera var. *hyalina* Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 146.
Loensia hemiphaeoptera (Enderlein). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 2.

hyalina Enderlein. Chile.
Amphigerontia hyalina Enderlein, 1925. *Konowia* 4: 102.

incerta Ribaga. Burma.
Amphigerontia incerta Ribaga, 1908. *Redia* 5: 109, pl. VI, fig. 9.

intermedia (Tetens). Europe.
Psocus intermedius Tetens, 1891. *Ent. Nachr.* 17: 371, 374.
Amphigerontia intermedia (Tetens). Jentsch, 1938. *Zool. Anz.* 122: 92, figs. 2b, 3c, 4c, 5c.

jezoensis Okamoto. Japan, Formosa.
Amphigerontia jezoensis Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 134.

lata Enderlein. Java.
Amphigerontia lata Enderlein, 1926. *Zool. Meded.* 9: 52.

limpida Navas. South America.
Amphigerontia limpida Navas, 1920. *An. Soc. cient. argent.* 90: 63.

martini Navas. Chile.
Amphigerontia martini Navas, 1922. *Estudios* 22: 365.

montivaga (Chapman). North America.
Psocus montivagus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 255; pl. XII, fig. 2; pl. XIV, figs. 7, 11.

namiana Navas. Tonkin.
Amphigerontia namiana Navas, 1920. *Mem. Accad. Nuovi Lincei* (2) 5: 27.

nervosa Navas. Argentine.
Amphigerontia nervosa Navas, 1933. *Rev. Acad. Cienc. Zaragoza* 16: 98.

nubila Enderlein. Japan.
Amphigerontia nubila Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 247; pl. 10, fig. 4.
Psocus grandis Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 122; pl. II, fig. 9.
Loensia nubila (Enderlein). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 2.

petiolata (Banks). North America.
Psocus petiolatus Banks, 1918. *Bull. Mus. comp. Zool. Harv.* 62: 4.
Amphigerontia petiolata (Banks). Mockford, 1950. *Proc. Ind. Acad. Sci.* 60: 201.

tincta Navas. South America.
Aphigerontia tincta Navas, 1920. *An. Soc. cient. argent.* 90: 63.

titschaki Navas. Costa Rica.
Amphigerontia titschaki Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 43.

ukingana Enderlein. East Africa.
Amphigerontia ukingana Enderlein, 1902. *Mitt. zool. Mus. Berl.* 2: 8.

umbrata Navas. Columbia.
Amphigerontia umbrata Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 45.

varia Navas. Costa Rica.
Amphigerontia varia Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 44.

vitiensis (Karny). Fiji.
Psocus (Amphigerontia) vitiensis Karny, 1926. *Bull. ent. Res.* 16: 285, fig. 1.

voeltzkowi Enderlein. Fundu Island.
Amphigerontia voeltzkowi Enderlein, 1908. *Reise in Ostafrika* 2: 248; pl. 11, fig. 1.

Genus **Blaste** Kolbe

Blaste Kolbe, 1883. *Stettin. ent. Ztg.* 44: 79.
Type species: *Blaste juvenilis* Kolbe.

Subgenera:

(Blaste) Kolbe, 1883. *Stettin. ent. Ztg.* 44: 99.
Type species: *Blaste quieta* (Hagen) (= *Blaste juvenilis* Kolbe).
Subgeneric status: Roesler, 1943. *Stettin. ent. Ztg.* 104: 3.

(Lasiopsocus) Enderlein, 1907. *Fauna S.W. Australien* 1 (3): 234.
Type species: *Lasiopsocus michaelseni* Enderlein.
Subgeneric status: Roesler, 1943. *Stettin. ent. Ztg.* 104: 3.

(Blastopsocus) Roesler, 1943. *Stettin. ent. Ztg.* 104: 3.
Type species: *Euclismia variabilis* (Aaron).

(Euclismia) Enderlein, 1925. *Konowia* 4: 99.
Type species: *Euclismia quadrimaculatus* (Latreille).
Subgeneric status: Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 253.

(Euclismiopsis) Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 254.
Type species: *Blaste (Euclismiopsis) machadoi* Badonnel.

(Blastopsis) Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 259.
Type species: *Blaste (Blastopsis) triangularum* Badonnel.

(Blastopsocidus) Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 261.
Type species: *Blaste (Blastopsocidus) maculatus* Badonnel.

Note: In the following list species are allocated to the subgenera only where this has been indicated in the literature, other species are regarded as belonging to *Blaste* sens. lat. The species in this group are in need of revision (cf. Thornton, 1960. *Trans R. ent. Soc. Lond.* 112: 239-240).

allaudi (Badonnel). Madagascar.
Euclismia allaudi Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 100; pl. I, figs. 3-7.

angolensis Badonnel. **(Blaste).** Angola.
Blaste (Blaste) angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 251, figs. 584-589.

balli (Badonnel). Morocco.
Euclismia balli Badonnel, 1945. *Rev. franc. Ent.* 12: 46, figs. 35-41.

bicuspis Smithers. Madagascar.
Blaste bicuspis Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 258, figs. 86-88.

binotata (Enderlein). Java.
Euclismia binotata Enderlein, 1926. *Zool. Meded.* 9: 57.

brevipilosa (Enderlein). **(Lasiopsocus).** South Africa.
Lasiopsocus brevipilosus Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 35; pl. III, fig. 15.

cinerea (Enderlein). Bombay.
Psocus cinereus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 228; pl. XIV, fig. 70.
Euclismia cinerea (Enderlein). Enderlein, 1925. *Konowia* 4: 100.

conspurcata (Rambur). Europe.
Psocus quadrimaculatus var. A. Latreille, 1799. *Illustrata Iconographica Insectorum* p. 4.
Psocus conspurcatus Rambur, 1842. *Histoire naturelle des Insectes* p. 323.
Psocus quadrimaculatus Latreille. Selys-Longchamps, 1873. *Ann. Soc. ent. Belg.* 16: 4.
?*Psocus hilaris* Navas, 1907. *Rev. Montser.* 1907: 1-2, figs. 1a-1c.
Euclismia conspurcata (Rambur). Badonnel, 1943. *Faune de Fr.* 42: 60, figs. 134-141.
(Not *Psocus conspurcatus* Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 224; pl. IV, fig. 13).

cubitalis (Enderlein). Singapore.
! *Psocus obtusus* Hagen. Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 227; pl. IV, fig. 14.
Psocus cubitalis Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 36.
Euclismia cubitalis (Enderlein). Enderlein, 1925. *Konowia* 4: 100.

dundoensis Badonnel. **(Euclismia).** Angola.
Blaste (Euclismia) dundoensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 253, figs. 590-594.

inornata (Aaron). North America.
Psocus inornatus Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 39.
Blaste ? inornatus (Aaron). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 240.

lignicola (Enderlein). Australia.
Psocus lignicola Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 401; pl. 23, figs. 1, 4.
Euclismia lignicola (Enderlein). Enderlein, 1925. *Konowia* 4: 100.

lithinus (Chapman). **(Blastopsocus).** North America.
Psocus lithinus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 249; pl. XX, fig. 11; pl. XIII, fig. 3; pl. XIV, fig. 16.
Blaste (Blastopsocus) lithinus (Chapman). Roesler, 1943. *Stettin. ent. Ztg.* 104: 2.
Blaste ? lithinus (Chapman). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 240.
Blastopsocus lithinus (Chapman). Mockford, 1961. *Florida Ent.* 44: 138.

longipennis (Banks). North America.
Psocus longipennis Banks, 1918. *Bull. Mus. comp. Zool. Harv.* 62: 3.
Blaste ? longipennis (Banks). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 240.

machadoi Badonnel. **(Euclismiopsis).** Angola.
Blaste (Euclismiopsis) machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 254, figs. 595-601, 613, 614.

maculata Badonnel. **(Blastopsocidus).** Angola.
Blaste (Blastopsocidus) maculatus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 261, figs. 617-625.

memorialis (Banks). Columbia.
Psocus memorialis Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 304.
Euclismia memorialis (Banks). Enderlein, 1925. *Konowia* 4: 99.

michaelseni (Enderlein). **(Lasiopsocus).** South-west Australia.
Lasiopsocus michaelseni Enderlein, 1907. *Fauna S.W. Austr.* 1 (3): 234, figs. 1-5.
Blaste (Lasiopsocus) michaelseni (Enderlein). Roesler, 1943. *Stettin. ent. Ztg.* 104: 3.

obtusa (Hagen). Ceylon, Japan, Singapore.
Psocus obtusus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 474.
(Not *Psocus obtusus* Hagen. Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 227; pl. IV, fig. 14).
Euclismia obtusa (Hagen). Enderlein, 1925. *Konowia* 4: 100.

opposita (Banks). North America.
Psocus oppositus Banks, 1907. *J.N.Y. ent. Soc.* 15: 165.
Psocus interruptus Banks, 1920. *Bull. Mus. Comp. zool. Harv.* 64: 306; pl. II, fig. 15.

oregona (Banks). North America.
Psocus oregonus Banks, 1900. *Trans. Amer. ent. Soc.* 26: 239.
Psocus californicus Banks, 1905. *Trans. Amer. ent. Soc.* 32: 2.
Blaste ? oregonus (Banks). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 240.

pauliani (Badonnel). **(Euclismiopsis).** Cameroons.
Euclismia pauliani Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 139, figs. 4-12.
Blaste (Euclismiopsis) pauliani (Badonnel). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 254, 256. (Referred to as *Euclismia lepesmei* Badonnel—in error?).

peringueyi (Enderlein). **(Euclismiopsis).** Congo, Southern Rhodesia.
Psocus peringueyi Enderlein, 1925. *Konowia* 4: 100.
Psocidus peringueyi (Enderlein). Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 316, figs. 113-116.
Blaste (Euclismiopsis) peringueyi (Enderlein). Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 259.

polioptera Smithers. Madagascar.
Blaste polioptera Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 256, figs. 80-82.

quadrimaculata (Latreille). **(Euclismia).** Europe.
Psocus quadrimaculatus Latreille, 1794. *Bull. Soc. philom. Paris* 1: 85.
Psocus subnebulosus Stephens, 1836. *Illustrations of British Entomology* 6: 121.
Psocus maculipennis Stephens, 1836. *Illustrations of British Entomology* 6: 126.
Euclismia quadrimaculata (Latreille). Enderlein, 1925. *Konowia* 4: 99.

quieta (Hagen). **(Blaste).** North America.
Psocus quietus Hagen, 1861. *Smithson. misc. Coll.* 4: 12.
Psocus semistriatus Walsh, 1862. *Proc. Acad. nat. Sci. Philad.* 14: 361 (part.).
Psocus bifasciatus Walsh, 1863. *Proc. ent. Soc. Philad.* 2: 183.
Blaste juvenilis Kolbe, 1883. *Stettin. ent. Ztg.* 44: 80.
Blaste (Blaste) quieta (Hagen). Roesler, 1943. *Stettin. ent. Ztg.* 104: 3.

simillima (Enderlein). Cape Province.
Psocus quadrimaculatus Latreille. Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 8; pl. I, figs. 3, 7 (part.).
Loensia simillima Enderlein, 1925. *Konowia* 4: 100.
Euclismia simillima (Enderlein). Badonnel, 1943. *Faune de Fr.* 42: 58.

stigmosalis (Banks). North America.
Psocus stigmosalis Banks, 1915. *Proc. Acad. nat. Sci. Philad.* 66: 611; pl. 28, fig. 18.
Euclismia stigmosalis (Banks). Enderlein, 1925. *Konowia* 4: 99.

stricta Smithers. Madagascar.
Blaste stricta Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 257; figs. 83-85.

stuckenbergi Smithers. Madagascar.
Blaste stuckenbergi Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 254, figs. 73-79.

subaptera (Chapman). California.
Psocus subapterus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 278; pl. XX, fig. 14; pl. XIV, fig. 1.
Blaste ? subapterus (Chapman). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 240.

subquieta (Chapman). North America.
Psocus subquietus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 279; pl. XIV, fig. 15.
Blaste ? subquietus (Chapman). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 240.

triangularum Badonnel. **(Blastopsis).** Angola.
Blaste (Blastopsis) triangularum Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 259, figs. 608-612.

variabilis (Aaron). **(Blastopsocus).** North America.
Psocus semistriatus Walsh, 1862. *Proc. Acad. nat. Sci. Philad.* 14: 361 (part.).
Psocus variabilis Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 38; pl. 9, fig. 5.
Psocus medialis Banks, 1907. *J.N.Y. ent. Soc.* 15: 165.
Euclismia variabilis (Aaron). Enderlein, 1925. *Konowia* 4: 100.
Blaste (Blastopsocus) variabilis (Aaron). Roesler, 1943. *Stettin. ent. Ztg.* 104: 2.
Blastopsocus variabilis (Aaron). Sommerman, 1956. *Proc. ent. Soc. Wash.* 58: 151.

vilhenai Badonnel. **(Euclismiopsis).** Angola.
Blaste (Euclismiopsis) vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 256, figs. 602-607, 615, 616.

Genus **Elaphopsocus** Roesler

Elaphopsocus Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 236.
Type species: *Elaphopsocus glaphyrostigma* Roesler.

glaphyrostigma Roesler. Brazil.
Elaphopsocus glaphyrostigma Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 236, figs. 1-2.

Genus **Neoblaste** Thornton

Neoblaste Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 239.
Type species: *Neoblaste papillosus* Thornton.

papillosa Thornton. Hong Kong.
Neoblaste papillosus Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 240, figs. 1, 3, 5, 7, 8, 10, 11.

setosa Thornton. Hong Kong.
Neoblaste setosus Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 240, figs. 2, 4, 6, 9.

Genus **Neopsocopsis** Badonnel

Neopsocopsis Badonnel, 1936. *Bull. Soc. zool. Fr.* 60: 419.
Type species: *Neopsocus pyrenaicus* Badonnel.

hirticornis (Reuter). Europe.
Psocus hirticornis Reuter, 1894. *Act. Soc. Fauna Flora fenn.* 9: 42, fig. 1.
Psocus bastmannianus Enderlein, 1918. *Zool. Jb. Abt. Syst.* 41: 487; pl. 8, 1 fig.
Euclismia bastmanniana (Enderlein). Enderlein, 1925. *Konowia* 4: 99.
Neopsocopsis hirticornis (Reuter). Badonnel, 1938. *Bull. Soc. zool. Fr.* 63: 239.

pyrenaicus (Badonnel). Europe.
! *Neopsocus rhenanus* Kolbe. Badonnel, 1931. *Bull. Soc. zool. Fr.* 56: 341.
Neopsocus pyrenaicus Badonnel, 1935. *Rev. franc. Ent.* 2: 47, figs. 1-8.
Neopsocopsis hirticornis pyrenaicus Badonnel, 1938. *Bull. Soc. zool. Fr.* 63: 239.

Subfamily **ANTIPSOCINAE**

Genus **Anomopsocus** Roesler

Note: This genus may be more correctly placed in the Peripsocidae.
Pseudopsocus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 287.
Type species: *Psocus amabilis* Walsh.
(Not *Pseudopsocus* Kolbe, 1882. *Ent. Nachr.* 8: 208).

Anomopsocus Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 239.
Type species: *Pseudopsocus amabilis* (Walsh). (*Pseudopsocus* preocc.).
Amapsocus Sommerman, 1944. *Ann. ent. Soc. Amer.* 37: 359.
Type species: *Pseudopsocus amabilis* (Walsh). (*Pseudopsocus* preocc.).
amabilis (Walsh). North America.
Psocus amabilis Walsh, 1862. *Proc. Acad. nat. Sci. Philad.* 14: 362.
Psocus minusculus Banks, 1905. *Trans. Amer. ent. Soc.* 32: 3.
Pseudopsocus amabilis (Walsh). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 287; pl. XVIII, figs. 7, 9, 10; pl. XX, fig. 1.
Anomopsocus amabilis (Walsh). Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 239.
Amapsocus amabilis (Walsh). Sommerman, 1944. *Ann. ent. Soc. Amer.* 37: 359.

Genus **Antipsocus** Roesler

Antipsocus Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 241.
Type species: *Antipsocus radiolosus* Roesler.
radiolosus Roesler. Costa Rica.
Antipsocus radiolosus Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 241.

Subfamily **CERASTIPSOCINAE**

Tribe **CERASTIPSOCINI**

Genus **Cerastipsocus** Kolbe

Cerastis Kolbe, 1883. *Stettin. ent. Ztg.* 44: 65.
Type species: *Psocus venosus* Burmeister.
(Not *Cerastis* Ochsenheimer, 1816. *Schmett. Europa* 4: 84).
Cerastipsocus Kolbe, 1884. *Berl. ent. Z.* 28: 38.
Type species: *Psocus venosus* Burmeister. (*Cerastis* preocc.).
Titella Navas, 1912. *Broteria, ser. zool.* 10: 196.
Type species: *Titella rufa* Navas.
Subgenera:
(Cerastipsocus) Kolbe, 1884. *Berl. ent. Z.* 28: 38.
Type species: *Psocus venosus* Burmeister.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.
(Clematoscenea) Enderlein, 1907. *Notes Leyden Mus.* 29: 115.
Type species: *Psocus lemniscatus* Enderlein, 1903.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.
(Sigmatoneura) Enderlein, 1908. *Zool. Anz.* 33: 761.
Type species: *Cerastipsocus subcostalis* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.
bogotanus (Kolbe). **(Cerastipsocus).** Columbia.
Cerastis bogotana Kolbe, 1883. *Stettin. ent. Ztg.* 44: 73.
coloratus (Kolbe). **(Cerastipsocus).** Columbia.
Cerastis colorata Kolbe, 1883. *Stettin. ent. Ztg.* 44: 71.
crassicornis (Kolbe). **(Cerastipsocus).** Brazil, Argentine.
Cerastis crassicornis Kolbe, 1883. *Stettin. ent. Ztg.* 44: 70.
Cerastipsocus crassicornis var. *argentinus* Ribaga, 1908. *Redia* 5: 98; pl. VI, figs. 1-3.
cubanus Enderlein. **(Cerastipsocus).** Cuba.
Cerastipsocus cubanus Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 34.
fuscipennis (Burmeister). **(Cerastipsocus).** Brazil.
Psocus fuscipennis Burmeister, 1839. *Handbuch der Entomologie* 2: 778.
Cerastis fuscipennis (Burmeister). Kolbe, 1883. *Stettin. ent. Ztg.* 44: 70.
Cerastipsocus fuscipennis (Burmeister). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* (3) 2: 34.

iguazuensis (Williner). **(Cerastipsocus).** Argentine.
Psocus iguazuensis Williner, 1945. *Rev. Soc. ent. argent.* 12: 242.
Cerastipsocus iguazuensis (Williner). Badonnel, 1962. *Biol. l'Amerique australe* 1: 225, figs. 96-99.

infectus (McLachlan). **(Cerastipsocus).** New Granada.
Psocus infectus McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 350.
Cerastis infecta (McLachlan). Kolbe, 1883. *Stettin. ent. Ztg.* 44: 68.

lemniscatus (Enderlein). **(Clematoscenea).** Java, Sumatra.
Psocus lemniscatus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 218; pl. IV, fig. 8.
Clematoscenea lemniscata (Enderlein). Enderlein, 1907. *Notes Leyden Mus.* 29: 115.
Cerastipsocus (*Clematoscenea*) *lemniscatus* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

moestus (Kolbe). **(Cerastipsocus).** Columbia.
Cerastis moesta Kolbe, 1883. *Stettin. ent. Ztg.* 44: 72.

pallidinervis (Kolbe). **(Cerastipsocus).** Columbia.
Cerastis pallidinervis Kolbe, 1883. *Stettin. ent. Ztg.* 44: 73.

rufus (Navas). **(Cerastipsocus).** Peru.
Titella rufa Navas, 1912. *Broteria, ser. zool.* 10: 197.

subcostalis Enderlein. **(Sigmatoneura).** Singapore, Java, India.
Cerastipsocus subcostalis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 215; pl. IV, fig. 7.
Sigmatoneura subcostalis (Enderlein). Enderlein, 1908. *Zool. Anz.* 33: 761.
Cerastipsocus (*Sigmatoneura*) *subcostalis* Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

tostus (Navas). Costa Rica.
Neopsocus tostus Navas, 1924. *Broteria ser. Zool.* 21: 64.
Cerastipsocus tostus (Navas). Badonnel, 1935. *Rev. franc. Ent.* 2: 50.

trifasciatus (Provancher). **(Cerastipsocus).** North America.
Psocus trifasciatus Provancher, 1876. *Nat. canad.* 8: 186.
Psocus speciosus Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 40; pl. 9, fig. 7.
Cerastis nigrofasciatus Kolbe, 1883. *Stettin. ent. Ztg.* 44: 70.
Cerastis nigrofasciata var. *elegantula* Kolbe, 1883. *Stettin. ent. Ztg.* 44: 75.
Psocus tolteca Banks, 1903. *J.N.Y. ent. Soc.* 11: 237.
Cerastipsocus trifasciatus (Prov.). Banks, 1907. *Cat. Neur. Ins. U.S.* p. 10.

venosus (Burmeister). **(Cerastipsocus).** North America, Cuba.
Psocus venosus Burmeister, 1839. *Handbuch der Entomologie* 2: 778.
Psocus micropthalmus Rambur, 1842. *Histoire naturelle des Insectes* p. 321.
Psocus magnus Walker, 1853. *Cat. Neur. Brit. Mus.* p. 484.
Psocus gregarius Harris, 1869. *Occ. Pap. Boston Soc. nat. Hist.* 1: 329.
Cerastis venosa (Burmeister). Kolbe, 1883. *Stettin. ent. Ztg.* 44: 69.
Cerastis venosa var. *mexicana* Kolbe, 1883. *Stettin. ent. Ztg.* 44: 75.
Psocus gossypii Ashmead, 1894. *Insect Life* 7: 29.
Cerastipsocus venosus (Burmeister). Enderlein, 1906. *Stettin. ent. Ztg.* 67: 317.
Cerastipsocus (*Cerastipsocus*) *venosus* (Burmeister). Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

vetustus (Kolbe). **(Cerastipsocus).** Columbia.
Cerastis vetusta Kolbe, 1883. *Stettin. ent. Ztg.* 44: 74.

Genus **Eremopsocus** McLachlan

Eremopsocus McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 347.
Type species: *Eremopsocus infumatus* McLachlan.

Nescus Navas, 1925. *Mem. R. Acad. Barcelona* 19: 19.
Type species: *Nescus flavatus* Navas.

Subgenera:

(Eremopsocus) McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 347.
Type species: *Eremopsocus infumatus* McLachlan.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.

(Syngonosoma) Kolbe, 1883. *Stettin. ent. Ztg.* 44: 76.
Type species: *Syngonosoma flagellicorne* Kolbe.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.

(Dinopsocus) Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 307.
Type species: *Dinopsocus atratus* Banks.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.
(Not *Dinopsocus* Martynova, 1928. *Trav. Mus. geol. Acad. Sci. U.S.S.R.* 4: 39).

(Podopterocus) Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 308.
Type species: *Podopterocus longicornis* Banks.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

atratus (Banks). **(Dinopsocus).** Borneo, Sarawak, Philippines.
Dinopsocus atratus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 307; pl. 3, fig. 25.
Eremopsocus (Dinopsocus) atratus (Banks). Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

flagellicornis (Kolbe). **(Syngonosoma).** Columbia.
Syngonosoma flagellicorne Kolbe, 1883. *Stettin. ent. Ztg.* 44: 78.
Eremopsocus (Syngonosoma) flagellicornis (Kolbe). Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.

flavatus (Navas). **(Syngonosoma).** Costa Rica.
Nescus flavatus Navas, 1925. *Mem. R. Acad. Barcelona* 19: 197, fig. 23.

infumatus McLachlan. **(Eremopsocus).** Brazil, Venezuela.
Eremopsocus infumatus McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 348.
Eremopsocus infumatus subsp. *venezuelensis* Pearman, 1933. *Stylops* 2: 160, figs. 1-9.
Eremopsocus (Eremopsocus) infumatus McLachlan. Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.

longicornis (Banks). **(Podopterocus).** Singapore.
Podopterocus longicornis Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 308; pl. I, fig. 4.
Eremopsocus (Podopterocus) longicornis (Banks). Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

reductus (Banks). **(Syngonosoma).** Mexico, Costa Rica.
Syngonosoma reducta Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 306.

semicoloratus (Banks). **(Dinopsocus).** Philippines.
Dinopsocus semicoloratus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 307; pl. II, fig. 24.

Genus **Psococerastis** Pearman

Psococerastis Pearman, 1932. *Ent. mon. Mag.* 68: 202.
Type species: *Cerastipsocus gibbosus* (Sulzer).

Subgenera:

(Psococerastis) Pearman, 1932. *Ent. mon. Mag.* 68: 202.
Type species: *Cerastipsocus gibbosus* (Sulzer).
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

(Dactylopsocus) Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 240.
Type species: *Psocus fumigatus* Kolbe.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

discalis (Navas). **Tonkin.**
Psocus discalis Navas, 1920. *Bol. Soc. ent. Esp.* 4: 90, fig. 1.
Psococerastis discalis (Navas). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 252.

fulleborni (Enderlein). **(Psococerastis).** East Africa, Congo, Sierra Leone, Angola.

Psocus fulleborni Enderlein, 1902. *Mitt. zool. Mus. Berl.* 2: 7; pl. V, fig. 13.
Psocus varians Navas, 1931. *Rev. Zool. Bot. afr.* 21: 131.
Psococerastis fulleborni (Enderlein). Pearman, 1934. *Stylops* 3: 128, fig. 7.

fumigata (Kolbe). **(Dactylopsocus).** Brazil.

Psocus fumigatus Kolbe, 1883. *Stettin. ent. Ztg.* 44: 81.
Dactylopsocus fumigatus (Kolbe). Roesler, 1940. *Arb. morph. taxon. Ent. Berl.* 7: 240.
Psococerastis (*Dactylopsocus*) *fumigatus* (Kolbe). Roesler, 1944. *Stettin. ent. Ztg.* 105: 147.

ghesquierei Badonnel. **(Psococerastis).** Congo, Angola.

Psococerastis ghesquierei Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 58, figs. 76-79.

gibbosa (Sulzer). **(Psococerastis).** Europe, Canary Is., China, N. Asia, North India.

Phryganea saltatrix Linnaeus, 1746. *Fauna Suecica* p. 226.
Phryganea gibbosa Sulzer, 1776. *Abgek. Geschichte der Insekten* 1: 173; pl. 24, figs. 12, 13.
Hemerobius longicornis Fabricius, 1777. *Genera Insectorum* etc. p. 245.
Psocus longicornis (Fabricius). Latreille, 1794. *Bull. Soc. philom. Paris* 1: 85.
Psocus lineatus Latreille, 1799. *Illustrata Iconographica Insectorum* etc. 1: 12; pl. 2, fig. 8.
Psocus saltatrix (Linnaeus). Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 217.
Psocus gibbosus (Sulzer). Enderlein, 1919. *Cat. Coll. Selys-Longchamps* 3 (2): 5.
Psococerastis gibbosa (Sulzer). Pearman, 1932. *Ent. mon. Mag.* 68: 202.

joannisi (Navas). **(Psococerastis).** Tonkin.

Psocus joannisi Navas, 1934. *Notes Ent. chin.* 2: 7, fig. 49.
Psococerastis joannisi (Navas). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 252.

kurokiana (Enderlein). **(Psococerastis).** Japan.

Psocus kurokianus Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 244; pl. 10, fig. 1.
Psococerastis kurokianus (Enderlein). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 252.

ryukyuensis Tsutsumi. **(Psococerastis).** Ryuku Island, Japan.

Psococerastis ryukyuensis Tsutsumi, 1964. *Kontyû* 32: 265, figs. 1-8.

sinensis Thornton. **(Psococerastis).** Hong Kong.

Psococerastis sinensis Thornton, 1960. *Trans. R. ent. Soc.* 112: 248, figs. 21-29.

taprobanes (Hagen). **(Psococerastis).** Annam, Sarawak, Java, China, Philippines, Ceylon, Sumatra, Singapore, Malacca, Bengal, India, Borneo, Burma.

Psocus taprobanes Hagen, 1858. *Ver. zool. -bot. Ges. Wien* 8: 473.
Psocus cosmopterus McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 350.
Psocus taprobanes var. *cosmopterus* (McLachlan). McLachlan, 1872. *Ent. mon. Mag.* 9: 76. (Note 1).
Psocus taprobanes var. *bengalensis* Kolbe, 1883. *Ent. Nachr.* 9: 153.
Psocus taprobanes var. *flavistigma* Kolbe, 1885. *Ent. Nachr.* 11: 329.
Psocus taprobanes var. *luzonensis* Banks, 1916. *Philipp. J. Sci.* 11: 198.
Psocus taprobanes var. *orientalis* Navas, 1913. *Notes Ent. chin.* 7: 5.
Psocus flavistigma (Kolbe). Enderlein, 1926. *Zool. Meded.* 9: 50.

Psocus taprobanes var. *luroris* Soehardjan and Hamman, 1959. *Idea* 12: 1; pl. 1, figs. 1-3, 7, 8.
Psococerastis taprobanes (Hagen). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 250.

thomasseti Pearman. **(Psococerastis).** Natal, Congo.
Psococerastis thomasseti Pearman, 1934. *Stylops* 3: 126, figs. 6 and 6a.

tokyoensis (Enderlein). **(Psococerastis).** Japan, Formosa.
Psocus tokyoensis Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 245; pl. 10, fig. 2.
Psocus capitatus Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 120; pl. II, fig. 10.
Amphigerontia ficivorella Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 132; pl. II, fig. 4.
Psocus tokyoensis var. *capitatus* (Okamoto). Banks, 1937. *Philipp. J. Sci.* 62: 257.
Psococerastis tokyoensis (Enderlein). Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 252.

yuwan Tsutsumi. **(Psococerastis).** Amami Islands, Japan.
Psococerastis yuwan Tsutsumi, 1964. *Kontyû* 32: 118, figs. 1, 2.

zambeziana (Badonnel). **(Psococerastis).** Mozambique.
Psocus zambezianus Badonnel, 1932. *Bull. Soc. zool. Fr.* 57: 198, figs. 5, 6.
Psococerastis zambezianus (Badonnel). Pearman, 1934. *Stylops* 3: 128.

Genus **Scaphopsocus** Smithers

Scaphopsocus Smithers, 1964. *Ann. Mus. Congo belge 8vo.* 88: 373.
Type species: *Scaphopsocus phaeotherus* Smithers.

phaeotherus Smithers. Tanganyika.
Scaphopsocus phaeotherus Smithers, 1960. *Ann. Mus. Congo belge 8vo.* 88: 373, figs. 11-16.

Tribe **METYLOPHORINI**

Genus **Brachinodiscus** Enderlein

Brachinodiscus Enderlein, 1925. *Konowia* 4: 103.
Type species: *Amphigerontia cinctipes* Enderlein.

cinctipes (Enderlein). Peru, Paraguay, Brazil.
Amphigerontia cinctipes Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 145; pl. 9, fig. 10.
Psocus lepidus Banks, 1920. *Bull. Mus. Comp. Zool. Harv.* 64: 304; pl. III, fig. 33.
Brachinodiscus cinctipes (Enderlein). Enderlein, 1925. *Konowia* 4: 103.

Genus **Diplacanthoda** Enderlein

Diplacanthoda Enderlein, 1909. *Bull. Mus. Hist. nat. Paris* 15: 488.
Type species: *Diplacanthoda bouvieri* Enderlein.

bouvieri Enderlein. Madagascar.
Diplacanthoda bouvieri Enderlein, 1909. *Bull. Mus. Hist. nat. Paris* 15: 488, fig. 1.

Genus **Metylophorus** Pearman

Metylophorus Pearman, 1932. *Ent. mon. Mag.* 68: 202.
Type species: *Psocus nebulosus* Stephens.

Subgenera:

(Metylophorus) Pearman, 1932. *Ent. mon. Mag.* 68: 202.
Type species: *Psocus nebulosus* Stephens.
Subgeneric status: Roesler, 1943. *Stettin. ent. Ztg.* 104: 6.

(Ophthalmopsocus) Roesler, 1943. *Stettin. ent. Ztg.* 104: 6.
Type species: *Ophthalmopsocus forficularis* Roesler, 1943.

forficularis Roesler. **(Ophthalmopsocus).** Bolivia.
Metylophorus (*Ophthalmopsocus*) *forficularis* Roesler, 1943. *Stettin. ent. Ztg.* 104: 8, figs. 7-11.

lobatus Badonnel. **(Metylophorus).** Angola.
Metyloporus lobatus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 241, figs. 559-563.

mendax Badonnel. **(Metylophorus).** Angola.
Metylophorus mendax Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 240, figs. 555-558.

nebulosus (Stephens). **(Metylophorus).** Europe, China, Japan, India.
Psocus nebulosus Stephens, 1836. *Illustrations of British Entomology* 6: 119.
Psocus similis Stephens, 1836. *Illustrations of British Entomology* 6: 120.
Psocus variegatus Curtis, 1837. *British Entomology* 14: 648.
Psocus fuscipennis Zetterstedt, 1840. *Insecta Lapponica* etc. p. 1053.
Psocus infuscatus Rambur, 1842. *Histoire naturelle des Insectes* p. 319.
Psocus affinis Rambur, 1842. *Histoire naturelle des Insectes* p. 320.
(Not *Psocus affinis* Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* p. 58; pl. 5, figs. 9, 9b, 9c, 12).
Psocus nebuloso-similis (Stephens). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 108.
Metylophorus nebulosus (Stephens). Pearman, 1932. *Ent.. mon. Mag.* 68: 202.
Metylophorus (*Metylophorus*) *nebulosus* (Stephens). Roesler, 1944. *Stettin. ent. Ztg.* 105: 146.

novaescotiae (Walker). **(Metylophorus).** North America.
Psocus novaescotiae Walker, 1853. *Cat. Neur. Brit. Mus.* 3: 485.
Psocus contaminatus Hagen, 1861. *Smithson. misc. Coll.* 4: 10.
Psocus perplexus Walsh, 1862. *Proc. Acad. nat. Sci. Philad.* 14: 361.
Psocus hageni Banks, 1904. *Proc. ent. Soc. Wash.* 6: 202.
Metylophorus novaescotiae (Walker). Mockford, 1961. *Florida Ent.* 44: 137.

ocularis (Kolbe). **(Ophthalmopsocus).** Brazil.
Cerastis ocularis Kolbe, 1883. *Stettin. ent. Ztg.* 44: 72.
Ophthalmopsocus ocularis (Kolbe). Roesler, 1943. *Stettin. ent. Ztg.* 104: 8.
Metylophorus (*Ophthalmopsocus*) *ocularis* (Kolbe). Roesler, 1943. *Stettin. ent. Ztg.* 104: 8.

purus (Walsh). **(Metylophorus).** North America.
Psocus purus Walsh, 1862. *Proc. Acad. nat. Sci. Philad.* 14: 361.
Psocus lucidus Harris, 1869. *Occ. Pap. Boston Soc. nat. Hist.* 1: 328.
Psocus genualis Banks, 1903. *J.N.Y. ent. Soc.* 11: 236.
Metylophorus purus (Walsh). Mockford, 1961. *Florida Ent.* 44: 137.

Genus **Pilipsocus** Badonnel

Pilipsocus Badonnel, 1935. *Rev. franc. Ent.* 2: 77.
Type species: *Psocidus intricatus* (Enderlein).

angolensis Badonnel. Angola.
Pilipsocus angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 248, figs. 567, 574, 576.

congolensis Badonnel. Congo, Angola.
Pilipsocus congolensis Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 319, figs. 121-126.

ghesquierei Badonnel. Congo, Angola.
Pilipsocus ghesquierei Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 60, fig. 80.

intricatus (Enderlein). Angola, East Africa, Cameroons.
Psocus intricatus Enderlein, 1907. *Schwed. Zool. Exped. Kilimandjaro* 3 (15) 2: 32.
Psocidus intricatus (Enderlein). Pearman, 1934. *Stylops* 3: 123, fig. 3.
Pilipsocus intricatus (Enderlein). Badonnel, 1935. *Rev. franc. Ent.* 2: 77, figs. 1-4.

lepesmei Badonnel. Cameroons, French Guinea.
Pilipsocus lepesmei Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 137, figs. 1-3.
machadoi Badonnel. Angola.
Pilipsocus machadoi Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 245, figs. 565, 572, 579.
vilhenai Badonnel. Angola.
Pilipsocus vilhenai Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 247, figs. 566, 573, 577.

Tribe **CYCETINI**

Genus **Cycetes** Enderlein

Cycetes Enderlein, 1907. *Notes Leyden Mus.* 29: 108.
Type species: *Cycetes thyrsophoroides* Enderlein.
Goya Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 37.
Type species: *Goya pictus* Navas.
thyrsophoroides Enderlein. Java.
Cycetes thyrsophoroides Enderlein, 1907. *Notes Leyden Mus.* 29: 109, figs. 1-3.
Goya pictus Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 37.

Subfamily **PSOCINAE**

Genus **Atlantopsocus** Badonnel

Atlantopsocus Badonnel, 1944. *Rev. franc. Ent.* 11: 48.
Type species: *Atlantopsocus chopardi* Badonnel.
adustus (Hagen). Madeira.
Psocus adustus Hagen, 1865. *Ent. mon. Mag.* 2: 10.
Atlantopsocus adustus (Hagen). Badonnel, 1944. *Rev. franc. Ent.* 11: 48.
berlandi Badonnel. Morocco.
Atlantopsocus berlandi Badonnel, 1944. *Rev. franc. Ent.* 11: 52, figs. 2, 5-8, 11.
chopardi Badonnel. Azores.
Atlantopsocus chopardi Badonnel, 1944. *Rev. franc. Ent.* 11: 49, figs. 1, 3, 4, 9, 12, 13.
lesnei Badonnel. Canary Islands.
Atlantopsocus lesnei Badonnel, 1944. *Rev. franc. Ent.* 11: 49, figs. 10, 14, 15.
leucophlebius (Navas). Canary Islands.
Amphigerontia leucophlebia Navas, 1916. *Mem. Acad. Nuovi Lincei* (2) 2: 57, fig. 33.
Atlantopsocus leucophlebius (Navas). Badonnel, 1944. *Rev. franc. Ent.* 11: 48.
personatus (Hagen). Madeira, Canary Islands.
Psocus personatus Hagen, 1865. *Ent. mon. Mag.* 2: 11.
Atlantopsocus personatus (Hagen). Badonnel, 1944. *Rev. franc. Ent.* 11: 48.

Genus **Copostigma** *Enderlein*

Copostigma Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 229.
Type species: *Copostigma dorsopunctatum* Enderlein.
Subgenera:
(Copostigma) Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 229.
Type species: *Copostigma dorsopunctatum* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 144.
(Clematostigma) Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 403.
Type species: *Copostigma maculiceps* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 144.
(Mecampsis) Enderlein, 1925. *Konowia* 4: 104.
Type species: *Mecampsis cinctifemur* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 144.

brevistylus Enderlein. **(Clematostigma).** New Guinea, Samoa.
Copostigma brevistylus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 233; pl. XIV, fig. 76.
Clematostigma brevistylus (Enderlein). Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 403.

cinctifemur (Enderlein). **(Mecampsis).** Chile.
Mecampsis cinctifemur Enderlein, 1925. *Konowia* 4: 104.
Copostigma (Mecampsis) cinctifemur (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 144.

dorsopunctatum Enderlein. **(Copostigma).** New Guinea.
Copostigma dorsopunctatum Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 30; pl. IV, fig. 15.
Copostigma (Copostigma) dorsopunctatum Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 144.

fumatum Enderlein. **(Clematostigma).** New Guinea.
Copostigma fumatum Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 231; pl. IV, fig. 16.
Clematostigma fumatum (Enderlein). Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 403.

hyalinum Okamoto. **(Clematostigma).** Japan, Formosa.
Copostigma hyalinum Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 116.
Clematostigma hyalinum (Enderlein). Enderlein, 1908. *Zool. Anz.* 33: 766.

indicum Enderlein. **(Clematostigma).** India.
Copostigma indicum Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 232; pl. XIV, figs. 73, 73a.
Clematostigma indicum (Enderlein). Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 403.

insolitum Banks. **(Copostigma).** Haiti.
Copostigma insolita Banks, 1938. *Rev. Ent. Rio de J.* 9: 285.

laconia Banks. **(Copostigma).** Santo Domingo.
Copostigma laconia Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 387; pl. 44, fig. 21.

maculiceps Enderlein. **(Clematostigma).** Australia.
Copostigam maculiceps Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 231, pl. IV, fig. 12.
Clematostigma maculiceps (Enderlein). Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 403; pl. 23, fig. 2.
Copostigma (Clematostigma) maculiceps Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 144.

morio (Latreille). **(Clematostigma).** Europe.
Psocus morio Latreille, 1794. *Bull. Soc. philom. Paris* 1: 85.
Clematostigma morio (Latreille). Enderlein, 1908. *Zool. Anz.* 33: 766.
Copostigma morio (Latreille). Enderlein, 1911. *Palaeontographica* 58: 282.
Psocus allaudi Lacroix, 1915. *Bull. Soc. ent. Fr.* 1915: 192, fig. 1.

paraguayense (Enderlein). **(Clematostigma).** Paraguay.
Clematostigma paraguayense Enderlein, 1910. *Zool. Anz.* 36: 164.

pindapaiense Williner. **(Copostigma).** Argentine.
Copostigma pindapaiensis Williner, 1943. *Rev. Soc. ent. argent.* 12: 114.

subcostale Okamoto. **(Clematostigma).** Japan.
Copostigma subcostale Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 117, fig. 1.
Clematostigma subcostale (Okamoto). Enderlein, 1908. *Zool. Anz.* 33: 766.

tardipes (Edwards). **(Clematostigma).** Tasmania.
Clematostigma tardipes Edwards, 1950. *Pap. roy. Soc. Tasm.* 1949: 95, figs. 1-17.

tunesicum (Enderlein). **(Clematostigma).** Tunis.
Clematostigma tunesicum Enderlein, 1923. *Konowia* 2: 33.

vinctum (Enderlein). **(Clematostigma).** Queensland.
Psocus vinctus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 223.
Clematostigma vinctum (Enderlein). Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 403; pl. 23, fig. 2.

Genus **Ghesquierella** Badonnel

Ghesquierella Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 61.
Type species: *Ghesquierella ealensis* Badonnel.

cantralli Mockford. Guatemala.
Ghesquierella cantralli Mockford, 1957. *Ent. News* 68: 204, figs. 6, 13-15, 19.

ealensis Badonnel. Congo.
Ghesquierella ealensis Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 61, figs. 81-83.

sjostedti (Enderlein). Kilimandjaro.
Psocus sjostedti Enderlein, 1907. *Schwed. Zool. Exped. Kilimandjaro* 3 (15) 2: 30; pl. 5, figs. 1, 6, 7.
Ghesquierella sjostedti (Enderlein). Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 62.

Genus **Hyalopsocus** Roesler

Hyalopsocus Roesler, 1954. *Beit. Ent.* 4: 572.
Type species: *Copostigma contrarium* (Reuter).

contrarius (Reuter). Europe.
Psocus contrarius Reuter, 1894. *Act. Soc. Fauna Flora fenn.* 9: 23, 42, fig. 3.
Amphigerontia contraria (Reuter). Enderlein, 1906. *Ber. westpreuss. bot. -zool. Ver.* 28: 75.
Copostigma contrarium (Reuter). Enderlein, 1925. *Konowia* 4: 103.
Hyalopsocus contrarius (Reuter). Roesler, 1954. *Beit. Ent.* 4: 572, figs. 17-24.

floridanus (Banks). North America.
Psocus floridanus Banks, 1905. *Trans. Amer. ent. Soc.* 2: 2.
Hyalopsocus floridanus (Banks). Roesler, 1954. *Beit. Ent.* 4: 572.

striatus (Walker). North America.
Psocus striatus Walker, 1853. *Cat. Neur. Brit. Mus.* 3: 486.
Psocus frontalis Harris, 1869. *Occ. Pap. Boston Soc. nat. Hist.* 1: 330.
Clematostigma striatum (Walker). Enderlein, 1925. *Konowia* 4: 102.
Hyalopsocus striatus (Walker). Roesler, 1954. *Beit. Ent.* 4: 572.

Genus **Maheella** Enderlein

Maheella Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 208.
Type species: *Maheella laevidorsum* Enderlein.

angustifrons Enderlein. Seychelles.
Maheella angustifrons Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 209; pl. 14, fig. 53.

laevidorsum Enderlein. Seychelles.
Maheella laevidorsum Enderlein, 1931. *Trans. Linn. Soc. Lond. (Zool.)* (2) 19: 208.

lemniscata Smithers. Madagascar.
Maheella lemniscata Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 261, figs. 93-96.

longispinosa Smithers. Madagascar.
Maheella longispinosa Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 260, figs. 89-92.

quadrimaculata Smithers. Madagascar.
Maheella quadrimaculata Smithers, 1964. *Rev. Zool. Bot. afr.* 70: 263, figs. 97-99.

seyrigi Badonnel. Madagascar.
Maheella seyrigi Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 801; pl. II, figs. 1, 3-5.

zachardiae Badonnel. Madagascar.
Maheella zachardiae Badonnel, 1935. *Bull. Acad. malgache N.S.* 18: 102; pl. II, figs. 2, 6, 7.

Genus **Neopsocus** Kolbe

Neopsocus Kolbe, 1882. *Ent. Nachr.* 8: 207.
Type species: *Neopsocus rhenanus* Kolbe.
Barnola Navas, 1909. *Act. Mem. Prim. Congr. Natur. Espan.* (5) 1: 157.
Type species: *Barnola lepidinus* Navas.
rhenanus Kolbe. Europe.
Neopsocus rhenanus Kolbe, 1882. *Ent. Nachr.* 8: 207.
Psocus heteromorphus Bertkau, 1883. *Arch. Naturgesch.* 49: 98; pl. I, fig. 1.
Barnola lepidinus Navas, 1909. *Mem. Prim. Congr. Natur. Espan.* (5) 1: 157; pl. 13, figs. 10a-10g.
Psocus lapididetectus Lacroix, 1915. *Bull. Soc. ent. Fr.* 1915: 179.
(Not *Neopsocus rhenanus* Kolbe. Badonnel, 1931. *Bull. Soc. zool. Fr.* 56: 341).

Genus **Oreopsocus** Roesler

Oreopsocus Roesler, 1939. *Zool. Anz.* 125: 165.
Type species: *Psocus montanus* Kolbe.
montanus (Kolbe). Europe.
Psocus montanus Kolbe, 1884. *Berl. ent. Z.* 28: 380.
Loensia montana (Kolbe). Enderlein, 1924. *S.B. Ges. naturf. Berl.* 31: 35.
Euclismia montana (Kolbe). Badonnel, 1936. *Bull. Soc. ent. Fr.* 41: 25.
Oreopsocus montanus (Kolbe). Roesler, 1939. *Zool. Anz.* 125: 166, figs. 8-10.

Genus **Pearmania** Badonnel

Pearmania Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 192.
Type species: *Psocus usambaranus* Badonnel.
collarti Badonnel. Congo.
Pearmania collarti Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 193, figs. 118-126.
fucata (Pearman). Natal.
Psocidus fucatus Pearman, 1934. *Stylops* 3: 124, fig. 4.
Pearmania fucata (Pearman). Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 196.
incuria (Navas). Mombasa.
Psocus incurius Navas, 1936. *Rev. Zool. Bot. afr.* 28: 361, fig. 117.
Pearmania incuria (Navas). Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 196.
nebulosa Badonnel. Angola.
Pearmania nebulosa Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 250, figs. 580-584.
rutshuruana Badonnel. Congo.
Pearmania rutshuruana Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 193, figs. 112, 115-117.
usambarana (Badonnel). Mozambique, East Africa, Natal, Rhodesia.
Psocus nebulosus var. *usambaranus* Enderlein, 1907. *Schwed. Zool. Exped. Kilimandjaro* (3) 15 (2): 33.
Psocus usambaranus Badonnel, 1932. *Bull. Soc. Zool. Fr.* 57: 110, figs. 7-11.
Psocus usambaranus var. *infuscatus* Badonnel, 1932. *Bull. Soc. Zool. Fr.* 57: 110, fig. 14.
Psocidus usambaranus (Badonnel). Pearman, 1934. *Stylops* 3: 125.
Pearmania usambarana (Badonnel). Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 192.
wittei Badonnel. Congo.
Pearmania wittei Badonnel, 1959. *Explor. Parc. nat. Albert, Mission G.F. de Witte (1933-1935)* 95: 22, figs. 36-39.

Genus **Psocidus** Pearman

Note: In 1932 the genus *Psocus* Latreille was redefined in a narrower sense by Pearman (*Ent. mon. Mag.* 68: 193-204) and in 1934 (*Stylops* 3: 122) the same author erected the genus *Psocidus* to contain the large number of species which had been described in *Psocus* but which were outside the scope of this genus in his restricted sense and which could also not be placed in other defined genera. In 1944 Roesler (*Stettin. ent. Ztg.* 105: 145) placed *Sigmatina* Enderlein and *Clistopsocus* Navas as subgenera of *Psocidus.* In the list which follows species are assigned to appropriate subgenera only where this has been indicated in the literature. Other species are included in the genus *Psocidus* sens. lat. The large number of species in this "omnibus" genus are in need of further study with a view to generic placing. It is probable that several species described in *Psocus* after its redefinition are incorrectly placed; these, however, are listed under that genus and not under *Psocidus.* (Cf. *Psocus*).

Psocidus Pearman, 1934. *Stylops* 3: 122.
Type species: *Psocidus zanzibarensis* Pearman.

Subgenera:
(Psocidus) Pearman, 1934. *Stylops* 3: 122.
Type species: *Psocidus zanzibarensis* Pearman. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.
(Clistopsocus) Navas, 1924. *Broteria ser. zool.* 21: 65.
Type species: *Clistopsocus dilatus* Navas. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.
(Sigmatina) Enderlein, 1925. *Konowia* 4: 103.
Type species: *Psocus aztecana* Banks. Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.

acourti (Cockerell). Isle of Wight (fossil.)
Psocus acourti Cockerell, 1921. *Ann. Mag. nat. Hist.* (9) 7: 480.
albostigmus (Banks). Brazil.
Psocus albostigmus Banks, 1913. *Psyche, Camb. Mass.* 20: 83.
albovarius (Banks). Malaya.
Psocus albovarius Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 299.
aldai (Navas). Argentine.
Psocus aldai Navas, 1926. *Broteria ser. zool.* 23: 98.
angulatus (Navas). Argentine.
Psocus angulatus Navas, 1918. *Physis B. Aires* 4: 88.
annulipes (Reuter). Finland.
Psocus ? annulipes Reuter, 1899. *Act. Soc. Fauna Flora fenn.* 17: 3.
arenosus (Navas). Tonkin.
Psocus arenosus Navas, 1923. *Arx. Inst. Cienc. Barcelona* 8: 198.
aztecanus (Banks). **(Sigmatina).** Peru.
Psocus aztecanus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 303.
Sigmatina azetcana (Banks). Enderlein, 1925. *Konowia* 4: 103.
Psocidus (Sigmatina) aztecanus (Banks). Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.
badonneli (Roesler). Mozambique.
Psocus multipunctatus Badonnel, 1932. *Bull. Soc. zool. Fr.* 57: 105, figs. 1-4.
Psocus badonneli Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.
(Not *Psocus multipunctatus* Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 204).
bakeri (Banks). Philippines.
Psocus bakeri Banks, 1913. *Proc. ent. Soc. Wash.* 15: 171.
barretti (Banks). Mexico.
Psocus barretti Banks, 1900. *Trans. Amer. ent. Soc.* 26: 239.
biguttatus Badonnel. Congo.
Psocidus biguttatus Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 317, figs. 117-120.
biroi (Enderlein). New Guinea.
Psocus biroi Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 222; pl. IV, fig. 11.

bisignatus (Banks). North America.
Psocus bisignatus Banks, 1904. *Proc. ent. Soc. Wash.* 6: 203; pl. II, figs. 10, 18.
borneensis (Banks). Borneo, Sarawak.
Psocus borneensis Banks, 1920. *Bull. Mus. comp. Zool.* 64: 302; pl. II, fig. 18.
brasilianus (Enderlein). Brazil.
Psocus brasilianus Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 352; pl. 17, fig. 2.
bridarelli (Navas). Argentine.
Psocus bridarelli Navas, 1928. *Estudios* 28: 144.
burmeisteri (Navas). Argentine.
Psocus burmeisteri Navas, 1917. *Mem. R. Acad. Barcelona* 13: 403.
callanganus (Enderlein). Peru.
Neopsocus callanganus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 147; pl. IX, fig. 12.
Psocus callanganus (Enderlein). Enderlein, 1925. *Konowia* 4: 100.
campestris (Aaron). Texas.
Psocus campestris Aaron, 1886. *Proc. Acad. nat. Sci. Philad.* 38: 14.
cockerelli (Banks). New Mexico.
Psocus cockerelli Banks, 1904. *Trans. Amer. ent. Soc.* 30: 100.
coniostigma (Navas). Argentine.
Psocus coniostigma Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 99.
consitus (Hagen). Ceylon.
Psocus consitus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 473.
consocius (Navas). Brazil.
Psocus consocius Navas, 1934. *Rev. Acad. Cienc. Madrid* 31: 21, fig. 33.
conspersus (Banks). Arizona.
Psocus conspersus Banks, 1903. *Proc. ent. Soc. Wash.* 5: 277; pl. IV, fig. 1.
coquilletti (Banks). California.
Psocus coquilletti Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 305; pl. I, fig. 7.
crosbyi (Chapman). Washington.
Psocus crosbyi Chapman, 1930. *J.N.Y. ent. Soc.* 38: 235; pl. XII, fig. 1; pl. XX, fig. 19.
cubanus (Banks). Cuba.
Psocus cubanus Banks, 1908. *Trans. Amer. ent. Soc.* 34: 257.
cuencanus (Enderlein). Ecuador.
Psocus cuencanus Enderlein, 1923. *Konowia* 2: 32.
cuneatus (Navas). Argentine.
Psocus cuneatus Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 100.
dilatus (Navas). **(Clistopsocus).** Costa Rica.
Clistopsocus dilatus Navas, 1924. *Broteria ser. zool.* 21: 66.
Psocidus (Clistopsocus) dilatus (Navas). Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.
dilutus (Navas). Argentine.
Psocus dilutus Navas, 1931. *Rev. Soc. ent. argent.* 3: 320.
divisus (Navas). Tonkin.
Psocus divisus Navas, 1922. *Broteria ser. zool.* 20: 58.
electricus (Enderlein). East Prussia (in amber).
Psocus electricus Enderlein, 1911. *Palaeontographica* 58: 305, figs. 4, 28.
elegans (Banks). North America.
Psocus elegans Banks, 1904. *Proc. ent. Soc. Wash.* 6: 203; pl. II, fig. 3.
elegantulus (Banks).
Psocus elegantula Banks, 1920. *Bull. Mus. comp. Zool.* 64: pl. III, fig. 29. (Description of this species is lacking in the text of the paper; a figure only is given).
femoratus (McLachlan). North China.
Psocus femoratus McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 349.

filicornis (Enderlein). Singapore, ? Formosa.
Psocus filicornis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 217.
flavonimbatus (Rostock). Russia, Estonia.
Psocus flavonimbatus Rostock, 1879. *Ent. Nachr.* 5: 129.
formosanus (Okamoto). Japan.
Psocus formosanus Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 130.
funerulus (Costa). Sardinia.
Psochus funerulus Costa, 1885. *Bull. ent. Ital.* 17: 243.
fuscatus (Navas). Brazil.
Psocus fuscatus Navas, 1916. *Broteria ser. zool.* 14: 34.
ghesquierei Badonnel. Congo.
Psocidus ghesquierei Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 190, figs. 111, 113, 114.
gloriosus (Banks). Borneo, Sarawak.
Psocus gloriosus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 301.
gomezi (Navas). Argentine.
Psocus gomezi Navas, 1928. *Estudios* 28: 145.
grandis (Okamoto). Japan.
Psocus grandis Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 122; pl. II, fig. 9.
grisescens (McLachlan). Natal.
Psocus grisescens McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 350.
guttulatus Pearman. Natal, Angola.
Psocidus guttulatus Pearman, 1934. *Stylops* 3: 125, fig. 5.
Pilipsocus guttulatus (Pearman). Badonnel, 1943. *Rev. Zool. Bot. afr.* 37: 139.
Psocidus guttulatus Pearman. Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 236, figs. 547-550.
hermosus (Banks). Singapore.
Psocus hermosus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 300; pl. I, fig. 8.
hoodi (Chapman). Arizona.
Psocus hoodi Chapman, 1930. *J.N.Y. ent. Soc.* 38: 239; pl. XII, fig. 8; pl. XV, fig. 1; pl. XX, fig. 15.
indigus (Navas). Costa Rica.
Psocus indigus Navas, 1930. *Rev. chil. Hist. nat.* 34: 304.
infernicolus (Chapman). Wyoming.
Psocus infernicolus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 240; pl. XIV, figs. 4, 14.
infumatus (Banks). North America.
Psocus infumatus Banks, 1907. *J.N.Y. ent. Soc.* 15: 165.
insulanus (Chapman). New York.
Psocus insulanus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 244; pl. XV, figs. 8, 23.
irroratus (Enderlein). South-west Australia.
Psocus irroratus Enderlein, 1907. *Die Fauna Sudwest Australiens* 1 (3): 237.
jacobsoni (Enderlein). Java.
Psocus jacobsoni Enderlein, 1907. *Notes Leyden Mus.* 29: 112.
japonicus (Kolbe). Japan.
Psocus japonicus Kolbe, 1882. *Ent. Nachr.* 8: 209.
javanicus (Enderlein). Java.
Psocus javanicus Enderlein, 1907. *Notes Leyden Mus.* 29: 114.
kiboschoensis (Enderlein). Kilimandjaro.
Psocus kiboschoensis Enderlein, 1907. *Schwed. Zool. Exped. Kilimandjaro* 3 (15) 2: 31; pl. 5, figs. 2, 8.
koltzbaueri (Navas). Brazil.
Psocus koltzbaueri Navas, 1925. *Mitt. münch. ent. Ges.* 15: 68.
komiensis (Navas). Congo.
Psocus komiensis Navas, 1932. *Rev. Zool. Bot. afr.* 22: 281, fig. 80.
Psocidus komiensis (Navas). Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 267.

lacroixi (Navas). Tonkin.
Psocus lacroixi Navas, 1920. *Bol. Soc. ent. Esp.* 4: 91, fig. 2.

lestagei (Navas). Tonkin.
Psocus lestagei Navas, 1922. *Broteria ser. zool.* 20: 57.

lichenatus (Walsh). North America.
Psocus lichenatus Walsh, 1863. *Proc. ent. Soc. Wash.* 2: 183.
Amphigerontia lichenatus (Walsh). Banks, 1892. *Trans. Amer. ent. Soc.* 19: 344.

lombokensis (Navas). Lombok.
Psocus lombokensis Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 40.

longicaudus Badonnel. Congo.
Psocidus longicaudus Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 189, figs. 108-110.

luteolus (Banks). Singapore.
Psocus luteolus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 301.

mali (Okamoto). Japan.
Psocus mali Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 126; pl. II, fig. 5.

masinus (Navas). Philippines.
Psocus masinus Navas, 1923. *Mem. Acad. Nuovi Lincei* 6: 22.

minutissimus (Enderlein). Fundu Island.
Psocus minutissimus Enderlein, 1908. *Reise in Ostafrika* 2: 248; pl. 11, fig. 2.
Psocidus minutissimus (Enderlein). Pearman, 1934. *Stylops* 3: 123.

mitsuhashianus (Okamoto). Japan.
Psocus mitsuhashianus Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 121, fig. 3.

mobilis (Hagen). Cuba.
Psocus mobilis Hagen, 1861. *Smithson. misc. Coll.* 4: 12.
Caecilius mobilis (Hagen). Hagen, 1866. *Verh. zool. -bot. Ges Wien* 16: 205.

muhni (Navas). Argentine.
Psocus muhni Navas, 1928. *Estudios* 28: 143.

multiplex (Roesler). East Prussia (in amber).
Psocus affinis Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* p. 58; pl. 5, fig. 9, 9b, 9c (part).
(Not *Psocus affinis* Rambur, 1842. *Histoire naturelle des Insectes* p. 320).
Copostigma affinis (Hagen). Enderlein, 1911. *Palaeontographica* 58: 308; figs. 11-15, 33.
Copostigma affinis ab. *pachystigma* Enderlein, 1911. *Palaeontographica* 58: 309, fig. 16.
Copostigma affinis ab. *clematostigmoides* Enderlein, 1911. *Palaeontographica* 58: 309, figs. 17-20.
Copostigma affinis ab. *pachystigmoides* Enderlein, 1911. *Palaeontographica* 58: 310, figs. 21-26, 34.
Psocus multiplex Roesler, 1943. *Stettin. ent. Ztg.* 104: 13. (*Psocus affinis* preocc.).
Psocidus multiplex (Roesler). Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.

murudensis (Karny). Sarawak.
Psocus murudensis Karny, 1925. *Sarawak Mus. J.* 3: 64.

nebulifer (Navas). Argentine.
Psocus nebulifer Navas, 1933. *Rev. Acad. Cienc. Zaragoza* 16: 101.

nexus (Navas). Argentine.
Psocus nexus Navas, 1922. *Estudios* 22: 364.

nigeriensis (Newstead). Nigeria.
Psocus nigeriensis Newstead, 1921. *Trans. ent. Soc. Lond.* 1921: 452, 1 fig.; pl. XI.
?*Ghesquierella nigeriensis* (Newstead). Badonnel, 1949. *Bull. Inst. Sci. nat. Belg.* 25: 63.

nigricornis (Brauer). Brazil.
Psocus nigricornis Brauer, 1865. *Verh. zool. -bot. Ges. Wien.* 15: 908. (Not *Psocus nigricornis* Stephens, 1836. *Illustrations of British Entomology* 6: 126).

nirvanus (Banks). Yembung.
Psocus nirvanus Banks, 1914. *Rec. Indian Mus.* 8: 352; pl. XXV, fig. 7.

nubeculosus (Navas). Argentine.
Psocus nubeculosus Navas, 1932. *Rev. Soc. ent. argent.* 5: 81.

nubilis (Navas). India.
Psocus nubilis Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 36.

oblitus (Hagen). Ceylon.
Psocus oblitus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 473.

ochraceocristatus (Enderlein). Peru.
Psocus ochraceocristatus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 146, fig. 13.
Psocus ochraceocristatus var. *conjugens* Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 146.

opulentus (Navas). Costa Rica.
Psocus opulentus Navas, 1930. *Rev. chil. Hist. nat.* 34: 303.

oxyurus Badonnel. Angola.
Psocidus oxyurus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 238, figs. 551-554.

parishi (Banks). Peru.
Psocus parishi Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 303; pl. III, fig. 28.

pellucidus (Okamoto). Japan.
Psocus pellucidus Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 123.

persimilis (Banks). Texas.
Psocus persimilis Banks, 1908. *Trans. Amer. ent. Soc.* 34: 257.

picteti (Enderlein). East Prussia (in amber).
Psocus affinis Hagen, 1856. *Die im Bernstein befindlichen organischen Reste* p. 58; pl. 5, fig. 12 (part).
Psocus picteti Enderlein, 1911. *Palaeontographica* 58: 306, figs. 3, 5, 6, 31, 32.

pollutus (Walsh). North America.
Psocus pollutus Walsh, 1862. *Proc. Acad. nat. Sci. Philad.* 14: 361.
Psocidus (*Psocidus*) *pollutus* (Walsh). Pearman, 1934. *Stylops* 3: 125.

posterior (Navas). Costa Rica.
Psocus posterior Navas, 1929. *Rev. Acad. Cienc. Zaragoza* 11: 41.

posticatus (Banks). Mexico.
Psocus posticatus Banks, 1905. *Trans. Amer. ent. Soc.* 32: 3.

proi (Navas). Brazil, Argentine.
Psocus proi Navas, 1928. *Estudios* 28: 143, fig. 12.

pulchellus (Banks). Singapore.
Psocus pulchellus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 300; pl. II, fig. 17.

punctaticeps (Enderlein). Brazil.
Psocus punctaticeps Enderlein, 1910. *Zool. Anz.* 36: 161.

pyralinus (Kolbe). Brazil, Paraguay.
Psocus pyralinus Kolbe, 1883. *Stettin. ent. Ztg.* 44: 83.
Psocus pyralinus var. *paraguayensis* Ribaga, 1908. *Redia* 5: 102; pl. VI, fig. 7.

quadrisignatus (Banks). Brazil.
Psocus quadrisignatus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 305; pl. III, fig. 34.

relativus (Banks). Singapore.
Psocus relativus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 302.

rotundus (Navas). Argentine.
Psocus rotundus Navas, 1918. *Physis B. Aires* 4: 89.

salai (Navas). India.
Psocus salai Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 35.

sauteri (Enderlein). Formosa.
Psocus sauteri Enderlein, 1908. *Zool. Anz.* 33: 761.

schmidti (Navas). Costa Rica.
Psocus schmidti Navas, 1927. *Rev. Acad. Cienc. Zaragoza* 11: 42.

serrei (Navas). Costa Rica.
Psocus ? serrei Navas, 1924. *Broteria ser. zool.* 21: 65.

signifer (Navas). India.
Psocus signifer Navas, 1934. *Rev. Acad. Cienc. Zaragoza* 17: 37.

similaris (Banks). Singapore.
Psocus similaris Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 299.

simplex (Enderlein). Brazil.
Psocus simplex Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 353; pl. 17, fig. 3.

sivorii (Ribaga). Montevideo.
Psocus sivorii Ribaga, 1908. *Redia* 5: 98; pl. VI, figs. 4, 5.

sparsipennis (Enderlein). East Prussia (in amber).
Psocus sparsipennis Enderlein, 1911. *Palaeontographica* 58: 303, figs. 1, 27.

sticticus (Banks). Brazil.
Psocus sticticus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 305; pl. I, fig. 1.

strictus Thornton. **(Psocidus).** Hong Kong.
Psocidus (Psocidus) strictus Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 255, figs. 32, 35, 36, 38.

tacaoensis (Enderlein). Formosa.
Psocus tacaoensis Enderlein, 1908. *Zool. Anz.* 33: 763.

takeokanus (Okamoto). Japan.
Psocus takeokanus Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 131, fig. 8.

texanus (Aaron). Texas.
Psocus texanus Aaron, 1886. *Proc. Acad. Sci. Philad.* 38: 16.

theresopolitanus (Enderlein). Brazil.
Psocus theresopolitanus Enderlein, 1910. *Zool. Anz.* 36: 162.

tikalus Mockford. Guatemala.
Psocidus tikalus Mockford, 1957. *Ent. News* 68: 202, figs. 16-18, 20, 21.

trimaculatus (Hagen). Ceylon.
Psocus trimaculatus Hagen, 1858. *Verh. zool. -bot. Ges. Wien* 8: 473.

validus Thornton. **(Psocidus).** Hong Kong.
Psocidus (Psocidus) validus Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 252, figs. 30, 31, 33, 34, 37, 39-41.

venustus (Navas). Argentine.
Psocus venustus Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 102.

viscayanus (Banks). Philippines
Psocus viscayanus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 302; pl. II, fig. 14.

vitalisi (Navas). Tonkin.
Psocus vitalisi Navas, 1922. *Broteria ser. zool.* 20: 58.

zanzibarensis Pearman. **(Psocidus).** Zanzibar.
Psocidus zanzibarensis Pearman, 1934. *Stylops* 3: 123; fig. 2.
Psocidus (Psocidus) zanzibarensis Pearman. Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.
Psocidus (Psocidus) zanzibarensis Pearman. Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 256.

zikani (Navas). Brazil.
Psocus zikani Navas, 1934. *Rev. Acad. Cienc. Madrid* 31: 20, fig. 32.

zonatus (Navas). Argentine.
Psocus zonatus Navas, 1932. *Rev. Acad. Cienc. Zaragoza* 16: 103, fig. 10.
(Not *Psocus zonatus* Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 204).

Genus **Psocus** Latreille

Note: Cf. also note under *Psocidus* Pearman. In the following list species which have been confirmed in the literature as belonging to *Psocus* in the restricted sense of Pearman (*Ent. mon. Mag.* 68: 193-204; *Stylops* 3: 122) are marked with an asterisk (*).

Psocus Latreille, 1794. *Bull. Soc. philom. Paris* 1: 85.
Type species: *Hemerobius bipunctatus* Linnaeus.
Psochus Latreille, 1796. *Precis des Characteres gén. des Insectes* etc. p. 99.

alticolus Banks. Philippines.
Psocus alticolus Banks, 1937. *Philipp. J. Sci.* 63: 126; pl. 1, fig. 8.

annellus Banks. Jamaica.
Psocus annellus Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 385, fig. 24.

bipunctatus (Linnaeus).* Europe.
Hemerobius bipunctatus Linnaeus, 1761. *Fauna Suec.* (*Ed.* II), p. 384.
Psocus bipunctatus (Linnaeus). Latreille, 1794. *Bull. Soc. philom. Paris* 1: 85.
Psocus bipunctatus var. *grisescens* Tetens, 1891. *Ent. Nachr.* 17: 375.

cabanae Williner. Argentine.
Psocus cabanae Williner, 1944. *Notes Mus. La Plata* (*Zool.*) 9: 448, fig. 2.

cataratae Williner. Argentine.
Psocus cataratae Williner, 1945. *Rev. Soc. ent. argent.* 12: 240.

cyllanus Banks. Santo Domingo.
Psocus cyllanus Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 386, figs. 8, 11.

dolorosus Banks. Philippines.
Psocus dolorosus Banks, 1937. *Philipp. J. Sci.* 63: 125; pl. 2, fig. 12.

gonzalezi Williner. Argentine.
Psocus gonzalezi Williner, 1945. *Rev. Soc. ent. argent.* 12: 236.

illotus Banks. Philippines.
Psocus illotus Banks, 1939. *Philipp. J. Sci.* 69: 134, fig. 2.

incomptus Banks. Philippines.
Psocus incomptus Banks, 1937. *Philipp. J. Sci.* 63: 126; pl. 1, fig. 9.

jeanneli Badonnel. * Morocco.
Psocus jeanneli Badonnel, 1945. *Rev. franc. Ent.* 12: 48, figs. 43-48.

kolbei (Enderlein). * Japan, Formosa.
Amphigerontia kolbei Enderlein, 1906. *Zool. Jb. Abt. Syst.* 23: 246.
Cerastipsocus singularis Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 118.
Cerastipsocus hakodatensis Okamoto, 1907. *Trans. Sapporo nat. Hist. Soc.* 2: 119.
Sigmatoneura singularis (Okamoto). Banks, 1937. *Philipp. J. Sci.* 62: 257.
Psocus kolbei (Enderlein). Tsutsumi, 1964. *Kontyû* 32: 118.

lapidarius Badonnel. * Algeria.
Psocus lapidarius Badonnel, 1936. *Rev. franc. Ent.* 3: 97, figs. 1-6.

leidyi Aaron. * North America.
Psocus leidyi Aaron, 1886. *Proc. Acad. Sci. Philad.* 38: 15; pl. I, fig. 2.
Psocus bilobatus Banks, 1918. *Bull. Mus. comp. Zool. Harv.* 62: 4; pl. I, fig. 1.

lossbergi Williner. Argentine.
Psocus lossbergi Williner, 1945. *Rev. Soc. ent. argent.* 12: 238.

omiscus Banks. Philippines.
Psocus omiscus Banks, 1939. *Philipp. J. Sci.* 69: 134.

oneitus Banks. Santo Domingo.
Psocus oneitus Banks, 1941. *Mem. Soc. cubana Hist. nat.* 15: 387, fig. 10.

pseudozonatus Williner. Argentine.
Psocus pseudozonatus Williner, 1945. *Rev. Soc. ent. argent.* 12: 239.

rizali Banks. Philippines.
Psocus rizali Banks, 1939. *Philipp. J. Sci.* 69: 134; fig. 1.
saghaliensis Okamoto. * Saghalien.
Psocus saghaliensis Okamoto and Kuwayama, 1924. *Ann. Mag. nat. Hist.* (9) 14: 487, figs. 1-4, 6-8.

Genus **Ptycta** Enderlein

Note: This genus may be synonymous with *Maheella* Enderlein (cf. Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 248). The species of *Ptycta* are in need of revision and it is clear that more species are involved than the following list suggests. In the absence of such revisionary work it has been considered best to present the synonymies as they would appear in a logical chronological treatment as an aid to the revising student in following the nomenclatural history of Perkins' species. This history can be followed through the following papers.

Perkins, R. 1899. *Fauna Hawaiiensis* 2 (2): 77-87.
Enderlein, G. 1913. *Zool. Anz.* 41: 354-360.
Enderlein, G. 1920. *Zool. Jb. Abt. Syst.* 43: 449-460; pls. 5, 6.
Enderlein, G. 1925. *Konowia* 4: 97-108, 1 fig.
Zimmerman, E. 1948. *Insects of Hawaii* 2: 217-255, figs. 121-137.

Ptycta Enderlein, 1925. *Konowia* 4: 102.
Type species: *Psocus haleakalae* Perkins.
distinguenda (Perkins). Hawaii.
Psocus distinguendus Perkins, 1899. *Fauna Hawaiiensis* 2: 80.
Psocus oahuensis Perkins, 1899. *Fauna Hawaiiensis* 2: 81.
Psocus vittipennis Perkins, 1899. *Fauna Hawaiiensis* 8: 82.
Clematostigma distinguendum (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma distinguendum var. *oahuense* Perkins. Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma vittipennis (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Psocus distinguendus Perkins. Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 452; pl. 6, fig. 7.
Psocus distinguendus var. *oahuensis* Perkins. Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 452.
Psocus distinguendus var. *vittipennis* Perkins. Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 453.
Ptycta distinguenda (Perkins). Enderlein, 1925. *Konowia* 4: 102.
haleakalae (Perkins). Hawaii.
Psocus haleakalae Perkins, 1899. *Fauna Hawaiiensis* 2: 77.
Psocus unicus Perkins, 1899. *Fauna Hawaiiensis* 2: 78.
Psocus lanaiensis Perkins, 1899. *Fauna Hawaiiensis* 2: 81.
Psocus sylvestris Perkins, 1899. *Fauna Hawaiiensis* 2: 81.
Psocus monticola Perkins, 1899. *Fauna Hawaiiensis* 2: 82.
Psocus heteragamias Perkins, 1899. *Fauna Hawaiiensis* 2: 82.
Psocus hualalai Perkins, 1899. *Fauna Hawaiiensis* 2: 79.
Psocus simulator Perkins, 1899. *Fauna Hawaiiensis* 2: 78.
Psocus molokaiensis Perkins, 1899. *Fauna Hawaiiensis* 2: 80.
Psocus konae Perkins, 1899. *Fauna Hawaiiensis* 2: 79.
Psocus kauaiensis Perkins, 1899. *Fauna Hawaiiensis* 2: 79.
Clematostigma haleakalae (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma kauaiense (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma simulator (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma hualalai (Perkins). Enderlein. 1913. *Zool. Anz.* 41: 355.
Clematostigma konae (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma molokaiense (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.

Clematostigma lanaïense (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma sylvestris (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma heterogamias (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma monticola (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Clematostigma unica (Perkins). Enderlein, 1913. *Zool. Anz.* 41: 355.
Psocus haleakalae var. *monticola* Perkins. Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 450; pl. 5, fig. 2.
Psocus haleakalae var. *lanaiensis* Perkins. Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 450; pl. 5, fig. 3.
Psocus haleakalae var. *hualalai* Perkins. Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 451; pl. 5, fig. 4.
Psocus haleakalae var. *molokaiensis* Perkins. Enderlein, 1920. *Zool. Jb. Abt. Syst.* 43: 451; pl. 5, figs. 5, 6.
Ptycta haleakale (Perkins). Enderlein, 1925. *Konowia* 4: 102.

incurvata Thornton. Hong Kong.
Ptycta incurvata Thornton, 1960. *Trans. R. ent. Soc. Lond.* 112: 245, figs. 12-20.

parvidentata Tsutsumi. Ryukyu Is., Japan.
Ptycta parvidentata Tsutsumi, 1964. *Kontyû* 32: 267, figs. 9-16.

schillei (Enderlein). Java, Krakatau.
Clematostigma schillei Enderlein, 1906. *Stettin. ent. Ztg.* 67: 310.
Ptycta schillei (Enderlein). Enderlein, 1925. *Konowia* 4: 102.

Genus **Steleops** Enderlein

Steleops Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 64.
Type species: *Steleops punctipennis* Enderlein.

Subgenera:

(Steleops) Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 64.
Type species: *Steleops punctipennis* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.

(Pelmatocoria) Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 63.
Type species: *Pelmatocoria pedunculata* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.

pedunculata (Enderlein). **(Pelmatocoria).** Paraguay, Brazil.
Pelmatocoria pedunculata Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 63.
Steleops (*Pelmatocoria*) *pedunculata* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.

punctipennis Enderlein. **(Steleops).** Paraguay.
Steleops punctipennis Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 65.
Steleops (*Steleops*) *punctipennis* Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 105: 145.

Genus **Trichadenotecnum** Enderlein

Note: This genus is at present regarded as being divisible into four subgenera. Species which have been assigned to these in the literature or which were included in *Loensia* are so assigned in the following list. Other species requiring further study before subgeneric assignment can be made are included as being in *Trichadenotecnum* sens. lat. (Cf. Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 1-4).

Trichadenotecnum Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 329.
Type species: *Psocus sexpunctatus* (Linnaeus).

Subgenera:

(Trichadenotecnum) Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 329.
Type species: *Psocus sexpunctatus* (Linnaeus).
Subgeneric status: Roesler, 1943. *Stettin. ent. Ztg.* 104: 5.

(Loensia) Enderlein, 1924. *S.B. Ges. naturf. Fr. Berl.* 31: 35.
Type species: *Psocus fasciatus* Fabricius.
Subgeneric status: Roesler, 1943. *Stettin. ent. Ztg.* 104: 5.

(Psocomesites) Roesler, 1943. *Stettin. ent. Ztg.* 104: 4.
Type species: *Trichadenotecnum (Psocomesites) continuatum* Roesler.

(Trichadenopsocus) Roesler, 1943. *Stettin. ent. Ztg.* 104: 4.
Type species: *Psocus desolatus* Chapman.

alexandrae Sommerman. **(Trichadenotecnum).** North America.
Trichadenotecnum alexandrae Sommerman, 1948. *Proc. ent. Soc. Wash.* 50: 169, figs. 13-19.
Trichadenotecnum (Trichadenotecnum) alexandrae Sommerman. Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 1.

angolense Badonnel. Angola.
Trichadenotecnum angolensis Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 234, figs. 544-546.

apertum Thornton. Hong Kong.
Trichadenotecnum apertum Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 7, figs. 13-20.

arciforme Thornton. Hong Kong.
Trichadenotecnum arciforme Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 11, figs. 21-26.

atratum (Aaron). North America.
Psocus atratus Aaron, 1883. *Trans. Amer. ent. Soc.* 11: 39.
Trichadenotecnum atratum (Aaron). Enderlein, 1925. *Konowia* 4: 105.

bidens Thornton. Hong Kong.
Trichadenotecnum bidens Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 6, figs. 5-6, 9-12.

circulare (Hagen). Ceylon.
Psocus circularis Hagen, 1859. *Verh. zool. -bot. Ges. Wien* 9: 201.
Trichadenotecnum circulare (Hagen). Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 330.

circularoides Badonnel. Angola.
Trichadenotecnum circularoides Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 229, figs. 532-534.

continuatum Roesler. **(Psocomesites).** Brazil.
Trichadenotecnum (Psocomesites) continuatum Roesler, 1943. *Stettin. ent. Ztg.* 104: 4, figs. 1-6.

desolatum (Chapman). **(Trichadenopsocus).** Colorado.
Psocus desolatus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 236; pl. XV, fig. 2.
Trichadenotecnum (Trichadenopsocus) desolatum (Chapman). Roesler, 1943. *Stettin. ent. Ztg.* 104: 4.

enderleini (Roesler) Australia.
Psocus conspurcatus Enderlein, 1903. *Ann. hist. -nat. Mus. hung* 1: 224; pl. IV, fig. 13.
(Not *Psocus conspurcatus* Rambur, 1842. *Hist. nat. Ins.* p. 323).
Trichadenotecnum conspurcatum (Enderlein). Enderlein, 1925. *Konowia* 4: 105.
Psocus enderleini Roesler, 1943. *Stettin. ent. Ztg.* 104: 13. (*Psocus conspurcatus* preocc.).
Psocidus enderleini (Roesler). Roesler, 1943. *Stettin. ent. Ztg.* 104: 13.

fasciatum (Fabricius). **(Loensia).** Europe.
Hemerobius trifasciatus Muller, 1776. *Zool. Dan. prodrom.* p. 146.
Hemerobius fasciatus Fabricius, 1787. *Mantissa insectorum* etc. 1: 247.
Psocus fasciatus (Fabricius). Fabricius, 1798. *Supplementum Entomologiae* p. 203.
Psocus pilicornis Latreille, 1799. *Illustr. Icon. Insect.* p. 13; pl. 2, fig. 12.
Amphigerontia fasciata (Fabricius). Enderlein, 1906. *Ber. westpreuss. bot-zool. Ver.* 28: 75.
Amphigerontia fasciata ab. *psocoides* Enderlein, 1910. *Nyt. Mag. Naturv.* 48: 321.

Loensia fasciata (Fabricius). Enderlein, 1924. *S.B. Ges. naturf. Fr. Berl.* 31: 35.
Trichadenotecnum (*Loensia*) *fasciatum* (Fabricius). Roesler, 1943. *Stettin. ent. Ztg.* 103: 5.

felix Thornton. Hong Kong.
Trichadenotecnum felix Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 18, figs. 37-40.

fuscimacula (Enderlein). **(Loensia).** Java.
Loensia fuscimacula Enderlein, 1926. *Zool. Meded.* 9: 51.

germanicum Roesler. **(Trichadenotecnum).** Germany, Czechoslovakia.
Trichadenotecnum germanicum Roesler, 1939. *Zool. Anz.* 125: 162.
Trichadenotecnum (*Trichadenotecnum*) *germanicum* Roesler. Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 1.

glabridorsum (Enderlein). **(Loensia).** Java.
Loensia glabridorsum Enderlein, 1926. *Zool. Meded* 9: 51.

incognitum Roesler. **(Trichadenotecnum).** Europe.
Trichadenotecnum incognitum Roesler, 1939. *Zool. Anz.* 127: 109, fig. 1-6.
Trichadenotecnum (*Trichadenotecnum*) *incognitum* Roesler. Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 1.

maculosum (Banks). **(Loensia).** California.
Myopsocus maculosus Banks, 1908. *Trans. Amer. ent. Soc.* 34: 258.
Psocus maculosus (Banks). Chapman, 1930. *J.N.Y. ent. Soc.* 38: 253; pl. XV, figs. 12, 13; pl. XX, fig. 28.
Trichadenotecnum (*Loensia*) *maculosum* (Banks). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 2.

majus (Kolbe). **(Trichadenotecnum).** Europe.
Psocus sexpunctatus var. *major* Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 109.
Psocus major (Kolbe). Loens, 1890. *Stettin. ent. Ztg.* 51: 6.
Psocus major var. *ocellata* Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 539.
Psocus major var. *septentrionalis* Enderlein, 1910. *Nyt. Mag. Naturv.* 48: 318.
Trichadenotecnum majus (Kolbe). Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 330.
Trichadenotecnum (*Trichadenotecnum*) *majus* (Kolbe). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 1.

medium Thornton. Hong Kong.
Trichadenotecnum medium Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 4, figs. 1-4, 7-8.

minutum Enderlein. Java.
Trichadenotecnum minutum Enderlein, 1926. *Zool. Meded.* 9: 50.

moestum (Hagen). **(Loensia).** North America.
Psocus moestus Hagen, 1861. *Smithson. misc. Coll.* 4: 11.
Amphigerontia moestus (Hagen). Banks, 1892. *Trans. Amer. ent. Soc.* 19: 344.
Loensia moesta (Hagen). Mockford, 1950. *Proc. Ind. Acad. Sci.* 60: 201.

nudum Thornton. Hong Kong.
Trichadenotecnum nudum Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 14, figs. 27-33.

obsitum (Enderlein). Formosa.
Psocus obsitus Enderlein, 1908. *Zool. Anz.* 33: 763.
Trichadenotecnum obsitum (Enderlein). Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 330.

pardidum Thornton. Hong Kong.
Trichadenotecnum pardidum Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 16, figs. 34-36.

pardoides Badonnel. Angola.
Trichadenotecnum pardoides Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 232, figs. 538-543.

pardus Badonnel. Angola.
Trichadenotecnum pardus Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 231, figs. 535-537.

pearmani (Kimmins). **(Loensia).** Europe.
Psocus picicorne Stephens, 1836. *Illustrations of British Entomology* 6: 118.
(Not *Psocus picicornis* (Fabricius). Fabricius, 1798. *Supplementum Entomologiae systematicae* p. 204).
Loensia picicornis (Stephens). Pearman, 1932. *Ent. mon. Mag.* 68: 194.
Loensia pearmani Kimmins, 1941. *J. Soc. Br. Ent.* 2: 96. (nom. nov. for *Psocus picicornis* Stephens).
Trichadenotecnum (*Loensia*) *macilentum* Roesler, 1943. *Stettin. ent. Ztg.* 104: 13. (nom. nov. for *Psocus picicornis* Stephens).
Trichadenotecnum (*Loensia*) *pearmani* (Kimmins). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 2.

pictiventre (Kolbe). Brazil.
Psocus pictiventris Kolbe, 1883. *Stettin. ent. Ztg.* 44: 83.
Trichadenotecnum pictiventre (Kolbe). Enderlein, 1925. *Konowia* 4: 105.

quinquepunctatum (McLachlan). Ceylon.
Psocus quinquepunctatus McLachlan, 1872. *Ent. mon. Mag.* 9: 75.
Trichadenotecnum quinquepunctatum (McLachlan). Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 330.

schonemanni (Enderlein). **(Loensia).** Chile.
Loensia schonemanni Enderlein, 1926. *Zool. Anz.* 46: 191.

sexpunctatum (Linnaeus). **(Trichadenotecnum).** Europe, North America.
Hemerobius sexunctatus Linnaeus, 1761. *Fauna Suecica* Ed. II, p. 383.
Psocus sexpunctatus (Linnaeus). Fabricius, 1798. *Supplementum Entomologiae systematicae* p. 203.
Trichadenotecnum sexpunctatum (Linnaeus). Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 329.
Trichadenotecnum (*Trichadenotecnum*) *sexpunctatum* (Linnaeus). Roesler, 1943. *Stettin. ent. Ztg.* 104: 5.

sexpunctellum (Enderlein). Japan.
Psocus sexpunctellus Enderlein, 1907. *Stettin. ent. Ztg.* 68: 91.
Trichadenotecnum sexpunctellum (Enderlein). Enderlein, 1909. *Boll. Lab. zool. Portici* 3: 330.

slossonae (Banks). **(Trichadenotecnum).** North America.
Psocus slossonae Banks, 1903. *J.N.Y. ent. Soc.* 11: 236.
Psocus quaesitus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 270 (part).
Trichadenotecnum slossonae (Banks). Sommerman, 1948. *Proc. ent. Soc. Wash.* 50: 273, figs. 1-6.
Trichadenotecnum (*Trichadenotecnum*) *slossonae* (Banks). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 1.

submarginatum (Aaron). North America.
Psocus texanus var. *submarginatus* Aaron, 1886. *Proc. Acad. Sci. Philad.* 38: 16; pl. I, fig. 1.
Psocus submarginatus (Aaron). Enderlein, 1906. *Stettin. ent. Ztg.* 67: 279.
Psocus submarginatus var. *amphigerontoides* Enderlein, 1906. *Stettin. ent. Ztg.* 67: 317.
Trichadenotecnum submarginatum (Aaron). Enderlein, 1925. *Konowia* 4: 105.

trigonoscenea (Enderlein). East Prussia (in amber).
Psocus affinis Hagen, 1882. *Stettin. ent. Ztg.* 43: 232 (part).
Psocus trigonoscenea Enderlein, 1911. *Palaeontographica* 58: 304, figs. 2, 29, 30.
Trichadenotecnum trigonoscenea (Enderlein). Enderlein, 1929. *Zool. Anz.* 83: 177-180, 3 figs.

unum Sommerman. **(Trichadenotecnum).** North America.
! *Psocus slossonae* Banks. Chapman, 1930. *J.N.Y. ent. Soc.* 38: 273 (part.).

Psocus quaesitus Chapman, 1930. *J.N.Y. ent. Soc.* 38: 270 (part.).
Trichadenotecnum unum Sommerman, 1948. *Proc. ent. Soc. Wash.* 50: 167, figs. 1-6.
Trichadenotecnum (*Trichadenotecnum*) *unum* Sommerman. Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 1.

variegatum (Latreille). **(Loensia).** Europe.
Psocus variegatus Latreille, 1799. *Illustr. Icon. Insect.* p. 13.
Psocus atomarius Stephens, 1836. *Illustrations of British Entomology* 6: 118.
Amphigerontia variegata (Latreille). Kolbe, 1880. *Jber. westf. ProvVer. Wiss. Kunst* 8: 105.
Loensia variegatum (Latreille). Pearman, 1932. *Ent. mon. Mag.* 68: 194.
Trichadenotecnum (*Loensia*) *variegatum* (Latreille). Thornton, 1961. *Trans. R. ent. Soc. Lond.* 113: 2.

Family **THYRSOPHORIDAE**

Genus **Dictyopsocus** Enderlein

Dictyopsocus Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 543.
Type species: *Thyrsophorus pennicornis* Burmeister.

pennicornis (Burmeister). Brazil.
Thyrsophorus pennicornis Burmeister, 1839. *Handbuch Ent.* 2 (2): 782.
Thyrsophorus ramosus Walker, 1853. *Cat. Brit. Mus.* (3): 480.
Dictyopsocus pennicornis (Burmeister). Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 543; pl. 3, fig. 8.

Genus **Thyrsophorus** Burmeister

Thyrsophorus Burmeister, 1839. *Handbuch Ent.* 2 (2): 781.
Type species: *Thyrsophorus speciosus* Burmeister.

Subgenera:

(Thyrsophorus) Burmeister, 1839. *Handbuch Ent.* 2 (2): 781.
Type species: *Thyrsophorus speciosus* Burmeister.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.

(Gigantopsocus) Enderlein, 1925. *Konowia* 4: 97.
Type species: *Thyrsophorus metallicus* Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 134, fig. A; pl. 8, fig. 1.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.

anticus Walker. **(Thyrsophorus).** Brazil.
Thyrsophorus anticus Walker, 1853. *Cat. Brit. Mus.* (3): 480.

formosus Navas. **(Thyrsophorus).** Brazil.
Thyrsophorus formosus Navas, 1934. *Rev. Acad. Cienc. Madr.* 31: 158, fig. 34.

leucotelus Walker. **(Thyrsophorus).** Brazil.
Thyrsophorus leucotelus Walker, 1853. *Cat. Brit. Mus.* (3): 479.

metallicus Enderlein. **(Gigantopsocus).** Peru.
Thyrsophorus metallicus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 138, fig. A; pl. 8, fig. 1.
Gigantopsocus metallicus (Enderlein). Enderlein, 1925. *Konowia* 4: 97.
Thyrsophorus (*Gigantopsocus*) *metallicus* Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 104: 148.

speciosus Burmeister. **(Thyrsophorus).** Brazil.
Thyrsophorus speciosus Burmeister, 1839. *Handbuch Ent.* 2 (2): 782.
Thyrsophorus spinolae Rambur, 1842. *Hist. nat. Insectes* p. 318.
Thyrsophorus (*Thyrsophorus*) *speciosus* Burmeister. Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.

trabeatus (Enderlein). **(Thyrsophorus).** Colombia.
Gigantopsocus trabeatus Enderlein, 1925. *Konowia* 4: 97.
Thyrsophorus trabeatus (Enderlein). Roesler, 1940. *Zool. Anz.* 130: 10.

Genus **Thyrsopsocus** Enderlein

Thyrsopsocus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 140.
Type species: *Thyrsopsocus peruanus* Enderlein.
Subgenera:
(Thyrsopsocus) Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 140.
Type species: *Thyrsopsocus peruanus* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.
(Colpostigma) Enderlein, 1925. *Konowia* 4: 98.
Type species: *Colpostigma elegans* Enderlein.
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.
(Poecilopsocus) Roesler, 1940. *Arb. morph. taxon. Ent.* 7: 239.
Type species: *Ischnopteryx calocoroides* Enderlein.
Ischnopteryx Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 139.
Type species: *Ischnopteryx calocoroides* Enderlein.
(Not *Ischnopteryx* Agassiz, 1846. *Nomen Zool. Index Univ.*).
Subgeneric status: Roesler, 1944. *Stettin. ent. Ztg.* 105: 148.

aequatorialis Enderlein. **(Thyrsopsocus).** Ecuador, Brazil.
Thyrsopsocus aequatorialis Enderlein, 1901. *Zool. Jb. Abt Syst.* 14: 545.

bellulus Banks. **(Thyrsopsocus).** Honduras.
Thyrsopsocus bellulus Banks, 1930. *Psyche, Camb. Mass.* 37: 185; pl. 9, fig. 1.

bellus (McLachlan). **(Thyrsopsocus).** Brazil, Peru.
Thyrsophorus bellus McLachlan, 1866. *Trans. ent. Soc. Lond.* (3) 5: 345.
Thyrsopsocus bellus var. *fuscosignatus* Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 142; pl. VIII, figs. 5, 6.

calocoroides (Enderlein). **(Poecilopsocus).** Peru.
Ischnopteryx calocoroides Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 139; pl. VIII, fig. 2.
Poecilopsocus calocoroides (Enderlein). Roesler, 1940. *Arb. morph. taxon. Ent.* 7: 239.
Thyrsopsocus (*Poecilopsocus*) *calocoroides* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 104: 148.

cinctus (Enderlein). **(Poecilopsocus).** Brazil.
Ischnopteryx cincta Enderlein, 1903. *Zool. Jb. Abt. Syst.* 18: 351; pl. 17, fig. 1.

elegans (Enderlein). **(Colpostigma).** Brazil.
Colpostigma elegans Enderlein, 1925. *Konowia* 4: 99.
Thyrsopsocus (*Colpostigma*) *elegans* (Enderlein). Roesler, 1944. *Stettin. ent. Ztg.* 104: 148.

iridescens (Enderlein). **(Poecilopsocus).** Ecuador.
Ischnopteryx iridescens Enderlein, 1901. *Zool. Jb. Abt. Syst.* 14: 544.

peruanus Enderlein. **(Thyrsopsocus).** Peru.
Thyrsopsocus peruanus Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 140; pl. VIII, fig. 3.
Thyrsopsocus (*Thyrsopsocus*) *peruanus* Enderlein. Roesler, 1944. *Stettin. ent. Ztg.* 104: 148.

pretiosus Banks. **(Thyrsopsocus).** Barro Colorado.
Thyrsopsocus pretiosus Banks, 1930. *Psyche, Camb. Mass.* 37: 185, fig. 3.

psocoides Enderlein. **(Thyrsopsocus).** Peru.
Thyrsopsocus psocoides Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 143.
Thyrsopsocus psocoides var. *pedunculata* Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 144; pl. VIII, fig. 7.
Thyrsopsocus psocoides var. *duplopostica* Enderlein, 1900. *Zool. Jb. Abt. Syst.* 14: 144; pl. 8, fig. 8.

pulchra (Enderlein). **(Poecilopsocus).** Central America.
Ischnopteryx pulchra Enderlein, 1906. *Stettin. ent. Ztg.* 67: 308.

stigmaticus (Banks). **(Colpostigma).** Peru.
Thyrsopsocus stigmaticus Banks, 1924. *Bull. Mus. comp. Zool. Harv.* 65: 422; pl. I, fig. 8.
Colpostigma stigmaticum (Banks). Enderlein, 1925. *Konowia* 4: 99.

Family **PSILOPSOCIDAE**

Genus **Psilopsocus** Enderlein

Psilopsocus Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 305.
Type species: *Psilopsocus nigricornis* Enderlein.

mimulus Smithers. Australia.
Psilopsocus mimulus Smithers, 1963. *J. ent. Soc. Qd.* 2: 56, figs. 1-10.

nebulosus Mockford. Philippines.
Psilopsocus nebulosus Mockford, 1961. *Psyche, Camb. Mass.* 68: 40, 1 fig.; pl. 5.

nigricornis Enderlein. New Guinea.
Psilopsocus nigricornis Enderlein, 1903. *Ann. hist. -nat. Mus. hung.* 1: 306, figs. 6, 7; pl. XIV, fig. 74.

Family **MYOPSOCIDAE**

Note: The genera of this family are in need of revision and redefinition. In the following list the subgeneric arrangement of Roesler is not adopted and the species are placed in the genera indicated in the literature. This arrangement must, of course, be regarded as provisional.

Genus **Lichenomima** Enderlein

Lichenomima Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910 (2): 66.
Type species: *Lichenomima conspersa* Enderlein.

argentina Williner. Argentine.
Lichenomima argentina Williner, 1944. *An. Soc. cient. argent.* 138: 159, 1 fig.

burgeoni (Navas). Congo.
Loensia burgeoni Navas, 1936. *Rev. Zool. Bot. afr.* 28: 362.
Lichenomima burgeoni (Navas). Badonnel, 1948. *Rev. Zool. Bot. afr.* 40: 267.

cameruna (Enderlein). Cameroons, Angola, Congo.
Myopsocus camerunus Enderlein, 1903. *Zool. Jb. Abt. Syst.* 19: 5, figs. 19, 20.
(Not *Lichenomima camerunus* var. *intermedia* (Enderlein). Pearman, 1934. *Stylops* 3: 121, fig. 1).
Lichenomima cameruna (Enderlein). Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 66.

conspersa Enderlein. Southern Brazil, Paraguay.
Lichenomima conspersa Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910 (2): 66.

fasciata Badonnel. Congo.
Lichenomima fasciata Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 186, figs. 101, 102, 106.

fenestrata Enderlein. Java.
Lichenomima fenestrata Enderlein, 1926. *Zool. Meded.* 9: 62.

guineensis Enderlein. French Guinea.
Lichenomima guineensis Enderlein, 1914. *Boll. Lab. Zool. Portici* 8: 241.

intermedia Pearman. Sierra Leone, Angola.
! *Lichenomima cameruna* var. *intermedia* Pearman, 1934. *Stylops* 3: 121, fig. 1.
Lichenomima intermedia Pearman. Badonnel, 1946. *Rev. Zool. Bot. afr.* 39: 183, figs. 96, 97, 98-100, 105.

lugens (Hagen). North America.
Psocus lugens Hagen, 1861. *Smithson. misc. Coll.* 4: 9.
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Type species: *Lophopterygella camelina* Enderlein.
Festona Navas, 1922. *Broteria ser. zool.* 20: 59.
Type species: *Festona lunata* Navas.

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Genus **Myopsocus** Hagen

Myopsocus Hagen, 1866. *Verh. zool. -bot. Ges. Wien* 16: 203, 210.
Type species: *Psocus unduosus* Hagen.

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Psocus virginianus Banks, 1900. *Trans. Amer. ent. Soc.* 26: 239.
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Genus **Phlotodes** Enderlein

Phlotodes Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 67.
Type species: *Myopsocus kolbei* Enderlein.

angolensis Badonnel. Angola, Natal.
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lyriifera Smithers. Madagascar.
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samoanus Karny. Samoa.
Phlotodes samoanus Karny, 1932. *Ins. Samoa* 7 (4): 123, fig. 6.

Genus **Rhaptoneura** Enderlein

Rhaptoneura Enderlein, 1910. *S.B. Ges. naturf. Fr. Berl.* 1910: 68.
Type species: *Rhaptoneura dispar* Enderlein.

africana Badonnel. Angola.
Rhaptoneura africana Badonnel, 1955. *Pub. cult. Cia. Diamant Angola* 26: 222, figs. 507-508.

ciliifera Smithers. Madagascar.
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magnifica Smithers. Natal, Southern Rhodesia, Tanganyika.
Rhaptoneura magnifica Smithers, 1957. *Proc. R. ent. Soc. Lond.* (*B*) 26: 11, figs. 1, 3.

muscosa Enderlein. Seychelles.
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pallida Smithers. Madagascar.
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setosa Smithers. Madagascar.
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speciosa Smithers. Madagascar.
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PSOCIDA AGNOTA

Note: The following three genera cannot be placed in any family owing to inadequate description.

Genus **Allopsocus** Banks

Allopsocus Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 312.
Type species: *Allopsocus marginalis* Banks.

marginalis Banks. Philippines.
Allopsocus marginalis Banks, 1920. *Bull. Mus. comp. Zool. Harv.* 64: 312; pl. I, figs. 10, 11.

Genus **Valenzuela** Navas

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Type species: *Valenzuela marianus* Navas.

marianus Navas. Spain.
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(Suprageneric names are in capitals, other valid names are in italics and invalid names in Roman type. Names of subgenera are in parentheses Species are listed alphabetically under each generic name).

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WILLIAM BLANDOWSKI— THE FIRST GOVERNMENT ZOOLOGIST OF VICTORIA

By Lech Paszkowski

(Plates I-III).

I first saw mention of William Blandowski's name when reading the Literary Supplement of the Melbourne *Age,* of 3rd April 1954, which contained an interesting article by R. T. M. Pescott entitled "Victoria's National Museum is One Hundred Years old." In it I noticed the name of William Blandowski referred to as "an unknown adventurer." The "unknown" usually attracts our interest, and consequently I spent a lot of time in the State Library of Victoria trying to read everything that had been written by, or about Blandowski. I found the most important material concerning Blandowski's activities in Australia in an excellent sketch entitled "Blandowski", published by T. Iredale and G. P. Whitley in the *Victorian Naturalist,* XLIX, 1932, and later I acquired a copy of a most informative book by R. T. M. Pescott *Collections of a Century* (Melbourne, 1954).

However, I had published an article on Blandowski in London in 1956 (*Wiadomosci*—News, Weekly) and there is a Chapter in a book of mine which appeared in the Polish language in London in 1962. There was little that was new in my own writings, as they contain mainly compilations from afore-mentioned Australian authors and various other sources.

It was not until the middle of 1965, that I decided to make another effort to clear up many questions on this important but rather little known pioneer of early Victoria. So I concentrated my research on the years 1851-1853 and 1859-1861, trying to cast more light on Blandowski's early movements in Australia and to find out what happened to him after he left this country. As the reader of this article will see, my success has been only partial. I also regret that I have had no time in which to make a detailed survey of the Melbourne Press of the 1854-1858 period, however, these particular years have been fairly well covered by the Australian authors already mentioned.

It should be stressed here, that the purpose of writing this paper, is not to give an all-round biography but merely to provide a selection of previously unknown or rather inaccessible material and to open up new lines of thought and approach for eventual further research into Blandowski's life and activities, particularly in the field of progress of Natural Science in Australia.

The Family Background

William Blandowski was born on 21st January, 1822, in Gliwice (Gleiwitz), Upper Silesia, a son of a Prussian Lieutenant-Colonel of the Medical Corps and his wife, née von Woyrsch. He was baptized Johann Wilhelm Theodor Ludwig, but used only the second Christian name as was customary in that part of Europe. He had at least one brother, Felix, born on 28th October, 1808, at Neumarkt, Silesia.

Wieniawa

Blandowski's coat-of-arms.

From *Encyklopedia staropolska* (Old-Polish Encyclopaedia) by Aleksander Brückner and Karol Estreicher, vol. i, Warsaw, 1937.

The Blandowski family, well known since 1610, and bearing the coat-of-arms of 'Wieniawa', was of Polish origin and belonged to the Silesian nobility, but later became Germanized, abandoning the Roman Catholic faith for the Lutheran. However, William, in his later life, was evidently not at all a religious man. When in Australia he signed his name as William Blandowski, and in Germany as Wilhelm von Blandowski.

On 31st August, 1834, Blandowski entered the Royal Prussian Cadets at Chelmno (Culm or Kulm), upon the Vistula river, but was dismissed, or left on his own request on 5th August, 1836. Further details regarding his education are not known, but he was once described as being a mining engineer by profession.

Beating a Naval Blockade under the Russian Flag

He left Hamburg on 26th April, 1849, on board the ship *Ocean*. As the Prusso-Danish war was still in full swing the departure was evidently delayed till 5th May, and the ship was forced to assume a Russian name (the *Wolga*) and Russian colours so as to evade the blockade.

However, the *Wolga* arrived happily in Adelaide as the *Ocean* on 14th September, 1849, with 180 passengers and a small cargo. In the *South Australian Register* of the next day we can find one, 'W. Blandowcski' (*sic*), entered in a list of passengers.

In the Colony of South Australia

Little is known about Blandowski's life in South Australia; nevertheless, a few facts can be established from the Colonial Secretary's correspondence of 1850. It seems that Blandowski became friendly with the Rev. August Kavel of Adelaide and started on a geological exploration of South Australia without much delay.

In a letter of 8th January, 1850, Rev. A. Kavel wrote to the Colonial Secretary, Captain Charles Sturt: "I am introducing once more Mr. Blandowsky, whose sketches you have seen lately, to your kind attention. I take the liberty of informing you, that he intends to make another tour through the country to examine it, especially those parts, situated on the left bank of the Murray, that appear to be hitherto least explored in a mineralogical point of view." Further on Kavel describes Blandowski as "a scientific man and a person of respectability, which may be proved by his testimonials . . ." and advocates his employment in one of the Government exploring parties; but this was refused.

Another similar effort was made by Kavel on 15th May, 1850, when he again wrote to Charles Sturt, enclosing some maps made by Blandowski and explaining: "I beg to observe, that they are the result of his travels and geological researches, he has made with intervals during his stay (nine months) in this Colony. His intention is to continue his examinations of this Province next Spring, and go to the western and northern portions of the Province, and after having within the space of some years completed his researches, to publish the result." Kavel also stated that Blandowski "not only studied Geology and Geognosy, but also practised Surveying art. He believes to make himself useful to Government if employed on the road as a Surveyor . . ."

Attached to this letter there was a personal note by Blandowski himself, dated 26th May, 1850, in which he said: "The undersigned, (designer of the enclosed maps and drawings) has made it already in Europa (*sic*) his principal aim to examine Australia in a geognostic-mineralogical manner. He intended to begin with the province of South Australia, and to that end staying there the first 5 years. Part of this time he has already spent, and examined during the last 9 months that portion of the colony, situated betwan (*sic*) the 138 and 140 degree of Long., and the 33 and 36 degr. of Lat."

Asking for the assistance of the Colonial Government Blandowski offered "to furnish the British Museum in London and a Colonial Museum, which may be established in Adelaide, with specimens the fruits of his travels, to be delivered to a committee of gentlemen every six months, and to give at the same time a (*sic*) account of his researches."

Charles Sturt replied to Kavel in a letter of June 21, 1850: "I have submitted your letter of the 18th Ultimo for the Lieut.-Governor's consideration, and I am directed by His Excellency to express his regret that there is no present opportunity for employing Mr. Blandowski as suggested by you. His Excellency has however directed that his name may be placed on the Books of the Surveyor General's Office, in the event of his services being required."

Many years later Blandowski stated officially, that, prior to his stay in Victoria, he was in the service of the Government of the Colony of South Australia. At present it has not been possible to establish confirmation of this.

However, there is no doubt that his 'original object' on arriving in Australia was that of 'compiling a natural history, a botanical classification, and a geological arrangement of this country.'

It seems that between June, 1850, and the end of 1851 he at least visited Twofold Bay, Sydney, Moreton Bay and Cape York by ship.

The First Geological Society of Victoria

Blandowski's name appeared in the Melbourne *Argus* on 4th October, 1852, as one of the founders of the first Geological Society of Victoria.

Perhaps some attention should be given to that interesting event in the early history of Victoria. According to the *Argus* of that day:-

> "A Meeting of gentlemen interested in the formation of a Geological Society, the objects of which would be the advancement of geological science in Australia, and the development of the varied mineral resources of the Colony, was held at the house, No. 132 Lonsdale

> Street, recently purchased by the Local Executive, as government offices."
>
> "The following resolutions were then proposed and seconded by the gentlemen whose names are respectively attached. Some of the remarks of the gentlemen present were highly interesting and instructive, especially those used by a German named Blandowski . . ."

The first motion was proposed by Evan Hopkins, Esq., F.G.S., and seconded by Alderman Hodgson:

> "That in the opinion of this meeting the establishment of a Geological Society would prove highly beneficial to the Colony . . . And that the gentlemen present now form themselves into a Society to be called 'The Royal Geological Society of Victoria'."

The motion was 'passed unanimously.' However, a Royal Charter was needed for such a name. The third motion by Mr. Blandowski, was seconded by Maurice Travers McDonogh, Esq.:

> "That each member shall pay on admission an annual subscription of two-guineas, payable in advance for the then current year . . . Carried unanimously."

The fifth and last motion was proposed by Alderman Hodgson and seconded by Joseph Brown, Esq.:

> "That His Excellency the Lieutenant-Governor shall be respectfully memorialized to place a sum of money on the estimates for the purpose of purchasing at once a collection of foreign and colonial minerals, and also to procure rooms for their reception; and that a memorial be presented to the Legislative Council, praying their sanction of the expenditure."

The *Argus* of 1st January, 1853, noted that:

> "On Thursday last [30th Dec.] a deputation from the above Society, consisting of G. M. Stephen, Esq., the Vice-President, T. T. a'Beckett, M.L.C., Dr. Thomas, Alderman Hodgson, and W. S. Gibsons, Esq., the Secretary, presented to His Excellency the Lieutenant-Governor, a Memorial signed by all the Officers of the Society, etc., praying him to place a sum of money on the Estimates, for the purpose of purchasing a cabinet of minerals and providing means of securing them. The deputation on the part of the Society also invited His Excellency to become its President. His Excellency received the deputation very graciously, accepted the post of President, and promisd to give the Society his cordial support. But he thought it too late in the Session to place any additional sum on the Estimates, and considered it wiser to work the Society for six months, before coming to the Council to ask pecuniary aid. He also intimated the wish, that the Society should have more extended objects: to embrace the whole range of natural history; and he eulogized the proceedings of the Royal Society of Van Diemen's Land.
>
> The Vice-President stated that it was the opinion of many experienced gentlemen in the colony, that it was highly desirable to nurse a young society by itself, and not to peril its stability by amalgamating with older societies which were already somewhat neglected; for that in such cases every one supposed that there were others attending to the business, and hence nobody attended it.
>
> After some desultory conversation, in which His Excellency admitted that he had felt chagrined at seeing valuable specimens he had presented to the Mechanic's Institute, tossed aside and covered with dust, the deputation withdrew, impressed with the necessity of trusting to their own exertions."

This original Memorial of the "Royal Geological Society of Victoria" is still preserved in the State Archives. There is one particularly interesting paragraph: "That your Memorialists are of opinion that the Nucleus of a Geological and Mineralogical Museum of permanent value might be thereby obtained and your Memorialists are assured that the public would thankfully support an Institution which would also offer such attractive means of study and recreation for the rising generation of both sexes."

On 8th January, 1853, a letter to the Editor appeared in the *Argus,* signed by Geo. M. Stephen, 'V. President Geol. Society', in which, beside some information on platina, it was stated that "one of the chief objects in instituting the Geological Society of Victoria, was to obtain and diffuse mineralogical information to the colonists."

However, on 7th March, 1853, in the same column, the Society became a target for an attack by a reader, signed "Alexander", in which he remarked:-

> "I noticed some time since the nucleus of a Geological Society started in your columns. There were all the office-bearers, committee of management, secretary, etc., there were all the rules; there was everything, in short, to form a complete society. As far as I can now judge, the body was perfect; but the breath of life had never entered it."

It seems that this opinion of the reader was true (incidentally, Blandowski's favourite expression *"Australia terra cognita"* appears further on in the letter).

In the *Melbourne Morning Herald* of 25th April, 1853, and in the *Argus* of 12th May, and 16th, 17th and 18th August there were other notes on the Society, but apparently after the last date the first Geological Society of Victoria just faded away.

The Gold Digger, Constructor and Inventor

Blandowski probably did not participate in the short life of the Society beyond his first appearance. He was far too busy with the construction of a powerful water-pump and the collecting of a fortune on the gold-fields. Already on 16th October, 1852, the *Argus* published information to the effect:-

> "A new double-actioned force pump is now being constructed at Mr. Langland's foundry, and will, in the course of a few days, be ready for the inspection of the gold diggers and others who are interested in the success of the gold fields of Victoria. Every person who has been at the Diggings during last winter must have seen the necessity which existed for a good water pump, constructed on an extensive scale.
>
> Mr. Blanonsky (*sic*), the inventor and proprietor of this valuable machine, is one of the successful German diggers, and as an ingenious and enterprising mechanic is deserving of encouragement and commendation. He has expended on the machine the produce of one year's labour at the Gold Field, amounting nearly to, 1000 *l,* thus improving the gold digging machinery, and at the same time aiding and maintaining the arts and manufacturers of this rising Colony; and we sincerely hope that he will meet with that protection from the Commissioners, and encouragement and support from his fellow-diggers, which he has, by his energy and enterprise, so well merited."

Further interesting information on the same subject was sent to the *Melbourne Morning Herald* by Bryce Ross, a correspondent of that newspaper's office at Forest Creek. His report, dated 12th November, 1852, appeared in the *Herald* five days later:-

> "A party of German diggers, known by the name of "Blandowski's" party (five in number), some time ago made 2000 *l* a man I understand in Spring Gully, head of Fryer's Creek. Their pits, in the language of Mr. Blandowski, looked somewhat like a jeweller's shop, being all stuck round by nature with nuggets. They had got to a considerable depth some time ago, when the water rushed in upon them in torrents, and they just escaped in time up the pit, leaving lots of gold behind. However, down the party came to Melbourne, and Mr. Blandowski, who came from Silesia, and was formerly a mining engineer for the Prussian government, obtained a double-action force-pump, with all the requisite attached machinery, and having increased their party to twelve men, have commenced operations at their old lucky spot at Spring Gully, with their machinery, which has

> cost, all expenses included, 1000 *l*. The power of the machinery is sixteen motions by one turn of the horse—making in gross round numbers, 4000 buckets of water brought up in an hour. I believe their claim is still enormously rich, beyond belief almost, and when they have worked it out the party mean, in two or three month's time to remove into Forest Creek, and sink wells near our office, and probably make another great fortune by supplying the neighbourhood with water; for last summer I recollect well I paid as high at one time as 1s. 6d. a bucket. Of course Blandowski's machinery and double pump would not only be able to supply the inhabitants with water for the house, but also the various diggers with sufficient to cradle with—so much for spirited enterprize. Blandowski's machinery and *modus operandi* is well worthy of inspection equally to the amateur and the man of science."

Apparently the same writer gave more information in the *Melbourne Morning Herald* of March 14, 1853:-

> "The noted German Pump in Spring Gully, Fryers Creek, is, I am informed, for sale; Mr. Blandowski, the owner, being about to pursue the original object he had in view when he landed in Australia, that of compiling a natural history, a botanical classification, and a geological arrangement, of this country. From a series of sketches and paintings that this really talented Prussian showed me, I have little doubt but that he will carry out his work with *eclat,* as well as with immense benefit to our reading community."

It is clear that in March, 1853, Blandowski left the goldfields and the occasional occupation as a gold-digger, taking a few thousand pounds to Melbourne, along with high hopes of again becoming a gentleman.

(I have not been able to identify a mysterious "Polish nobleman, Count Landoski", who had "a party at work on the Creek", and who supported the gold-field politics of Captain Harrison and Mr. Frencham, by delivering a "very appropriate speech" at the meeting of the gold-diggers at Bendigo on 9th December, 1851. It is quite puzzling, as perhaps the letter 'B' was omitted by a reporter and the name should read (B)landoski. I have no knowledge of any other man with a similar name being in Victoria at this time).

Governor La Trobe's Fancy

It seems that for a short time in 1853 he was attached to the field party of Alfred Selwyn, the Government Geologist, but not in an official capacity.

On 21st May, 1853, Blandowski sent a letter to the Colonial Secretary, which reads as follows:-

"I have the honor to request that you will lay before His Excellency the Lieutenant Governor and the Executive Council the following reference to a subject on which I had an interview with His Excellency about six weeks ago.

I have for five years been engaged in preparing an *Illustrated Natural History of the Colony of Victoria* and I feel very desirous of publishing the work in a complete form at a sufficiently low rate to ensure its extensive circulation among all classes of the community. I believe such a work as I expect to produce would be a valuable addition to our colonial literature.

My work is at present in an unfinished state and I fear that my means are insufficient to enable me to complete it within a short time and I am therefore induced to apply to the Colonial Government for assistance to finish it.

I shall require two years longer in continuing my researches and in preparing them for publication and I should feel grateful to obtain from the Government a moderate yearly allowance to enable me to do it. I am prepared to enter on this work at once and should this meet with approval of His Excellency and the Executive Council I shall be happy to give them such additional explanation & information as they may require and which cannot be conveyed in this communication."

Evidently La Trobe did not take the alleged first interview with Blandowski in April, 1853, to heart, as he wrote on the back: "I really do not remember Mr. B. name. Is he a person attached for a while to Mr. Selwyn's Party?" It is also obvious that the fabulous claim in the gold-fields did not bring enormous fortune, or perhaps Blandowski wanted to keep the gold for a rainy day.

Unfortunately, some important letters are missing from the State Archives, especially Blandowski's giving information about his early movements and personal connections in Victoria. It is certain that interesting correspondence was exchanged between Blandowski and the Acting Colonial Secretary between 27th May and 14th November, 1853, when the following letter was sent to Blandowski:-

"The importance of establishing a museum of Practical Geology in this Colony, in connection with the Assay Office, in which all the Mining Records of the Colony, Geological & Mineralogical reports of every description, together with the Geological Maps and Sections to serve for reference, also specimens of all the Metals, Minerals, Coal etc. should be kept — having been brought under H.E. notice. I have the honor by desire of the Lieut. Govr. to request you will be so good as to favour H.E. with your views on the subject. (Signed) L. Gilles A.C.S."

Probably, during that time, La Trobe became impressed by Blandowski's correspondence. Already on 8th November, 1853, La Trobe wrote to the Acting Colonial Secretary: "I propose that immediate steps should be taken to commence such museum and Mr. Blandowsky who offers his services, is a most suitable person to employ in the first instance."

These words were written on the back of a report by Evan Hopkins, F.G.S., dated 4th November, 1853, who offered his suggestions relating to the establishment of a Geological Museum in Melbourne. In passing, it is rather strange to note that Evan Hopkins, F.G.S., the author of several early pamphlets on the geology of Victoria and director of one of the pioneering gold mining companies in Australia, has not yet found his biographer nor had any attention paid to him by Australian historians.

On 20th December, 1853, Blandowski submitted his detailed "Memorandum" of six pages on a "Museum of Practical Geology for the Colony."

It is worth mentioning, that, when writing about the "Snow Alps and Gippsland", in his "Memorandum", Blandowski said: "my theory is that this is just the place where Victoria can look forward with great hope for the mineral beds in future and particularly in the boundaries of the Coal formation in the south and great attention is to be paid from Western Port to Wilson's Promontory where extraordinary natural powers have been at work some long time ago . . ." Not only the Latrobe Valley industries but also recent off-shore discoveries of natural gas and oil have proved how remarkable his intuition was in this field, more than a hundred years ago.

Apparently, a few days later, after submitting the "Memorandum", Blandowski sent an application to La Trobe to fill the post of official organizer of the Museum. Another application was sent by one, a Mr. Judd, probably a public servant in the Colonial Secretary's Office, but, on 30th December, 1853, La Trobe commented: "the application from a German gentleman attached to Mr. Selwyn's Party, (was) filled a few days ago." Evidently the Governor had already made up his mind to appoint Blandowski.

On the 1st April, 1854, Blandowski was indeed appointed as the first officer of the staff of the Museum of Natural History in Melbourne, in the capacity of Government Zoologist.

The Eventful Five Years

The story of the next five years, in which Blandowski acted as the Government Zoologist, is rather well known through the already mentioned works of Messrs. T. Iredale, G. P. Whitley and R. T. M. Pescott.

He was one of the eight men who founded the Philosophical Society of Victoria, on 17th June, 1854. Blandowski was appointed to the Council of this Society and, for a short time in 1856, became the honorary secretary, and was subsequently made a life member.

At the end of 1854, and early in 1855, he made several excursions to the coastal areas of Victoria and the region of McIvor and the Black Ranges, collecting numerous specimens and attempting to create the first check list of the mammals and birds of Victoria. He possessed considerable knowledge of physical geography, geology, mineralogy, palaeontology, zoology, ichthyology, botany and ethnology. His drawings were not only accurate in detail, but also had artistic merit. He described his findings in seven reports, published in the *Transactions of the Philosophical Society of Victoria,* 1855-57.

Blandowski's life was considerably affected by the person of Prof. Frederick McCoy, who, in May 1856, was appointed Palaeontologist to the Geological Survey of Victoria and who made himself responsible for the transfer of the collections of the National Museum to the University. After the transfer of the Museum, which Blandowski opposed, the antagonism between the two men deepened beyond reconciliation. The Melbourne *Argus* of 29th July, 1856, defended Blandowski, stressing his zeal and devotion to his work, and stating that "the museum almost owes its existence to him."

On 2nd December, 1856, the Government appointed him as leader of an expedition, to investigate the natural history of the region at the junction of the Darling and Murray Rivers, with a view to collecting specimens for the National Museum. He was chosen for this position by Captain Andrew Clarke. Aided by a German naturalist, Gerard Krefft, and by overcoming many personal and physical set backs, often created by his own faults, Blandowski accomplished his task, arriving in Adelaide in August, 1857, with twenty-eight boxes containing more than 17,400 specimens.

Some comments on Gerard Krefft's Manuscripts

This expedition is one of the most interesting facts concerning Blandowski's life in Australia. Fortunately we have a fairly good description of the expedition by Gerard Krefft. The Mitchell Library holds two versions of it—Mss. A.267 and A.268, the latter, which consists of 110 foolscap pages in Krefft's handwriting seems to have been rewritten and slightly enlarged from the first one, with a view to publication in England. It is rather a pity that this interesting manuscript has not yet been published.

However, the account of the expedition is certainly true but it should be remarked that Krefft was without doubt prejudiced against Blandowski and tried to make him appear ridiculously ignorant in the eyes of the reader. We do not know if this attitude was based on personal rivalry perhaps created by a difficult streak in Blandowski's character, or whether Krefft, born in West Germany, may have disliked the Silesian.

He shows Blandowski as a haughty individual, with a "very imperfect mastery of the English tongue." However, the letters, which seem to be in Blandowski's handwriting do not show any marked deficiency in syntax and his spelling is quite tolerable. Another accusation by Krefft was that he was too trusting, and too lenient with the Aborigines whom he spoiled by overpaying a "most exorbitant price" of "a shilling for every skin." It is interesting to note that the Germans accused John Stanislaw Kubary, Polish born naturalist and ethnographer of the Pacific Islands, of exactly the same "crime."

It should be stressed here, to the credit of Blandowski, that, after returning from the expedition, he wrote about Krefft in the most favourable terms: "It would, however, be unjust on my part were I not to acknowledge services, rendered to me by my assistant, Mr. G. Krefft, who, from the beginning to the end of my undertaking, most faithfully shared my lot."

Blandowski stated later that Krefft took him to the Police Court for not paying him wages and the former, evidently in revenge, there charged Krefft with the theft of some specimens.

It also seems that in all of his communications with Professor McCoy, Krefft tried to be "a nice fellow" and did his utmost to show Blandowski in the most ridiculous and unfavourable light.

In the Krefft manuscripts there are also a few marginal remarks on Blandowski's background worthy of comment. Krefft wrote that he was "formerly a military man" and in another place that he "had served in the Prussian army in the capacity of corporal." It is a puzzling point as to whether or not these references hinted at Blandowski's service in the Royal Prussian Cadets, where he could have received the titular rank of "corporal" at the age of fourteen. As a nobleman or a hereditary Knight (*Ritter von*) and educated man, Blandowski certainly was entitled, in those days, to officer's rank unless dismissed from the Cadets Corps for disciplinary reasons.

Another unsolved remark by Krefft relates to Blandowski's alleged connection with the Prusso-Danish hostilities: (Blandowski) . . . "entertained me with some incidents of the Schleswig-Holstein war to which I lent a patient ear although I had heard the story already several times." It is not clear from this whether Blandowski was directly involved in the war or had just heard in Hamburg some stories and whether he acted as a soldier or perhaps as an engineer. Blandowski's alleged participation in these hostilities, which started in April, 1848, could not have been longer than five months, as he left Germany in April, 1849. On 26th August, 1848, a cease fire was negotiated at Malmö between the Danes and the Prussians, but on 1st April, 1849, the Germans resumed the fighting and the war dragged on till July, 1850 and the Berlin peace treaty, when Blandowski was already long ago in South Australia.

The Complimentary Dinner

After his return from the expedition, the *Melbourne Argus* of 4th September, 1857, published a detailed description of "welcome home" celebrations:

> "Last evening the members of the Philosophical Institute gave a complimentary dinner to M. Blandowski, one of the most active of their society, at Wedel's Criterion Hotel, on the occasion of his approaching return to explore the district of the Lower Murray. Professor Wilson, vice-president of the institute, occupied the chair, and was supported by Dr. F. Mueller, Professor Irving, Dr. Macadam, the Rev. Dr. Bleasdale, Drs. Eades and Gillbie, Messrs. Acheson, Elliott, A. K. Smith, and others. About forty gentlemen sat down to dinner. After a very sumptous repast, placed on the table in excellent style, the chairman gave the usual loyal toasts, and then proposed the health of M. Blandowski. He said there was no one present who was not acquainted with the zeal shown by their guest in exploring the resources of the country, especially in the departments of zoology and botany. In the prosecution of his researches M. Blandowski had to encounter severe hardships, and he (the chairman) felt it a special honor to have to propose his health. (Cheers). They were all aware of the existence of a National Museum, and a good deal of attention had been aroused as to the whereabouts of it, (hear, hear, and laughter)—as to where it was deposited. (Laughter). The existence of the museum was almost entirely due to the labors and contributions of M. Blandowski, and he believed that nearly nine-tenths of the specimens had been collected by him. (Cheers). He (the chairman) felt that in proposing the health of M. Blandowski he was giving them the opportunity of doing honor to a man to whom they all felt grateful. (Cheers). The toast having been drunk with much cheering, M. Blandowski rose and said that the honor which had been done to him far exceed[ed] the services he had performed."

On 16th October, he was directed to recall his party in the field and five days later he was also informed that the wages of his party and his own allowance for expenses in the field would cease on the 31st October, 1857, but the expedition was not disbanded till 15th December. In a letter from the Deputy Surveyor of the 7th January, 1858, Blandowski was further informed, that, as the Museum of Natural History was to be placed under the control of the Colonial Secretary, he would be accordingly transferred to that Department.

The "Intended Compliments" or Little Fishes and Great Scandal

In the meantime Blandowski, on 2nd September, 1857, presented his "Preliminary Report on Recent Discoveries in Natural History of the Lower Murray" to the Philosophical Society. The Council of the Society ordered it to be published with the omission of the 'objectionable' pages dealing with nineteen new species of fishes named after prominent members of the Council (e.g. "A fish easily recognized by its low forehead, big belly and sharp spine" or "Slimy, slippery fish. Lives in mud"). The Council demanded a written explanation and later the withdrawal of his 'offensive descriptions', but he refused.

It seems that the whole city of Melbourne was talking about Blandowski's little fishes. The matter was by no means a secret as the *Argus* of 27th March, 1858, discussed it in public in its editorial:-

> " 'Put not your trust in princes' is a very old caution which in these democratic days few of us are disposed to under-value. But, without attempting to anticipate the verdict of the Committee of the Philosophical Institute, appointed to investigate certain charges against Mr. BLANDOWSKI, we feel that that gentleman has some occasion to say—'Put not your trust in philosophers.' It is not many months since the Philosophical Institute departed from its ordinary course to pay the marked compliment of a public dinner to Mr. BLANDOWSKI. The compliment, we believe, has only been paid to one other gentleman—the late Dr. SCORESBY—and we have no doubt that Mr. BLANDOWSKI felt duly gratified. But, alas, it seems that philosophers are fickle like other mortals, and, it is now in agitation whether the late honored guest of the Institute is not to be expelled from it altogether. The charge against Mr. BLANDOWSKI, so far as we understand it, is that he has perverted science and the Transactions of the Institute so far as to make the latter the vehicle for the publication of satirical commentaries upon the personal peculiarities of some of its members. The precise words in which these alleged satires are couched we do not know, but we understand that a local habitation and a name having to be given to certain newly-discovered fish, it was proposed to immortalise some members of the Institute by calling the said fish after them. Among these gentlemen were Dr. EADES and Rev. Mr. BLEASDALE. The fish called after Dr. EADES was described as having a receding forehead and a large belly. Dr. EADES seems to think that in this description Mr. BLANDOWSKI had some kind of *arrière pensée* to peculiarities in the conformation of the Doctor's frontal and abdominal regions, and the Rev. Mr. BLEASDALE thinks the same about the *tittlebat Bleasdaliensis,* or whatever the fish may be to which the reverend gentleman's name had been attached.
>
> Now, if Mr. BLANDOWSKI really did commit the offence alleged against him, we certainly think he was very much to blame. If he has any private pique against the gentlemen in question, he ought not to make the Transactions of the Philosophical Institute the instrument by which to gratify that pique with sarcastic comicalities. But what the Committee will in the first instance have to inquire into is the evidence of this fact. A mere coincidence of form between the Doctor and the fish will be quite insufficient. If the Doctor be dissatisfied with his stomach and his forehead—and we trust that his distrust of them is altogether unfounded—neither Mr. BLANDOWSKI nor Mr. BLANDOWSKI'S fish is responsible for the misfortune. One thing to

be inquired into, indeed, is whether Mr. BLANDOWSKI picked out a fish having a grotesque likeness to Dr. EADES, in his least pleasing features, and named it after the Doctor for the purpose of having a fling at him. But if not, we think the Doctor's stomach and forehead are, as it were, altogether out of court. Is the fish truthfully and properly described, or has it been misdescribed to make its caricature the more like to Dr. EADES? As a scientific man Mr. BLANDOWSKI could 'nothing extenuate' the big belly of his ichthyological finding, although he was equally bound not to 'set down aught in malice' against Dr. EADES. In short, to speak as gravely as we can on so irresistibly comic a subject as the disputes of these scientific gentlemen about the personal charms and resemblances of themselves and their specimens, mere coincidence of similitude will afford no evidence at all. There must be adequate proof that in the description the resemblance was established and heightened with malice prepence.

If so, we certainly think that Mr. BLANDOWSKI has been indulging in an improper place in very misjudged and reprehensible pleasantry. But even on the assumption that this can be established, we do not think that Mr. BLANDOWSKI'S offence merits the capital punishment of expulsion from the Philosophical Institute. The philosophers in the course of their researches into what is rare and curious, may have fallen upon the remark, that *nemo mortalium omnibus horis sapit,* and Mr. BLANDOWSKI might be allowed the benefit of assumption that he was in an exceptionally foolish frame of mind when he did, if he did it, the thing charged against him. Make the most of Mr. BLANDOWSKI'S alleged offence, and it yet affords insufficient grounds for expelling from the ranks of the Institute a gentleman who has the reputation of being one of the most zealous men of science that this Colony contains—a gentleman whose abilities and exertions have been recognised in so very marked a manner by the Philosophical Institute itself. Men of this kind are not so plentiful with us that they ought at once to be flung off in disgrace for the inconsiderate and ill-timed jest of a moment.

Although we cannot help thinking that in the present instance the Philosophical Institute has placed itself in a somewhat ridiculous light before the public—for who would ever thought about Dr. EADES'S stomach and forehead, in connection with the peculiarities of the unlucky fish, if his (the Doctor's) friends had not so agitated the matter, and insisted upon the resemblance—we feel also for the sake of the Institute, and its great capacity for public usefulness, that it is a great pity that the dispute under consideration should have been fomented to its present height."

The Fruitless Debate

About three weeks later the *Argus,* of 15th April, 1858, dedicated two full columns to the meeting of the Philosophical Institute of Victoria, discussing the charges against Blandowski and the findings of the Committee appointed to inquire into the circumstances of the resignation of Professor Wilson. "The Committee, on carefully examining the alleged offensive plates and descriptions, could find nothing to justify the professed grievances of Professor Wilson and the Rev. Mr. Bleasdale, especially when the said plates and descriptions were compared with the general mass of which they formed a part. The general tenor did not seem to be departed from in the particular cases. At the same time, the Committee were of opinion that Mr. Blandowski had no right, without having previously sought permission, to have named certain fishes after certain individuals, and from this oversight they believed the present unfortunate difference to have arisen." Lieutenant Amsinck moved that the report be received and Mr. Elliott seconded the motion.

Then Captain Clarke rose and delivered a long speech criticizing the Committee and its findings "and concluded by moving that the report be not received." The motion was most cordially seconded by Mr. Miller, the only member of the Committee opposing the report.

"Lieutenant Amsinck vindicated the Committee from the slur which had been cast upon it by Captain Clarke, and alleged that he had himself gone into the matter with the most entire independence of feeling . . . Lieut. Amsinck proceeded, at length, to defend the conduct of the Committee, and to assert the independence of its action, and the impartiality of the report."

Dr. Macadam regretted that the attempt at personal caricature was part of Mr. Blandowski's system. He complained that the Committee had not taken personal evidence.

Mr. Schultz defending the Committee said that "looking to the merits of the case, he could conscientiously say he did not see how people could be so very sensitive as Mr. Bleasdale and Professor Wilson had been."

Mr. Elliott read an extract from a letter from Mr. Blandowski to the Council, in which it was stated that the fish named after Dr. Eades had been selected from the drawings by Dr. Eades himself to whom Mr. Blandowski showed his portfolio in the Public Library, and that Dr. Eades had himself written his name under it; but Dr. Eades indignantly denied the allegation contained in this letter.

"Professor Wilson totally disclaimed having sent in his resignation from any feeling of personal pique towards Mr. Blandowski, but he had done so solely on the ground that Mr. Blandowski had sent descriptions of fish which were no descriptions at all, and would literally have damned the Institute as a scientific body in the eyes of every institution in Europe. (Loud cries of 'Hear, hear')."

Dr. Knaggs stated that he "had served most unwillingly upon the Committee, and had actually gone into the Committee-room prejudiced against Mr. Blandowski; but after a careful inspection of the documents and descriptions, he felt convinced that the most critical acumen could not have discovered anything offensive in it."

After another attack by Rev. Bleasdale, Blandowski "said the fishes were correct drawings from nature, and the numerals attached to particular parts of them referred to a proper description which was to have been duly furnished. The paper was purely a preliminary one, and nothing more. Dr. Eades might possibly have forgotten the circumstances under which he had written his name under the fish which bore it. He would not, as a well-known public man, reply any further to the various insinuations thrown out against his character.

"Dr. Eades rose abruptly and said he deeply regretted to have to deny upon honor as a gentleman that he had ever selected a fish as Mr. Blandowski had said."

"Mr. Blandowski continued at great length to defend his conduct. He also vindicated his entire right to name animals after any person he thought proper, however related to them, without asking thier permission."

Further arguments were given by Mr. Hough who said that "now Mr. Blandowski persisted in his alleged right to name animals after individuals without seeking their permission. Looking to the whole facts, and the tone assumed by Mr. Blandowski, that gentleman had made out a case against himself."

The president of the Institute, Sir William F. Stawell, summed up the debate, stating that "he fully concurred to all that had fallen from Dr. Eades, who certainly had reason to feel aggrieved by the manner in which his name had been drawn into the report." . . . if the Institute should not receive their report the matter would be *in status quo,* and it was undoubtedly competent to the Institute not to receive the report, although perhaps it would be rather individious not to do so."

"The motion for the reception of the report was then put, and lost, by an overwhelming majority, about 10 hands only being held up for it. Mr. A. K.

Smith then moved, 'That the resignations of Professor Wilson, and the Rev. Mr. Bleasdale be not accepted.' Dr. Robertson seconded the motion, which was carried almost unanimously."

Evidently at the next meeting a motion asking Blandowski to resign failed through the lack of a two-thirds majority of votes. There is no doubt that some members of the Institute supported his stand. He lost much of his interest in the Society, but as a member of the Exploration Committee attended meetings till March, 1859.

The Commission of Inquiry

On the 21st April, 1858, Blandowski addressed a letter to the Governor of Victoria and the Executive Council, asking them to decide his precise position in the Public Service because he stated, that on sending in the quarterly abstract ending 31st March, 1858, for payment of his salary, he was informed that the Colonial Secretary was not aware that he held any appointment in the Public Service.

As a result of this application Captain Charles Pasley, R.E., and Captain Joseph H. Kay, R.N., were appointed by the Government to investigate the matter and Blandowski's grievances.

It should be pointed out here that, in March 1858, he was reported by the Board of Science of the Public Lands Office, that he never reported back for duty at the Museum "having been absent without leave for upwards of seven months" (Pescott, *Collections of a Century,* p. 13).

On 18th November, 1858, the afore-mentioned Commissioners delivered to the President of the Board of Land & Works a report of 18 pages, as the result of their inquiry. Among various findings it was stated in this document that "On the 7th June, 1854, Mr. Blandowski was appointed Curator of the Museum of Natural History with a Salary of £400 per annum and £250 per annum as an equipment allowance, and from Documents in the Department of Public Lands which we have inspected, it would appear that his Salary was defrayed from the Territorial Revenue, which was not placed under the control of the Legislature until the end of the year 1855. After that period we consider it to have been Captn. Clarke's intention that Mr. Blandowski should receive the same Salary, because we have ascertained that on the 31st October, 1856, he addressed the Treasurer informing him that Mr. Blandowski was rated as an Assistant Surveyor of the 1st Class with a Salary of £400 per annum; and it appears to have been necessary to place Mr. Blandowski on the Staff of Assistant Surveyors, and to convey this information to the Treasurer, in order to obtain payment of the Salary which it was intended he should receive."

Further on the Commissioners stated: "This application of Mr. Blandowski [of 21st April, 1858] was referred to the Department of Public Lands, and the Surveyor General in a Minute of the 29th states that no intimation was at any time made to Mr. Blandowski from the Surveyor General's Department to the effect that his services were no longer required by the Government, and that in the Estimates for 1858, provision had been made for Mr. Blandowski's Salary in the capacity of Zoologist to the Government. The substance of the Surveyor General's Minute was communicated to Mr. Blandowski. We are of opinion that Mr. Blandowski has reason to consider himself still in the Public Service, and that he is entitled to receive Salary at the rate of £400 per annum up to the present time, as it does not appear that he has at any time received an intimation, that his services were no longer required."

Proceeding upon Blandowski's claim for payment of the amount of £237/6/9, which he divided into three items—wages of 3 men for one month £41/10/0, field equipment allowance £116/13/4 and extra expenses £79/3/5—the Commissioners agreed that he "has established his claim for reimbursement of this sum of £41/10/0—as it is reasonable to infer that his men demanded payment of wages from him, until such time as their wages were liquidated in full."

The second item was dismissed: ". . . we do not think Mr. Blandowski is entitled to the additional sum he claimed."

Only part of the third claim was considered to be "a legitimate charge upon the Public Funds" namely £3/10/0 for "purchasing a rare specimen" and "freight of specimens from the Murray via Adelaide to Melbourne—£30/19/0"—"provided that he produces vouchers of these payments."

In closing the report the Commissioners recommended "that previous to a final settlement of his claim" he should be called upon to produce all the memoranda and drawings in his possession.

It would seem that it was a most crucial point for Blandowski, when he received a letter from the Surveyor General requesting him to deliver to the Office all drawings and memoranda relating to the Natural History of the country, made during the period when he held an appointment in the Government Service. His reaction was prompt and he replied the same day, 23rd November, 1858: "I deny . . . the justice of this demand, and as I regard these papers and drawings my private property, I must decline to allow them to pass out of my hands. In conclusion I may add, that although, I have held my appointment under many Governments, to various members of which I have repeatedly shown my drawings, no former Government has ever laid slightest claim to them."

The next day Blandowski had a conversation with the Surveyor General, which evidently took a more conciliatory turn and was reflected in a much milder strain in the letter of 24th November:

> "I have since reconsidered your letter and my reply, I have also sought the advice of a friend of mine, a barrister, who has always taken a great interest in the progress of science in this Colony, and whose opinion I much value, and I have come to the conclusion that the view, I took, as a foreigner, was incorrect. I now beg to request . . . to withdraw my letter of the 23rd Nov. . . ."
>
> "My drawings and memoranda are contained in 16 large bound volumes and many loose papers, they extended over 10 years, and are miscellaneously arranged. A very large proportion of them are derived from my private experience in South Australia, another considerable portion are also the results of my own private experience of this country before I was connected with the Government of Victoria.
>
> "The memoranda and drawings which I have made in any way connected with the subject of your letter during the period I have been an officer of the Government, were made by me without exception during my own private time and in my leisure hours, and in all instances my energies have been devoted to the earnest fulfilment of my official duties.
>
> "I have never withheld any specimens or information which I have obtained, from the Government or Public. I have contributed to the Museum of which I was the Curator many hundred specimens collected by me, either before I held any official appointment or beyond the range of my official duties.
>
> "I have submitted most of the Portfolios containing such drawings and memoranda to the late Governor, to Capt. Clarke and many others connected with the Government, who were at the time of their inspection perfectly aware of the fact that I openly represented and considered them my private property and intended at some future period to present them to the Public as the fruits of my observations of the whole continent of Australia and not merely of this colony.
>
> "I am happy to say that I have received from these distinguished gentlemen ample encouragement to strengthen me in this intention. The drawings and memoranda relative to the Colony of Victoria are interspersed as above stated, with the other various memoranda made

before I was in the Government Service in S. Australia and here in Victoria.

"I am perfectly willing to produce them for the inspection of the Government at all times when required, but I think I am reasonably entitled to decline to part with the possession of such bound books and notes having regard to the circumstances above mentioned.
"I regret to be obliged to add that having expended large sums of my private means exceeding at least two thousand pounds in furthering the advancement of science in Australia the delay of the settlement of my claims against the Government in peculiarity to me a matter of serious importance."

As a matter of fact Blandowski never gave up this material and took it with him to Europe.

The List of the Specimens

During the proceedings of the Commission of Inquiry, Captains Pasley and Kay requested from Blandowski the list of specimens collected during the expedition. On 29th October, 1858, he sent a letter of three pages and a classified list also on three pages. In the letter he stated "That no specimen collected by me or my party is in my possession, and that I have neither destroyed, sold, exchanged or given away any of the specimens booked under the 3,000 numbers of the voluminous printed catalogue forwarded to the Chief Secretary."

He wrote further, without any explanation, "That upwards of six hundred specimens have been given from the National collection to His Royal Highness the Prince of Württemberg."

He suggested also "That it would be desirable to examine the report of Mr. Selwyn who in conjunction with dealers examined the specimens in the University collected on the expedition to the Lower Murray and to compare his report with that furnished by Professor McCoy to the Editor of "Facts and Figures" and with the numbers in my list, and the specimens now in the University."

The "List of specimens of Natural History collected by Mr. Blandowski & Party on the Lower Murray from 4th December, 1856 to 15th December, 1857 and delivered to Prof. McCoy at the University" covered three pages and ended with "Recapitulation" arranged in the following order:

Species					
?	Stones, fossils and sundry specimens			358	
?	Insects			4202	
13	Shells			8484	
19	Fishes			247	
52	Reptiles			866	
183	Birds	skins	1864		
		skeletons	164		
		eggs	309	2335	
22	Marsupial animals	skins	565	436	
		skeletons	86		
12	Not Marsupial animals	in spirit	91	306	
301?		Grand total		——	17,434

The Baltic Barque and the Farewell Letter

On 21st January, 1859, a Prussian barque was observed outside Port Phillip Heads and the next day she arrived in Melbourne. She was the *Mathilde,* of 452 tons, under the command of Captain Albert August Ballaseyers, 128 days out of Danzig, carrying a cargo of typical contemporary imports from Prussia and Poland: deal, pieces of timber, spars, cases of cordials and clothing. It was Blandowski's ship of destiny.

His position in Melbourne became very difficult, as it appears that he did not receive any payment from the Government after the end of 1857 and, as he stated later, he was actually starving. Without doubt he often visited Captain Ballaseyers on board the *Mathilde,* and discussed his future.

On 4th March, he wrote another letter to the Colonial Secretary:-

> "As Mr. Ligar assures me, that he has long ago transmitted to the Government a report after examining my drawings etc. stating, that they would be of no use to the Government; and as you have stated in your place in the Legislative Assembly, that the Government intended to pay me a sum of money in accordance with the report of the Board of inquiry which recently investigated my case, I have the honor to request, that you will be good enough, to pay me the amount due to me with the least possible delay, as this continued postponement of the final settlement of my pecuniary claims on the Government has been direct the cause of great embarrassment to me."

The *Argus* of 12th March, 1859, announced the projected departure of the *Mathilde* for Batavia. The same day Blandowski wrote his farewell letter addressed to the Governor of Victoria:-

> "I have the honor to represent, that circumstances, over which I have had no control, compell (*sic*) me to abandon in these Colonies, those favorite (*sic*) pursuits of mine, to which, for the last 10 years I have devoted that earnest and exclusive attention, indespensable (*sic*) in original inquiries.
>
> Permit me, with all due respect, to state, that the inexplicable inconsistency of the Heads of the Departments, to which I had the honor for a period of 5 years to belong, and their unscientific spirit displayed in taking, what I cannot, but term an unfair advantage of my local experience, together with the frequent political changes of these Heads of Department have rendered the combined effects of my opponents, only too successful in shaking my position in the service.
>
> I feel most deeply, that the interest and support of your Excellency have proved decisive in my case at a moment, when official difficulties, appeared as unsurmountable impediments in the path, by which I intended to set myself right with the Government and the Public; but now nevertheless in consequence of the extraordinary and I may say, arbitrary proceedings against me, I am forced to take refuge again in my fatherland, and am driven from the field of my labors, where I had hoped to make myself of some little use both to the Colonist and to the world at large. At the very time, when I have been able, to make my scientific labors available, my whole means of subsistence, were unexpectedly cut off; and others, are reaping the benefits of my original observations, and pirating the materials collected by me under much personal privation and at the sacrifice of all my little pecuniary savings.
>
> I have bitterly to complain of no information whatever having been given me wether (*sic*) my future services would be required or otherwise, as Governments of all civilized nation (*sic*) have the custom of giving their servants some due official notice when their services

are no longer wanted—and I am entirely at a loss to understand the reason why this was omitted in my case.

A merchant Captain, a countryman of mine, hearing of my position, has, like a good samaritan, offered me a passage home, which, as my only alternative I have accepted.

I regret, that the absence of your Excellency from town, prevented me, from thanking you in person, for all the courtesy and support uniformly shown me; but I beg to accept my best and sincerest acknowledgements for the same.

I shall ever retain the highest respect for the English Nation, altho' my experience of Colonial treatment in the service, has exceptionable (*sic*) left so unfavorable an impression on my mind."

An interesting inscription can be seen on the margin of this letter: "Mr. Blandowski called today & handed a series of Plates which he begs His Ex-cy will accept, he leaves Melbourne this afternoon for home." It would be interesting to know whether these plates found their way into the Mitchell Library collection or represented some different examples of his works.

The *Mathilde,* with Blandowski on board, actually left Melbourne on 17th March, 1859, and next day passed through Port Phillip Heads. It should be stressed, that on his departure from the Colony of Victoria Bandowski received from the Government a payment of £475, comprising his salary for the year 1858 and remuneration for some of his claims regarding alleged expenses during the expedition to the Lower Murray. Apparently this payment was made after the afore-quoted "farewell" letter of 12th March. It seems that in spite of his sometimes odd and extravagant behaviour he was fairly well treated in Australia.

The East Indies Interlude and the London Foray

On 5th October, 1860, Blandowski described his journey in a letter written to the Governor of Victoria, Sir Henry Barkley:-

> "When I left Melbourne on the 17th March 1859, I had no time to inform your Excellency that the Chief Secretary of Victoria had at the hour of my departure ordered, that the sum of money which was by the Commission of Inquiry in my case decided upon, should be paid to me at once. I therefore did not accept the liberal offer of my countryman, but as I had arranged to go with him. I started with his Prussian Bark "Mathilde" via Batavia (!-) to Europe, making use of my time, satisfied with a poor board, bad accommodation and long voyage. I made observations along the Southern and Western coast of Australia and upon the Sea of Java. The ship arrived at Batavia after 40 days voyage, and during the 6 Weeks which the vessel required for taking a load of Rice, Sugar and Spices, I applied my time in making myself acquainted with the fauna of Java in order to compare them with thus (*sic*) of Australia. We left on the 4th June Batavia and after calling for provisions at St. Helena I landed in Plymouth, on the 4th October after a four months voyage. I left the latter place shortly for London with my Portfolios and Documents bearing upon my labors in Australia, in order, to lay them before the leading men of science for examination. I explained to them the nature of the claims which the Colonial Government of Victoria laid to my works, the circumstances under which the materials were collected by me, and requested advise as to *how I ought to answer it.* I did this advisedly, knowing, that by my receiving money, which had been admitted due to me, the Government withdrew the original claim (of 23rd Nov. 1858) upon my Portfolios and Papers, but nevertheless I was willing to submit to the decision of those men as to the right of the claim."

"The Opinion of Men of Science in London"

When back in his native Silesia, Blandowski published a pamphlet of 10 pages (9 x 11 inches) under the heading *The Opinion of Men of Science in London, of Wilhelm von Blandowski's Ten Years Labor in Australia 1849-1859.* The first four pages are in English and the remaining six in the German language.

The English section is composed of the following eight letters by Prof. Thomas Huxley, Sir Roderick Murchison, Sir William Hooker, Prof. Owen, Charles La Trobe, Admiral Sir Edward Belcher, Admiral Fitz-Roy and Sir Paul Strzelecki.

The Government School of Mines
Jermyn Str. Oct. 28, 1859

My dear Mr. Blandowski.

Having examined your Zoological Drawings and notes with as much care as the time at my disposal would permit, I have no hesitation in expressing my sense of their scientific importance. The drawings of Fishes particularly, appear to be most carefully executed and all the details essential to the discrimination of species to be rested in such a manner as to give them great value.

Again my personal acquaintance with Australia justifies me in so far travelling beyond my own especial line of work, as to say, that I have been much struck by the manifest truthfulness and strong local character of your representation of the natives and of the country.

I should greatly regret the existence of any obstacles to the working out and publication of researches which appear to me to be the result of so much long and conscientious labor; and with respect to the particular question on which you have asked my advice, I am of opinion, that you should, in the first place, apply to the Colonial Government for the means of publishing the results of your investigations; the work to be carried out under your own control and superintendence, but to be the property of the Government when published.

I am further of opinion that should the Colonial Government not think fit to accede to these conditions you will be perfectly justified in publishing your labors in any way you think proper.

I am faithfully yours

Thomas H. Huxley, F.R.S.
Professor of Natural-History,
Government School of Mines.

W. v. Blandowski Esq.

Geological Survey Office,
28, Jermyn-Street S. W. Octob. 28, 1859.

Dear Sir,

From what I have seen of your maps, sketches and drawings, I willingly add to the commendation of Professor Huxley the expression of my hope, that such valuable documents, illustrative of two of our important Australian Colonies, may be satisfactorily published.

I think that the proceeding which Prof. Huxley has suggested is well advised and I trust that the Colonial Government may consider it advisable to publish the result of your labor of nine years.

Yours truly

Roderick Murchison,
Director General
Geological Survey and School of Mines.

W. von Blandowski

Royal Gardens Kew Nov. 1, 1859

Sir,

It is impossible, I think, for any one to see the drawings (accompanied by several Engravings) of Scenery, Ethnology, Geology, Natural-History in general etc. of our Colonies in S. Australia, without feeling an anxious desire that such materials should be published, if it were only on scientific grounds.

Perhaps I ought to con. [fine] — my laudatory opinion to the botanical objects, unfortunately, as I think, confined to four excellently engraved plates of the habit and aspects of certain forms (Tree ferns, Gumtrees &c. for example), and to the drawing of the curious Cestphyllon-Fungus, accompanied by a representation of the perfect insect. These seem to me to be very true to nature and of great interest to the Botanist. It would give me great pleasure to learn that such excellent figures met the approbation of the Government and Parliament of Victoria, and that they [were] very likely to be published, with scientific descriptions, for the use and enlightenment of the scientific World.

I am, Sir,

Your very obedient Servt.

W. J. Hooker

To William von Blandowski

Sheen Lodge Mortlake Richmond-Park
November 1, 1859.

Dear Sir,

It would give me great pleasure to see your descriptions and drawings of the Natural History of the parts of Australia which you investigated, published, either as an official Colonial Work by order of Government, or by some Scientific Body having the requisite funds at Command for the due illustration of your numerous and valuable observations.

Believe me . . . truly yours

Rd. Owen

Mr. Wm. von Blandowski etc.

Atheneum, den 17 Nov. 1859.

Sir,

There can be no doubt but that the production of such a work as you project, is highly desirable, and that if fully carried out while materials for the illustration of the aboriginal races of Australia, their habits, and rude productions are still within reach such work would hereafter possess a very high degree of interest.

You appear to have had many opportunities and to have given much diligence to the selection and preparation of materials for such a work as far as I am able to judge by my cursory glance at your Portfolio yesterday, and I shall be very glad to hear that you succeeded in your endeavour to engage the attention and patronage of the Colonial Government in carrying out such undertaking.

I have the honor to be . . . Sir

Your obt. Serv.

C. J. Latrobe

Herr von Blandowski

Union-Club, Nov. 16/59.

Dear Sir,

In reply to your question if, "I have had on my return from a scientific Expedition to give up to the Government all my crude notes, drafts of manuscripts, rough sketches &c. or only a digested Report of the same?"

I have no hesitation in informing you that, *only carefully digested Reports,* except in case of Larch Arctic Discovery, are expected, and that in *every case* where originals have been given in *sealed,* they have invariably *returned* as *Private Property* and for the *free use* of the parties who made them and each Officer who has served under me has, without the possibility of dispute, enjoyed this power.

Now, with regards to the Drawings which I had the pleasure of inspecting, at our friend Admiral Fitz-Roy's, I can confidently state, and I am sure I shall be supported by all the Authorities on Natural History, that they should be engraved and *described* at the Expense of Government. And in saying this I assert, that, for materials of *infinitely less importance* the Government have granted sums equal to £1000-£1500-and £2000.

I think if your work is submitted to Gray—Richardson—Owen—Lovell Reeve—Gould—and others you can with their signatures go to the Colonial office with confidence.

Believe me

Yours very truly

Edward Belcher

London, 38 Onslow Square, Nov. 21, 1859.

Dear Sir,

May I request that you will allow me to take advantage of your kind offer to take charge of a packet for Professor Dove—our mutual friend, and, in Meteorology, our Master most highly esteemed?

And may I, without arrogance or presumption attempt to express, in a word, how exceedingly valuable I believe the results of your nine years sojourn in the southern hemisphere will be found—not only by real Meteorologists (few indeed) but by Naturalists of first rate eminence and by philosophers—in addition to all the well informed public.

As a draughtsman and physiognomist—(sufficiently so, to appreciate the works of others)—I have been struck by the fidelity and acumen evident in your drawings—and in figures especially.

In meteorology—it appears to me that we think much alike: as you will discover by reading my last paper, read at the Aberdeen Meeting of the British Association.

I remain Dear Sir,

Faithfully yours

Rob. Fitz-Roy

William von Blandowski Esq. etc.

Nov. 28, 1859.

Dear Mr. Blandowski,

Excuse the delay of this in answer to your letter of Wednesday last which was occasioned by my inability of communicating with Mr. Longmann sooner.

I am very glad to perceive from your letter that you approve of my suggestion made to you regarding the exhibition of your valuable collection of Victorian Colony in Berlin, and I have no doubt, that your labours will be appreciated there, and be recommended to the appreciation of the Public here.

Thus putting you in a fair way of success either in reference to your intended publication, or your intended further researches in Australia.

As to the right you claim to the possession of the manuscripts which you showed me, you have according your own statement, such valuable opinion upon the subject of Admiral Fitz-Roy and Sir Edward Belcher both of whom commanded H.M. Expeditions, that you should rely upon their decision more, than upon that of any one else. My opinion is not worth much as I never was employed by the Government, but still I think, that as you have delivered the collection of specimens of Natural History for which you engaged yourself with the Colonial Government, you have a perfect right to every thing else.

I should have done myself the pleasure of communicating to you verbally what I am writing but for my rather sudden departure from London.

Your most truly

P. E. de Strzelecki

William v. Blandowski Esqr.
18, Montague-Street.

The English part of this pamphlet closes with the line on the bottom of the page: "Printed from the Documents by Gustave Neumann in Gleiwitz (Upper Silesia, Prussia)."

The German part consists of an address to the Royal Academy of Sciences in Berlin, dated 18th April, 1860, in Gleiwitz, Upper Silesia, and a list of nine enclosures: (1) The afore-quoted correspondence; (2) some plates (the original matrices in steel and copper were then still in the hands of Blandowski: *"die Orginale in Stahl und Kupfer sind noch in meinen Händen"*) and photographs taken by him in the corresponding spots; (3) sketches; (4) a large map of Australia, showing the main zones of vegetation, fauna and inhabitation of Aborigines and some geographical features; (5) a list of birds and reptiles; (6) a book called "Birds", forming part of a manuscript on birds and reptiles of Australia, prepared from his own and Gould's observations; (7) a collection of articles and cuttings from Victorian newspapers, referring to Blandowski; (8) his Curriculum vitae; (9) miscellaneous documents.

The next three pages consist of letters and opinions of German scientists, Doctors Ehrenberg, Von Olfers, Dove and Klotzsch—while on the last page there is a "Who's who" of these four gentlemen with a description of their qualifications, degrees, honours, etc.

Dr. von Olfers, the Chief Director of the Royal Museum in Berlin remarked, that as regards Zoology the collection represents a "treasure of characteristic drawings, particularly reptiles and fishes, and among them also some less known fresh water fishes" (*"Aus der Zoologie ist ein grosser Reichthum von characteristischen Zeichnungen da, besonders von Reptilien und Fischen, und unter diesen auch von den weniger gekannten Süsswasserfischen"*).

The Letter to the Governor of Victoria

This pamphlet was sent to the Governor of Victoria, Sir Henry Barkly, together with a long letter of seven foolscap pages in small, close writing, dated in Gleiwitz on 5th October, 1860, in which Blandowski again poured out all his grievances and grudges against the Governmental Departments in Victoria, Captain Clarke, Professor McCoy and others. The letter was divided into 19 long paragraphs and it would take far too much space to quote it in extenso, but perhaps a few sentences are worth quoting to illustrate the vein in which it was written:-

"When I established first the Museum of Natural History, the funds of the Colony were so exhausted that, by the outlay's born by my own pecuniary means, only, the foundation of the said Establishment was made possible . . ."

"During the disastrous monetary calamity of the year 1855 I had to pay the labourers' wages and other current expenses of the Museum out of my own pocket . . ."

"The quite illegal and highly insulting steps, which has been even taken by the Crown Solicitor on the 26th June 1858 (through his clerke (*sic*) Mr. Morran (*sic*)) in penetrating without a warrant, twice under some pretence my private domicile, was highly injurious to my good name in the society, to my future prospects in the Colony detractory, to my health destructive and to my reputation tarnishing . . ."

"I ought to mention, that I left a copy of 34 Plates being part of the work on 'Australia terra cognita' in the library of the Houses of Parliaments (*sic*) in Melbourne for the inspection of the members of Government and Parliament. It was originally intended to contain 200 similar Plates in one Volume with about 4000 objects of Natural History of Australia for which I hold the Materials in readiness. The explanatory letterpress to those plates will occupy about two Octavo Volumes . . ."

"I therefore beg for the grant of means for the proper publication of my labours in conformity with the advices I received in London and Berlin. All this sinister combinations enumerated in the foregoing paragraphs have caused me the loss of means, moreover, may deprive me of the fruits of my many years labors, and, in appealing finally to the known justice of your Excellency and an english (*sic*) Government for redress of grievous wrongs I suffered in the Colony, that such will be done to me satisfactorly (*sic*)."

The letter ends with this rather naive and curious appeal:- "I now beg the Government to dismiss from their mind (*sic*) any unfavorable impressions respecting me, derived from the insinuations of certain mischevious, selfish, unworthy and intriguing persons, who have become my enemies . . . I beg now to treat them either with indignity and do me justice . . . The virtue of Englishman consists in giving to every one what is his due—and that is justice—only for what I desire." He signed himself "Government Zoologist of Victoria (now in Gleiwitz—Upper Silesia—Prussia)".

It is no wonder that this letter did not arouse any enthusiasm, or bring forth any positive result from Melbourne. The Chief Secretary of Victoria made a comment referring to the report from Capt. Pasley, R.E., and Capt. Kay, R.N., stating that "£475 was all he was entitled to" and that his intended publication concerned the "whole Continent of Australia and not merely of this Colony."

In His Native Silesia

Unfortunately, very little is known about the life and activities of Blandowski after his return to Silesia.

In 1860, he published two short articles, of about 400 words each, in the annual *Jahresbericht der Schlesischen Gesellschaft fur vaterlaendische Kultur* (Breslau), pp. 60-61 "Ueber die geographische Verbreitung der Voegel und Saeugetiere Australiens" and pp. 61-62 "Kurze Uebersicht der wichtigsten zur Erforschung Australiens unternommenen Reisen." In spite of this he was neither a member nor even a correspondent of the Silesian Society as his name cannot be found on the list for the 1860-77 period.

A larger article on Australian Aborigines, entitled "Ueber die ureinwohner Australien", was published by him in *Naturwissenschaftliche Gesellschaft Isis*, Dresden, 1861, No. 10-12, pp. 101-110.

In December 1862, Blandowski published a brochure of 52 pages *Australien in 142 photographischen Abbildungen*, Gleiwitz, printed, like the first pamphlet, by Gustav Neumann. Except for the "Kurze Uebersicht . . .", which was found in the Wroclaw University Library during my recent research, the aforementioned three publications are known to Australian biographers of Blandowski. Unfortunately, no more information has come from this Library and no further references to Blandowski have been traced.

The search made in Gliwice also brought no result. Professor Jan Lubicz-Pachoński of Cracow was good enough to engage all his seminary on this quest, and the Registry Office, Museum of Gliwice, the Treasury Department's Records and the old cemeteries of Gliwice were searched by the students without any trace of Blandowski, or his family. According to Professor Pachoński's information, the local archives and collections were mostly destroyed during the last war and few documents prior to 1870 have survived.

An important discovery was made recently by Gilbert P. Whitley of Sydney in the Mitchell Library, being a letter from Baron Von Mueller to Mrs. Krefft, dated 10 Nov. 1881, with the following information: "The friends of the family of the late Mr. Blandowski applied also to me from Breslau on their behalf and all I could do was to advise them to ask through the German Consulate your Government to purchase his drawings and manuscripts, in the elaboration of which more than 25 years ago, your husband gave of his help." It could be presumed from this letter that Blandowski died about 1880 probably in Breslau, where the family kept his drawings and manuscripts. So perhaps any future research should be directed to Wroclaw (Breslau) and not Gliwice.

It should also be mentioned that as late as October 1870, Blandowski tried, through the German Consul, to make some claims against the Government of Victoria through the Treasury Department, but certainly without result.

The Closing Remarks

The Australian writers, Tom Iredale, Gilbert P. Whitley, E. Troughton, R. T. M. Pescott, and Geoffrey Serle, have described Blandowski as an important pioneer in the early history of Victoria. Pescott also rightly commented on the "unforgiveable failings of Blandowski in the latter years of his residence in Australia" (*Collections of a Century,* p. 20) and Dr. Serle on the "awkwardness of his personal relations" (*The Golden Age,* Melbourne, 1963, p. 366). There is no doubt that he was an ambitious, eccentric, stubborn, impulsive, quarrelsome individualist, but these psychological features are much less important today than results of his work. The sixteen bound volumes of his notes, 4,000 sketches, maps and plates would be most interesting material for the history of the development of science in Australia. As R. T. M. Pescott stated, Blandowski "collected a number of native mammals that are now extinct in this area and, as far as National Museum records show, have never been collected there since" (*op. cit.,* p. 13) and that ". . . the detailed observations and measurements made [by him] of the birds and mammals would have been extremely valuable to modern scientists" (*op. cit.,* p. 9).

However, the City of Wroclaw was extensively devastated during the last war, then known as the "Fortress of Breslau", there is still a hope that a scrupulous survey of the Breslau newspapers of the late 1870's will reveal Blandowski's obituary and the whereabouts of his family. Perhaps such priceless material still exists today in Poland or Germany; anyway its fate should be established.

Also more research will be needed in Australia to fill the blank pages in Blandowski's life during the years 1850-52, and more should be known about his alleged exploration of Cape York, Moreton Bay, Twofold Bay and other places on this continent.

Acknowledgements

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I am also very grateful to Mr. Gilbert P. Whitley of Sydney for valuable notes and advices; to Dr. Geoffrey Serle of Melbourne for bibliographical notes; to Mr. Bernard K. Pilewski of London for genealogical and heraldic information; to Prof. Jan Lubicz-Pachoński of Cracow, Poland, for information and search at Gliwice and to Miss Nona D. Lucas of Box Hill, Vic., for kind help in preparation of the typescript.

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EXPLANATION OF PLATES I-III

Plate I. Title page of the first paper by Blandowski, published in Melbourne, 1855.

Plate II. Blandowski's encampment on the Lower Murray (after drawing by Gerard Krefft), from the *Illustrated Melbourne News,* February 6, 1858.

Plate III. First from four plates which were attached to Blandowski's "Preliminary Report on Recent Discoveries in Natural History of the Lower Murray"—and omitted from the publication. The modern names of the fishes in the plate are: 1, Freshwater Catfish, *Tandanus tandanus* (Mitchell); 2, Bony Bream, *Fluvialosa richardsoni* (Castelnau); 3 and 4, Silver Perch (young and adult), *Bidyanus bidyanus* (Mitchell).

(All three plates by courtesy of the La Trobe Library, Melbourne).

SHARKS OF THE AUSTRALASIAN REGION

By G. P. Whitley

(Honorary Associate, The Australian Museum, Sydney*)

(Plate IV; text-figs. 1-2).

In 1940, the Royal Zoological Society of New South Wales published a handbook concerning sharks, stingrays, etc., in which an epitome of what was known about Australasian sharks was given (Whitley, 1940). During the ensuing 26 years, sharks have been studied sporadically from several viewpoints: as sources of vitamin-rich oils, as food, as a danger to man, and to some extent taxonomically and biologically. So some scattered information has been gathered concerning sharks' food, their migrations, growth, sex-ratios, size at maturity and of embryos, but the data are inconclusive as regards most of the species because, for worthwhile results, each must be studied over a long period from many specimens in a given area, and this has been impracticable. My own notes, not the result of full-time study, are very incomplete. Some new species were discovered and named and some biological data have been published elsewhere (see References). Points worth stressing in comparing allied species seem to be their sizes, especially lengths at which they first reproduce, numbers of vertebrae, numbers of embryos in each litter and whether or not they are separated by compartments in the uterus. The sizes of gummy sharks, for example, differ on the eastern and western sides of Australia.

SIZE AT FIRST BREEDING OF SHARKS

Total lengths at which certain sharks first breed:—

Molochophrys galeatus—about 2 feet.
Galeolamna dorsalis—mature about 5½ feet.
Galeolamna pleurotaenia tilstoni—breeding male 4 feet, female 5 feet.
Galeolamna eblis—breeds at about 10 feet.
Galeolamna macrurus—breeds at (about 10 feet), certainly at 12 feet.
Galeolamna cauta—breeds at 4 feet.
Galeolamna spenceri—mature at 5 feet.
Galeolamna fitzroyensis—ovulating at 4 feet.
Galeocerdo cuvier—breeds at 11 feet 8 inches or less.
Mapolamia spallanzani—mature at 4 feet 3 inches.
Koinga kirki—gravid at 2 feet.
Notogaleus rhinophanes (School Shark)—matures at nearly 4 feet.
Rhizoprionodon—gravid at 19 inches to 2 feet.
Protozygaena taylori—gravid at about 2½ feet.
Furgaleus ventralis—breeds at just over 4 feet.
Emissola antarctica—male matures at about 32 inches.
Emissola ganearum—breeds at 4 feet.
Flakeus—matures between 2 and 3 feet.
Proscymnodon—breeds at about 4 feet.

BROOD

The number of embryos in a litter varies enormously, the female tiger shark, for example, may bear from 10 to 63 embryos. Some sharks have more young in one uterus than the other. Egg-layers usually produce 1 or 2 eggs in a clutch, but the brood-numbers of most sharks are not yet known. *Emissola antarctica* has generally 3 to 7 embryos in New South Wales, 5 to 23 in New Zealand. The Western Australian *E. ganearum* has 13 to 22.

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* Presented at the Eleventh Pacific Science Congress of the Pacific Science Association, held at the University of Tokyo, Japan, August-September, 1966, and organized by the Science Council of Japan.

Data are sparse for Australasian Sharks but the following field-notes give at least an approximate idea of the situation.

The dog shark, *Flakeus,* has 1 or 2 embryos and *Koinga* has 5 to 7.
Rhizoprionodon acutus has 2 to 6 embryos in a litter.
Lamna whitleyi has 3 embryos in a litter.
Brachaelurus waddi has 7 embryos in a litter.
Furgaleus ventralis has 11 embryos in a litter.
Notogaleus rhinophanes has 23 to 50 embryos in a litter.
Sphyrna lewini—has 25 to 40 embryos in a litter.
Centrophorus plunketi—36 embryos in a litter.
Orectolobus maculatus—37 embryos in a litter.
Carcharhinus mackiei—46 embryos in a litter.

In the genus *Galeolamna* there is diversity in numbers of embryos according to species:

G. pleurotaenia tilstoni has 2 to 5 embryos in a brood;
G. dorsalis has 10; and *G. macrurus* has 10 to 18.

The number of embryos may be less an indication of zoological relationship than a function of size at motherhood or some ecological requirement of the shark concerned. Embryos are all together in the uterus of the Western Australian *Emissola ganearum.* They are in separate compartments in *E. antartica* also in *Galeolamna cauta, G. dorsalis, G. pleurotaenia tilstoni, Notogaleus rhinophanes* and in *Furgaleus ventralis,* though in the last-named the compartments are very thin and easily torn or overlooked.

VERTEBRAE

V. Springer and Garrick (1964, Proc. U.S. Nat. Mus., 116: 73-96, pl. i) have tabulated many vertebral counts for sharks. I add the following from my field notes, based, not on X-rays, but on dissections.

Oxynotus bruniensis, 92 vertebrae.
Emissola ganearum, 124 vertebrae.
Galeolamna cauta, 160 and 163 vertebrae.
Galeolamna eblis, 174 vertebrae.
Galeolamna spenceri, 185 vertebrae.
Mapolamia spallanzani, 193 and 195 vertebrae.

Not only the total number of vertebrae may be of importance in separating species or races, but the numbers of vertebrae between the skull and certain well-defined levels along the body.

A few examples are given in Table 1.

COMMENTS ON SELECTED SPECIES

From an annotated list of some 116 Australasian sharks which was tabled at the Science Congress at Tokyo, the following were selected for comment.

(1) *Molochophrys galeatus*

A Crested Port Jackson Shark hatched from an egg in Taronga Zoological Park Aquarium, Sydney, in April 1938 and, after 11¾ years, itself laid eggs. The growth-rate of the young shark has been recorded in *Proc. Roy. Zool. Soc.*

TABLE I.—VERTEBRAL COUNTS OF SOME WESTERN AUSTRALIAN SHARKS

Name	Sex	Total length (mm.)	Total no. of vertebrae	To below origin of first dorsal	To below second dorsal origin	To over ventral origin	To over anal origin	To between ends of bases of anal and second dorsal fins.	To root of tail.
Galeolamna cauta	♂	965	163	26	—	—	64	—	86
Galeolamna cauta	♀	918	160	25	66	—	—	—	90
Galeolamna eblis (Allotype)	♂	1375	174	31	69	—	70	—	87
Mapolamia spallanzani	♂	1265	193	30	87	57	86	95	113
Mapolamia spallanzani	♀	1090	195	30	86	58	84	95	114
Emissola ganearum	♀	1375	124	21	48	33	54	—	74

N.S.Wales 1942-43 (1943): 11, *et. ibid;* 1948-49 (1950): 28. In February 1950, this shark was 28½ inches long and weighed 8½ lb.

(2) *HemiscyHium strahani,* sp. nov.

There is a new species of *Hemiscyllium** from New Guinea, alive in Taronga Park Aquarium, Sydney, where it has been in captivity since about 1960 without showing any evident growth (except for a slight increase in length in 1966) or colour change. It differs from its congeners in coloration.

Mouth nearer end of snout than front edge of eye. Pupil oblique, slit-like. A fold behind mouth across chin. Head widest at gills. Back without dermal ridges.

Dorsal fin-angles extended behind, not rounded. Dorsal fins slightly larger than ventrals. Origin of first dorsal fin behind level of base of ventral; barely over its lobe. Pectorals and ventrals rounded. Anal fins shorter than subcaudal fin. Female. Head 120 mm.; total length 2 feet, 5½ inches (measured 23rd May, 1967).

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*Family *Hemiscylliidae*

Genus *Hemiscyllium* Muller & Henle, 1838.

Hemiscyllium Muller & Henle, 1838, Mag. Nat. Hist. (n.s.), 2 January 1838: 34 (genus caelebs). *Id.* A. Smith, 1838, Proc. Zool. Soc. Lond., 5, 1837 (publ. 13 Feby 1838): 86. Haplotype, *Squalus ocellatus* Bloch. *Id.* Muller & Henle, 1838, Syst. Plagiost. (1): 16. Haplotype, *H. ocellatum* (Gmelin). The original author of *ocellatum* was Bonnaterre, 1788, Tabl. Encycl. Meth. Ichth.:8, from "La mer du sud" [probably Cooktown, Queensland]. The genus was reviewed by Fowler, 1941, Bull. U.S. Nat. Mus., 100 (13): 81. *Hemiscyllium ocellatum* has been observed in Taronga Park Aquarium, Sydney, to stay close to the bottom of the tank during the day but Mr. Douglas Boness of the aquarium staff tells me that the sharks are liable to jump out of the water at night. Females lay two eggs every fourteen days and they take 120 days or so to hatch, but the egg-cases are sometimes chewed or eaten by males. The egg-case gapes at the top and the developing embryo can be readily inspected from about 2 months after oviposition. One newly hatched juvenile (4 days or less old) was 147 mm. in total length on 23rd May, 1967. Uusually they average 5½ inches in length on hatching and are cryptozoic, entering shells or holes in rocks. They are cream and blackish banded, rather like young *Chiloscyllium punctatum* but with the dorsal fins more dark-spotted. The characteristic ocelli of *Hemiscyllium ocellatum* appear soon after hatching. Mr. Boness kept one specimen under separate observation in water of 80°F. temperature and reported on its development as follows.

Egg laid 7th November, 1963, opened by hand 12th March, 1964, the yolk-sac was the size of a match-head and the young shark was 5 inches long when removed from the egg. On 17th March, 1964 it was eating prawn, the yolk-sac having been absorbed. On 15th April, it measured 6¼ inches, and on 22nd July, 6¾ inches, the bands becoming spots; on 1st October, 1964 it was 8 inches long, light cream with more distinct spots; on 23rd April 1965, 12½ inches long with colour-markings as in parents; on 16th May 1965, it died by jumping from its tank and was 13 inches long.

Another embryo, after 5 weeks in its egg, was very active and had external gills and a large yolk-sac.

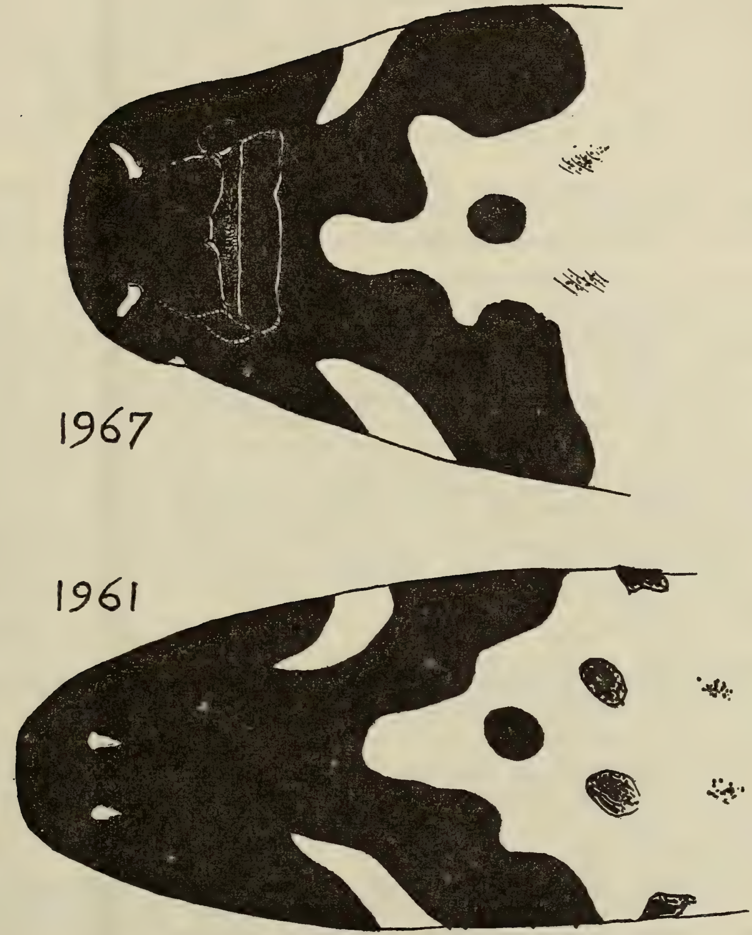

Figure 1.—Holotype of *Hemiscyllium strahani* from New Guinea. Sketches, natural size, of ventral surface of head in the years 1961 and 1967. The nasal tentacles are spread laterally and the mouth-parts are indicated in the 1967 sketch.

Colour, in life, yellowish-brown of various shades. Nose black. Fourteen dark brown cross-bars along back from interorbital to tail; these generally divide before reaching ventral surface. Most of the upper parts, before the tail, with milky spots, each about size of eye. A dark ocellus behind last gill-openings. Fins narrowly edged white. Areas between brown cross-bars cream to yellowish. Most of ventral surface of head black but tips of nasal cirrhi are cream and a lunule of lighter colour extends into the black area on each side; posteriorly the breast is light with several round black spots. The black areas of ventral parts of head come up over cheeks and snout. Spiracle cream with brown spots. Two dark brown marks on each dorsal fin anteriorly. The dark ocellus behind last gill-slit is much smaller than that of *ocellatum* or *trispeculare*. Inside of mouth cream.

Loc.: New Guinea. Unique holotype in Taronga Zoological Park Aquarium, Sydney. I have seen nothing like it in aquaria in Asia and elsewhere.

Named after Mr. Ronald Strahan, M.Sc., Director, Taronga Zoological Park.

Hemiscyllium hallstromi, sp. nov.

Also living in Taronga Park Aquarium are two specimens of a larger species than *strahani*, which differ from it, *freycineti*, *trispeculare* and *ocellatum* in coloration, notably in having no spots on the head before the interorbital. Its ground-colour is very pale golden tan on which are large, dark brown spots; the chin is light-toned. The large ocellus behind the gill-slits is partly surrounded by four or five other large ovate spots. The spots on body and fins are larger and fewer than in other species and with very much wider light interspaces. About eight cross-bars do not descend below the back, which is otherwise white from just before the first dorsal fin backwards. Fins edged cream; pectorals plain or with very few spots. Eye light blue with oblique slit-like pupil.

Dorsal fins with pointed lobes. First dorsal origin over posterior part of ventrals. Slight median dorsal ridge. First dorsal little larger than ventral fin. Anal fin much shorter than subcaudal. Less than 30 dark spots along middle of sides.

Loc.—New Guinea. Holotype male and paratype alive in Taronga Zoological Park Aquarium, Mosman, Sydney.

I have pleasure in naming this new species after Sir Edward Hallstrom, K.B., F.R.Z.S., Director Emeritus of Taronga Park.

(3) *Rhincodon typus*

The Whale Shark has been seen off the eastern Australian coastline on many occasions and several more times since the records were listed in *Australian Natural History* June 1965: 44-46, 3 figs.

(4) *Galeolamna* spp.

The Whaler Sharks (as species of *"Carcharhinus"* and *Galeolamna* are named in Australia), are notoriously difficult to identify. There is a tendency by some authors to unite various nominal species into one, or a few, variable species, but it seems to me that this course is unwise, because there are obviously more kinds than are usually recognized, their characters are fairly constant, and their sizes at first maturity often differ markedly so that interbreeding appears to be prevented. Data are incomplete but, as far as is known, *G. eblis* and *G. macrurus* breed when about 10 feet long whilst many of the other species breed before attaining 6 feet in length. As Stewart Springer (1938) observed, "I have no doubt but that the size range of adults is a useful character for the separation of species."

Because the type-species of *Carcharhinus* is still in doubt and modern attempts to select one seem to involve departing from established canons of nomenclature, I use Owen's genus *Galeolamna* for the Whaler Sharks, the holotype of the type-species of which, *G. greyi*, I examined years ago in the museum of the Royal College of Surgeons in London. (See plate IV).

(5) *Galeocerdo cuvier.*

Australasian data are not detailed enough to sketch the life-history of the Tiger Shark, but may link up later with information from extralimital sources. Length-weight ratios are approximately as follows.

4 feet = 22 lbs.
11 to 12 feet = 710-825 lbs.
12 to 13 feet = 850-1151 lbs.
13 to 14 feet = 1028-1395 lbs.
14 to 15 feet = 1183-1324 lbs.
15 to 16 feet = ?
16 to 17 feet = 1300 lbs.
18 feet = 3330 lbs.

Females up to 10 feet long have been found to be immature but they breed at 11 feet 8 inches and at just over 12 feet. A very variable number of embryos may be produced, up to 2 or 2¼ feet in length.

According to Messrs. Joyce & Watkins' Fremantle (Western Australia) fishery returns, small and large tiger sharks were caught at all times of the year, but there were waves of small ones in October (about 5 to 7 feet), January and April (4½ to 6 feet), and by May large ones (10 feet or longer) were coming in again.

In New South Wales, the tiger shark has been taken in August, but is usually caught between November and April.

(6) *Emissola* spp.

The White-spotted Gummy Sharks of Western Australia are much larger than those of New South Wales, Victoria and Tasmania and are specifically distinct. New South Wales gummies, *Emissola antarctica,* have a total length of 900 mm. or less and a weight of up to 5¾ lbs. (modal class of trawled specimens 751 to 800 mm; most frequent weight between 4 and 4½ lbs.). New South Wales females are larger, up to 1250 mm. (weight 18¼ lb.): modal class 851 to 900 mm.; most frequent weight, 6¼ to 6½ lb. Males are mature at 800 to 880 mm. (32-35 inches).

Bunbury (Western Australia) gummies, *E. ganearum,* observed in June-July 1943, were: one male, 1285 mm. long = 16 lb., and 8 females, 1040 to 1354 mm. = 10½ to 28 lb. (average 1235 mm. = 20 lb.), but off Albany (W.A.) on 5th October 1943, a female of 1570 mm. = over 45 lbs. was caught. This specimen had 16 embryos, 8 male and 8 female, 305 to 330 mm. long.

(7) *Carcharodon albimors.*

Gunther, in 1880, estimated that a White Shark from Port Fairy, Victoria, would have been 36½ feet long, and Bigelow & Schroeder give the allied species' maximum size as about 21 feet long and 7,100 lb. in weight. Vertebrae of a Tasmanian specimen said to have been 28 feet long, are exhibited in the Queensland Museum, Brisbane.

Mr. A. Dean hooked one 16 ft. 10 in. long and weighing 2,664 lb. at Ceduna, South Australia in April 1959. The smallest Australian one was noted as 7 ft. 5 in. long, weighing 130 lb. in commercial returns from Fremantle, Western Australia.

The smallest free-living white shark was just over 4 ft. from Algoa Bay (J. L. B. Smith) and the *Illustrated London News* once illustrated a 14 ft. female from Alexandria, Egypt, weighing 2½ tons (5,600 lb.), with at least nine embryos, 2 ft. long and weighing 108 lb. A mature male Great White Shark, in mating condition, from Florida, U.S.A., in February 1967, was 11 ft. 1 in. long and weighed 1,060 lb. (Anon., 1967, Cape Haze Mar. Lab. Quart. Newsletter, March 1967:2).

In view of Postel's (1958) observation that the white shark appeared regularly off the coast of Tunis in the latter half of May, I have drawn up a rough, and admittedly incomplete "calendar" of occurrences off Australia's coasts from which the following picture emerges.

Most of the big-game specimens are taken in South Australian waters in January, although September and November to April captures have been made there. In Victoria it has been taken in April and July; in New South Wales in October and from January to June; in Queensland in May and June. Perhaps a leisurely and not very direct migration is indicated, or the sharks may stay near whales or in suitable regions. I have no monthly details from New Zealand. Mr. A. Dean, who has caught many large South Australian specimens, states (1966) of *Carcharodon,* "Despite a proved capacity for long migrations individuals favour a particular area and will repeatedly return to it." One female shark he recognized from a characteristic scar after 13 years; her weight had apparently not increased.

(8) *Halsydrus mccoyi.*

I have seen the remains of the Orkney Islands "Sea-serpent" in the Royal College of Surgeons' Museum, London, on which the genus name *Halsydrus* was based; they were those of a basking shark.

A contribution towards a bibliography of the basking shark is appended (Appendix A).

For cosmetic purposes, the ladies of Japan are anxious to obtain squalene, an oily preparation from basking sharks and dogfishes. Since, however, the ladies of Japan are already beautiful it seems a pity to sacrifice such uncommon and interesting animals as basking sharks and the less known squaloids like *Centrophorus* for this purpose. In the past, seals have been decimated for their pelts, egrets and other birds have been slaughtered for their plumes, and many rare and lovely creatures have vanished in the fleeting cause of fashion. The basking shark is mainly known in Australasia from beach-strewn examples, about 27 of which have been noted from literature and museum specimens from 1883 when McCoy discovered it in Victoria until 1956 (See Table II).

When months of occurrence have been reported they have been May, September and November for Victoria; May, August and September for New South Wales and, for New Zealand, February, April, May "every [Southern] spring" and "summer months", August, October, November and December.

Size of specimens has been from about 8 ft. long to 34 ft. 3 in. (N.Z., 1889), usually between 9 and 13 feet and with perhaps a peak in the graph at 25 feet.

Sex in most cases was not reported but when this was mentioned there were 6 males to 1 female, an unreliable ratio and contrary to the findings of Harrison Mathews (1963) in Old World seas.

(9) *Euprotomicrus bispinatus.*

Recorded from westward of Australia by Bigelow and Schroeder in 1957, the latest information on this species has been put on record by Parin (1964, Trudy Akad. Nauk SSSR. Okeanol. 73: 163, etc., figs. 2-4).

Acknowledgments

Most of the work upon which this paper is based was done in the field in different States of Australia and in Papua during the 1940's when the author was employed by the Council for Scientific and Industrial Research; the rest, (in Australia, New Zealand and some Pacific Islands) during his term as Curator of Fishes at the Australian Museum, Sydney. To both these institutions he is grateful for laboratory and library facilities. Thanks are also due to Miss Elizabeth Pope, of the Australian Museum, who kindly dissected sharks selected from the catches of the Red Funnel Trawlers of Sydney. The co-operation of officials of the State Fisheries Departments in Perth, Hobart and Melbourne is gratefully acknowledged. Information was also derived from shark-meshing

contractors, fish markets, fisheries statistics and records of anglers' catches, but considerations of space will not allow for full details to be included here. Mr. D. Boness of Taronga Park Aquarium, Sydney, has also been helpful in several ways.

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TABLE II.

Australasian records of Basking Sharks.

No.	Date	Locality	Remarks	Recorder
1	1883, Nov.	Portland, Victoria	Length 30' 6", ♂. Fed on pteropods	Macleay, 1883 & 1884; McCoy, 1885, pl. 104; Barrett, 1932.
2	1902, May	Off Williamstown, Hobson's Bay, Victoria	12' 11", ♂.	Kershaw, 1902.
3 & 4	—	Port Fairy, Victoria	♀ & half-grown ♂.	Kershaw, 1902.
5	1889, Nov.	Near mouth of Wade River, near Devonport, N.I., New Zealand	34' 3"	Cheeseman, 1891; Waite, 1907.
6	1901, May	Twofold Bay, New South Wales	9'.	Waite, 1902.
7	1901, Aug. 14	Eden, New South Wales	10' 6" ♂, fed on *Munida subrugosa.*	Waite, 1902; Bridge, 1904 and Gudger, 1915.
8 & 9	—	South Australia	8' & 10'	Zeitz, 1908.
10	—	Fowler's Bay, South Australia	25' ♂, cast in S. Austr. Museum.	Waite, 1921 & 1923.
11	—	Auckland, New Zealand		Phillipps, 1924.
12	"every spring"	Whangaparaoa Peninsula, New Zealand		
13		Banis Bay, Tasmania		Lord, 1927.
14	1914	South Australia		Anon., a. 1956.

15		Great Australian Bight		Ward & Fountain, 1907, as *Rhinodon.*
16	1918, Dec.	Te Mingi, Paraparaumu, near Wellington, New Zealand	28' 6"	Phillipps, 1946.
17	1930, Sept.	Mungo Beach near Myall Lakes, New South Wales	25'	A. L. Marshall, 1931; Whitley, 1934 & 1940.
18	1929, Dec.	Off Kapiti Island, near Wellington, New Zealand	Several seen	by W. J. Phillipps.
19	1931, April	Wairoa, Hawkes Bay, New Zealand	12', spotted.	Phillipps, 1946.
20	1932, Feb. 7	Off Wellington wharves, New Zealand		
21	1932, May 14	Makara, New Zealand	17' 2", ♂	Phillipps, 1946.
22		Wellington etc., New Zealand	12' 10"	Phillipps, 1946.
23		Encounter Bay, South Australia	10' 6"	Hale, 1932.
24	1934, Aug.	Kapiti, New Zealand	12' 10"	Phillipps, 1946.
—		New Zealand	Feeds on zooplankton.	McCann, 1954.
25		Port Taranaki, New Plymouth, New Zealand (12th N.Z. specimen).	9' = 134 lb.	Newscutting, about 1958? and MS. photo. by J. A. F. Garrick.
26	1956, Sept. 11	Warrnambool, Victoria	About 20'.	Anon., b, 1956.
27	1956, Oct.	Off Goose Bay, Kaikoura, New Zealand	16'. Fed on plankton. "Shoals [of basking sharks] seen off the west coast of South Island [New Zealand] in summer months."	Anon., c, 1956.

The above list has been compiled from the literature; possibly other specimens have been taken commercially but not recorded.

APPENDIX A.

Contribution towards a bibliography of the Basking Shark.

A splendid bibliography of the Basking Shark, covering publications from the earliest times to about the year 1941 was provided by Bigelow & Schroeder (1948: 147). In 1931, Mr. W. J. Phillipps of the Dominion Museum, Wellington, New Zealand, and I compiled a manuscript synonymy of the Basking Shark and detailed its occurrence in Australian and New Zealand seas. Our account was never published but we independently included briefer references to the Basking Shark in separate papers of ours published since 1931. The *Zoological Record* for recent years has supplied numerous references to reports of Basking Sharks, mainly from the Northern Hemisphere. There is, therefore, no need to traverse the ground covered by the above sources, nor to particularize mention of the Basking Shark in various editions, translations, or secondary accounts of such authors as Cuvier; moreover, a number of local European and Japanese publications are unavailable for consultation; but a supplementary list of references, mostly additional to those in Bigelow & Schroeder (1948) and in recent *Zoological Records* is offered below in the hope that it may contribute to a better understanding by later students of the biology of the Basking Shark.

Although no Basking Sharks appear to have been washed ashore or captured by Australians or New Zealanders for a decade or so, the species has come under the notice of Japanese commercial interests.

The first reference to the possible occurrence of the Basking Shark in the Pacific Ocean was not a satisfactory record: in Frederick Debell Bennett's *Narrative of a Whaling Voyage around the Globe* (London: Bentley), vol. 2, 1840: 240, we read:

"While cruising in the South Pacific, we occasionally observed . . . "Bone-sharks" . . . If we admit that an error exists on the subject of there being whale-bone in its mouth, it appears probable that the Bone-Shark is allied to, or identical with, the Basking-shark (Squalus maximus) . . ."

Bennett was in the whaler *Tuscan* from 1833 to 1836. He was not near Australia or New Zealand, so his "South Pacific" more likely refers to the Marquesas or Society Islands, from which, however, the Basking Shark seems never to have been recorded.

The next Pacific record appeared in "Forest and Stream" in 1877, according to Dean's *Bibliography of Fishes*. As no Australian library holds this publication, I applied to the Library of Congress, Washington, U.S.A. for information. Mrs. Winifred Desmond, of that Library kindly supplied xerox copies of two articles from *Forest and Stream* of vol. 7, 1877; 356 and 8:17. The former, by M. Harvey, was entitled "The Basking Shark in Newfoundland Waters" and reported one found there in August 1876; 30 feet long, *Selache maximus*. The second paper, "The Basking Shark in the Pacific", by E. R. Wilson, states that he had seen the whalemen's "Bone Shark" in the South Seas and on the coast of Africa. In 1861, he saw one between Tumbez and Guayaquil, Ecuador, and in 1859 saw barrels of basking shark oil shipped to Callao, Peru. Thus Wilson's Pacific records were not Australasian.

Australasian records of Basking Sharks from the 1880's to the 1950's are listed in Table II. An indication of world distribution is given in figure 2.

"Seehunde" Goyeau, 1760, Hamburg Mag., 24:531 (*fide* Muller & Henle, 1839 and Dean, 1923).

"Brygd-Fisk" Fries, 1772, K. Svensk. Vet. Akad. Handl. 157 and Kiobenh. Selsk. Skr., 10, 1772: 202 (*fide* Dean, 1923).

Squalus maximus Berkenhout, 1795, Synopsis Nat. Hist. Gt. Brit., ed. 3, 1: 61, no. 10, ex Pennant. *Id.* Blainville, 1811, Ann. Mus. Hist. Nat. Paris, 18c: 88, pl. 6, fig. 1 (not seen). *Id.* Hunter, 1834, Cat. Comp. Anat. Mus. R. Coll. Surg., 2:63 & 86. *Id.* Jenyns, 1835, Man. Brit. Vert. Anim., Nov. 1835: 563, no. 193. *Id.* Richardson, 1836, Faun. Bor. Amer. 3:291. *Id.* Templeton, 1837, Mag. Nat. Hist. (Charlesw.), 1:413. *Id.* Owen, 1852, Descr. Cat. Comp. Anat. Mus. Roy. Coll. Surg., ed. 2, 1:51, 145 & 203. *Id.* Smyth, 1854, The Mediterranean: 204. *Id.* Montague, 1861, Dict. Univ. Hist. Nat. (D'Orbigny), 9: 549. *Id.* Schlegel, 1869, Nat. Hist. Neder., Visschen: 191, pl. 19, fig. 1.

Scoliophis atlanticus Anon., 1817, Rept. Comm. Linn. Soc. N. England on Serpent: 44 (*fide* Sherborn, Index Animalium). New England.

Selache maxima (*-us, -um*) Agassiz, 1835, Poiss. Foss., 3:87, pl. F, figs. 8, 8a. *Id.* Swainson, 1838, Nat. Hist. Classif. Fish. Amphib., 1:119. *Id.* Allman, 1842, Fourth Ann. Rept. Dublin Nat. Hist. Soc., 1841-42, *fide* Wright, 1877. *Id.* Bonaparte, 1846, Cat. Metod. Pesc. Europ.: 17, no. 62. *Id.* Baird, 1868, Amer. Agricult. 27:130 (*fide* Dean, 1916). *Id.* Hadfield, 1875, Zoologist (2) 10: 4415 (Isle of Wight, England). *Id.* Allman, 1876, Nature, 14:368. *Id.* Wright, 1877, Nature 15:292 and 16:61. *Id.* Lutken, 1880, Vid. Medd. Kjobenh., 1879: 45 & 62 and Tidsskr. Pop. Frems. Nat., 26:56. *Id.* Macleay, 1883, Abstr. Proc. Linn. Soc. N.S.Wales, Nov. 28, page iii and Proc. Linn. Soc. N.S.Wales, 8, 1884: 464 and 9, 1884:62, *ex* McCoy, MS (Portland, Victoria—first Australian record). *Id.* Macleay, 1886, Proc. Roy. Soc. Tasm. 1885:300. *Id.* Cheeseman, 1891, Trans. N. Zeal. Inst., 23:126 (Wade R., N.Z.). *Id.* Grieg, 1897, Naturen: 85. *Id.* Collett, 1903, Forh. Vidensk. Selsk. Christ., 1:121. *Id.* Murie, 1906, Zoologist, 10:396. *Id.* Mazzarelli, 1908, Riv. Mens Pesca Pavia

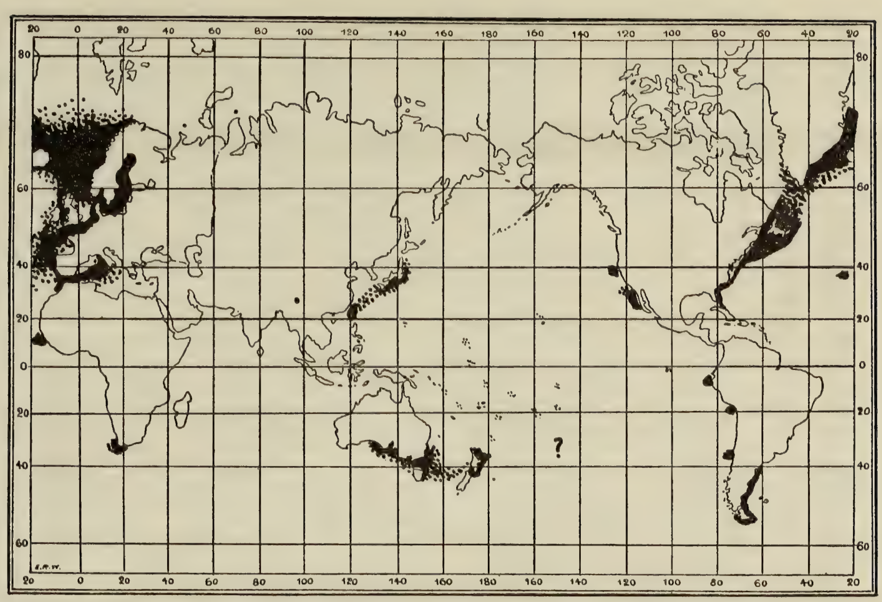

Figure 2.—World distribution of the Basking Shark.

Letters indicate type-localities for the earliest names given to regional forms, as follows:

A. *maximus* Gunner, 1765 (and 14 synonyms). Europe.
B. *angiova* Rafinesque, 1810 (2 syns.). Mediterranean.
C. *atlanticus* Anon., 1817 (2 syns.). United States of America.
D. *maccoyi* Barrett, 1932. Australia.
E. *normani* Siccardi, 1960. South Atlantic.

The Japanese form does not appear to have been separately named.

10:165, and Parona, *in ibid.*: 263 and Monti, *in ibid.*: (2) 5, 1910:158. *Id.* Parisi, 1912, Riv. Sci. Nat. Milano, 3:221. *Id.* Senna, 1920, Monitore Zool. Ital. Firenze, 31:35, pl. 3 (skull). *Id.* Saemundsson, 1922, Vid. Medd. Dansk. Foren., 74:190 *et ibid.*, 84, 1927: 183, pl. 5, 2 figs (Iceland). *Id.* Valle, 1922, Congress Gen. 28 Soc. Pesca Trieste: 31, 4 figs. *Id.* Vinciguerra, 1924, Rend. Union Zool. Ital. Genova: 36. *Id.* Jenkins, 1925, Fish. Brit. Isles: 314, pl. 122.

Id. Refs. in Zoological Records for 1932 and 1933. *Id.* Fraser Darling, 1947, Natural History in the Highlands and Islands: 171, coloured pl. 27a (p. 220). Female swims in front of male as they cruise.

Squalus rhinoceros Gill, 1864, Proc. Acad. Nat. Sci. Philad., 1864: 259, in synonymy, ex DeKay, 1842. Maine, U.S.A.

Selache rostrata Pavesi, 1874, Ann. Mus. Civ. Stor. Nat. Genova, 6:36, pls. 1-3. Italy.

Selache sp. Gunther, 1880. Intro. Stud. Fish.: 322.

Selache pennanti Noetling, 1885, Faun. Tertiary Prussia: 49. New name for Pennant's Basking Shark, regarded as distinct from *S. maxima* Day, Cornish—*fide* Grant, 1886, Zool. Rec., 1885:17. England.

?Selache glauconitica Noetling, 1885, Faun. Tertiary Prussia: 49. Fossil.

Rhinodon Aflalo, 1896, Nat. Hist. Austr.: 221 & 249. Australia. Not *Rhincodon* Smith, 1829.

Cetorhinus (Selache) maximus Boulenger, 1904, Cambr. Nat. Hist.: 453, fig. 259. *Id.* Escribano, 1909, Bol. Soc. Espan. Hist. Nat., 9:340, pl. (Portugal; *fide* Dean). *Id.* Dean, 1923, Bibliogr. Fishes: 619.

Rhinodon typicus Ward & Fountain, 1907, Rambles of Austr. Nat.: 120 (Great Australian Bight. Record unreliable). Not *Rhincodon typicus* Muller & Henle, the South African Whale Shark.

Cetorhinus sp. Leriche, 1908, Comptes Rendus Acad. Sci. Paris, 146:875. Fossil, fide Zoological Record.

Selache (Cetorhinus) maximus Gudger, 1915, Zoologica, 1:382.

Cetorhinus maximus McCoy, 1885, Prodromus Zool. Vict. 2 (dec. 11): 11, pl. 104 (Portland, Victoria). *Id.* Ogilby, 1889, Proc. Linn. Soc. N.S.Wales, (2) 3:1772, ex McCoy. *Id.* Lucas, 1890, Proc. Roy. Soc. Vict. (2) 2:45, ex McCoy. *Id.* Kershaw, 1902, Vict. Nat., 19:62 (Hobson's Bay, Vic.). *Id.* Waite, 1902, Rec. Austr. Mus., 4:263 (Eden, N.S.Wales). *Id.* Jordan & Fowler, 1903, Proc. U.S. Nat. Mus., 26:625 (Japan, ex Matsubara). *Id.* Stevenson, 1904, Rept. U.S. Fish. Comm. 28, 1902: 227. *Id.* Bridge, 1904, Cambr. Nat. Hist., 7:453 (Australian waters). *Id.* Stead,, 1906, Fish. Austr.: 233. *Id.* Waite, 1907, Rec. Canterb. Mus., 1:6 (New Zealand). *Id.* Zietz, 1908, Trans. Roy. Soc. S. Austr., 32:291. *Id.* Elmhirst, 1913, Glasgow Nat., 5:66. *Id.* Jordan, Tanaka & Snyder, 1913, J. Coll. Sci. Tokyo Univ., 33:17, fig. 8. *Id.* Engelhardt, 1913, Sitzb. K. Akad. Wiss. Berlin, 4, Suppl.-Band 3: 35 & 97, fig. 3 (distribution). *Id.* Gudger, 1915, Science, 42:653. *Id.* McCulloch, 1919, Austr. Zool., 1:223, fig. 24a and Illustr. Austr. Encyclop. 1, 1925:142. *Id.* Waite, 1921, Rec. S. Austr. Mus., 2:22, fig. 29 and Fish. S. Austr., 1923:41, fig. *Id.* Phillipps, 1924, N. Zeal. J. Sci. Tech., 6:266, fig. 10. *Id.* Dixon & Eddy, 1925, Personality of Water Animals: pl. opp. p. 105 (large American specimen). *Id.* Jordan & Hubbs, 1925, Mem. Carneg. Mus., 10:102. *Id.* Lord, 1927, J. Pan-Pacif. Res. Inst. 2 (4):12 (Banis Bay—new rec. Tasmania). *Id.* Bonnot, 1929, Calif. Fish & Game, 15 (2):175. *Id.* Berger, 1930, Nat. Hist. (New York), 30(4):443. *Id.* Phillipps, 1930, Arch. Hydrobiol., 21:499. *Id.* A. L. Marshall, 1931, Education Gazette (Sydney), 25 (2): 20, fig. (Near Myall Lakes, N.S.Wales, notes and photo. Teeth in Australian Museum, Sydney). *Id.* Chu, 1931, Biol. Bull. St. John's Univ., 1:3 (China). *Id.* Norman, 1931, Hist. Fishes: 39, fig. 18d (gill-rakers). *Id.* Tanaka, 1932, Jap. Fish., no. 21, and of later Japanese authors. *Id.*, as "Basking Shark", Hale, 1932, 48th. Ann. Rept. Mus. S. Austr., 1931-32:9 (Encounter Bay, S. Austr.). *Id.* Fang & Wang, 1933, Contrib. Biol. Lab. Sci. Soc. China (Zool.), 8 (8):243, fig. 13. *Id.* Norman, 1933, Proc. Zool. Soc. Lond., 1933:1121 (Falkland Iss.). *Id.* Tchang Si, 1933, Bull. Soc. Zool. France, 58: 423, fig. 1. (Abnormal branchial apparatus of Chinese example). *Id.* Young & Mazet, Shark! Shark!: 266, etc. *Id.*, as "Basking Shark", J. G. Marwick, 1934, Orcadian, Feb. 1, 1934 (Low's "Natural History of Orkney" (1813) quoted). *Id.* A. E. Cooper, 1934, Lonsdale Library 17, Sea Fishing: 105 (Shetlands, etc. Nearly 8,000 lb.). *Id.* Borri, 1934, Atti Soc. Toscana Sci. Nat. Pisa, 44: 93, figs. & ref. to 1929 paper on p. 102. *Id.* F. de Buen, 1935, Not. Res. Inst. Esp. Oc. (2) 88: 6, 9, 16 & 29, fig. 20. *Id.* Walford, 1935, Calif. State Fish. Lab. Fish. Bull., 45: 39, with original figure. *Id.*, as "Blue-nosed shark" Sphere (London), Sept. 10, 1938: 400, fig. (Weymouth, England; 12 ft.). *Id.* McKenzie, 1939, Proc. Nova Scotia Inst. Sci. 20 (1):14 (Nova Scotia, up to 10,700 lb. according to graph). *Id.* Gudger, 1940, Science 91:357 (Norway). *Id.* McKenzie, 1940, Proc. Nova Scotia Inst. Sci., 20 (2):42 (25¼ ft. should have weighed 7,200 lb.). *Id.* Refs. in Zoological Records, various years. *Id.* Beebe & Tee Van, 1941, Zoologica, 26:98, fig. 4. *Id.* Chapman, 1942, Copeia, 1942(1):51 (Washington). *Id.* Bonham, 1942, Copeia, 1942 (4):264, figs. (claspers). *Id.* Navarro, 1943, Bol. Real. Soc. Esp. Hist. Nat., 41:55 (Balearics). *Id.* Hart, 1946, Discov. Rept., 23: 259, etc. (Patagonia). *Id.* Barnard, 194-, Pict. Guide S. Afr. Fish.: 14, pl. 2, figs. 4a-b (South African recs. Summer migrant). *Id.* Hillaby, 1948, Discovery, 9: 369, 10 text-figs. *Id.* Scattergood, 1948, Copeia, 1948 (2):143 (Gulf of Maine). *Id.* J. B. Phillipps, 1948, Calif. Fish & Game, 34:11, figs. *Id.* Fitch, 1948, Calif. Fish & Game, 34:219, figs.

77-78 (California). *Id.* Gudger, 1948, J. Elisha Mitch. Scient. Soc. 64:41, pl. 7, figs. 1-2 (grows to at least 45 feet). *Id.* Bigelow & Schroeder, 1948, Mem. Sears Found., 1:147, figs. *Id.* Yanez, 1949, Rev. Biol. Marina (Valparaiso), 1 (3):233, fig. 41 (Chile). *Id.* Tortonese & Trotti, 1949, Centr. Talass. Tirreno Pubbl., 1:17. *Id.* Roedel & Ripley, 1950, Calif. Fish. Bull., 75: 21, etc., fig. 30 (California. Bears live young). *Id.* Matthews & Parker, 1950, Proc. Zool. Soc. Lond., 120 (3): 535, pls. 1-8 & 15 text-figs. (Anatomy and biology). *Id.* Tortonese, 1950, Arch. Zool. Ital. Torino, 35:119. *Id.* Refs. in Zoological Records, various years. *Id.* G. Maxwell, 1952, Harpoon at a Venture: 25, figs. 1-82. *Id.* Scattergood, 1952, Copeia, 1952 (3):205 (Gulf of Maine. Male of 348cm. = 650lb. Liver 12.5 per cent of total weight). *Id.* P. F. O'Connor, [1953], Shark-O, *passim*. *Id.* Parker & Boeseman, 1954, Proc. Zool. Soc. Lond., 124 (1):185, 3 plates and figs. in text (Food, growth, moult of gill-rakers). *Id.* McCann, 1954, J. Bombay Nat. Hist. Soc., 52: 331, pls. 1-2. (New Zealand. Feeds on zooplankton). *Id.* Anon. (a), 1956, Rec. S. Austr. Mus., 12, plate opp. p. 104 (South Australia, 1914). *Id.* Munro, 1956, Handbk. Austr. Fish., no. 14. *Id.* Anon. (b), 1956, The Standard [newspaper, Warrnambool, Victoria], Sept. 12 and 13, 1956 (Warrnambool, Victoria; 11 Sept. 1956). *Id.* Clarke, 1956, Discov. Rept., 28: 261, pl. 2, fig. 4 (Horta. From stomach of sperm whale). *Id.* B. L. Gordon, 1957, Nat. Hist. (N. York), May 1957: 272, figs. (Nova Scotia. Up to 50 feet). *Id.* F. G. Wood, 1957, Copeia, 1957 (2): 153 (Florida). *Id.* Greenbank, 1957, Copeia, 1957 (2):156 (Chesapeake Bay). *Id.* Backus, 1957, Copeia, 1957 (3):246 (Massachusetts. Juvenile). *Id.* Anthony Watkins, 1958, The sea my hunting ground, *passim*, illustrated. *Id.* Leim & Day, 1959, J. Fisher. Res. Board Canada, 16 (4):504. *Id.* Hardy, 1959, Open Sea, 2:69, pl. 4 & text-fig. *Id.* Backus, 1960, Copeia, 1960 (3): 244. *Id.* Torchio, 1960, Act. Soc. Ital. Mus. Civico Milano, 99 (4):303, fig. 1. *Id.* Siccardi, 1960, Rev. Mus. Argent. Cienc. Nat. Bernard Rivadaria (Buenos Ayres), 6 (2):61, plates & text-figs. *Id.* Refs. in Zoological Records, various years. *Id.* Baldwin, 1961, Copeia, 1961 (4):476. *Id.* Heegaard, 1961, Rec. Austr. Mus., 25:177 (copepods). *Id.* Scott, 1962, Fish. S. Austr.: 26, figs. *Id.* Cadenat, 1962, Bull. Inst. France Afr. Noire, 24 (A) 1: 305, pl. 2 (Senegal). *Id.* Hubbs, 1962, Copeia, 1962 (3):677 (Cuba; new record. Ref. to Torre, 1945). *Id.* Harrison Matthews, 1963, Smithson. Rept., 1962; 415-421 (The shark that hibernates. Structure, habits, spermatophore, viviparity. Smallest specimen about 6 feet. Sex-ratio). *Id.* Chen, 1963, Biol. Bull. 19 Tunghai Univ.: 37 (Taiwan). *Id.* v.d.Land, 1965, Zool. Meded., 40(32):293 (Distribution and parasites). *Id.* Parker & Stott, 1965, Zool. Meded., 40 (34), pl. 1, figs. 1-2 (Age, size and vertebral calcification). *Id.* Leim & Scott, 1966, Fish. Atlant. Coast Canada: 29, fig. *Id.* Squire, 1967 Copeia, 1967(1): 247, fig. 1.

Tetroras maccoyi Barrett, 1932, Sun Nature Book 4: 13, fig., ex Whitley & Phillipps, MS. Australasia. Type from Portland, Victoria, in National Museum, Melbourne. *Id.* Coppleson, 1933, Med. J. Austr., April 15, 1933: 458.

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Halsydrus maximus Whitley, 1939, Austr. Zool., 9:241 (23 trivial names in synonymy). *Id.* Fowler, 1940, Bull. U.S. Nat. Mus., 100 (13): 113. *Id.* Phillipps, 1946, Dom. Mus. Rec. Zool., 1(2):9 (New Zealand locs. and lengths). *Id.* Hass, 1958, We come from the sea: 225. *Id.* Parrott, 1958, Game fish. sharks N. Zealand: 107, fig. *Id.* Stead, 1963, Sharks & Rays Austr.: 200, fig. 18.

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Cetorhinus maximus normani Siccardi, 1960, Rev. Mus. Argent. Cienc. Nat. Bernard Rivadaria (Buenos Ayres), 6(2): 84, plates & figs. South Atlantic.

"Nomenclator Zoologicus. Edited by Marcia A. Edwards, B.Sc. and A. Tindell Hopwood, D.Sc. Vol. VI 1946-1955" (London: The Zoological Society of London), 1966, pp. [viii +] 329.

The first five volumes of this *Nomenclator Zoologicus* were produced by Dr. S. A. Neave who died at the end of 1961. They recorded the bibliographical origins of the name of every genus and subgenus in zoology published between the years 1758 and 1945 and have been noted by this reviewer elsewhere*. "This volume, the sixth in the series, covers the period from 1946 to 1955 and also contains many earlier names which for various reasons were omitted from the previous volumes", and corrigenda are incorporated in the main body of the work as well as being listed separately.

The gratitude of zoologists is due to the editors of this sixth "Neave" for the care they have taken with this exacting work, in which very few misprints have been found. The compilation is time-saving, as it obviates much tedious searching through the annual indexes of the *Zoological Record,* whilst the cross-references are of the utmost value. It is perhaps a tribute to the *Nomenclator Zoologicus* that (at least in ichthyology) practically no preoccupied new generic names are proposed nowadays.

So, once again, heartfelt thanks are expressed to the *Nomenclator Zoologicus* and to Miss Marcia Edwards and Dr. A. T. Hopwood, its indefatigable editors.

— G. P. Whitley.

* Whitley, 1939, Austr. Zool., 9 (3): 262; 1940, Austr. Naturalist, 10 (7): 241-243; and 1950. Proc. Roy Zool. Soc. N.S.Wales, 1948-49: 44.

NOTES ON THE CONSTRUCTION OF THE NET AND SPERM-WEB OF A CRIBELLATE SPIDER **DINOPIS SUBRUFUS** (KOCH) (ARANEIDA: DINOPIDAE)

by DENSEY CLYNE

(Figures 1-6).

1. NET

Several species of the genus *Dinopis* were described by L. Koch (Die Arachniden des Australiens, 1879) from specimens sent to him by H. B. Bradley, a former trustee of the Australian Museum. These included *Dinopis subrufus.*

This spider is common around Sydney, its habitat being low shrubbery and herbage, and the following observations were made in a garden in Turramurra, 12 miles north of that city, where the spider is abundant throughout the year.

The net is used by males and females from about 4 mm. upward in size for the capture of prey. The female makes it during the whole of her life, the male until his final moult, when he leaves his customary place to go in search of a female. The net, composed of threads of cribellate silk and measuring about 10 mm. x 15 mm. unexpanded, is made by the spider in the early evening.

Emerging at dusk, *Dinopis* moves deliberately around on her long, stick-like legs placing the supporting framework of non-cribellate silk thread. As far as the terrain will allow, these threads always occupy the same relative positions.

Fig. 1 is a diagram of the completed framework. Between points C, D and E there is always a small network of supporting threads; these have been left out for simplicity. Lines H-D and D-I are secured at their outermost points somewhat behind lines F-C and C-G. Similarly, lines J-E and E-K are secured a little behind H-D and D-I.

The framework made, *Dinopis* takes up a position from behind, grasping it with her legs as shown in Fig. 1, where numbers are used to indicate the placing of tarsi 1 and 2. R1 indicates the tarsus of the first right leg, L1 the tarsus of the first left leg, R2 the tarsus of the second right leg and L2 the tarsus of the second left leg. It will be seen that at this stage the spider is suspended *head upward* by her first legs, which grasp line B-C. Her second legs support her also, by grasping respectively lines F-C and C-G. The first and second legs remain in these positions throughout the making of the net.

The third legs change position constantly as the net is made; they are employed to hold, each in turn, the four lines H-D, D-I, J-E and E-K at the junction of which the rectangular net is placed, and to affix to them as required the lengths of cribellate thread which compose it.

The fourth legs are used in the usual way of cribellate spiders to produce the blue-white cribellate silk by rhythmic combing movements of each calamistrum in turn across the cribellum. Under magnification, the silk appears as two wavy parallel lines connected by a series of fuzzy transverse loops.

Placing the tip of her abdomen at point M (Fig. 2) *Dinopis* now starts combing out the first length of cribellate silk. When this length is nearly completed, L3 picks up line E-N about half-way along and takes it towards the spinnerets. The first length now finished, the fourth legs stop combing, L4 takes the line from L3 close to point N, and applies it to the spinnerets to attach the length of silk in place.

Combing immediately recommences; R3 moves to point N; L3 moves to D-O, and at the appropriate moment carries it towards the spinnerets. Combing stops; L4 picks up the line; the new length is attached to it at point O, and now the direction is reversed.

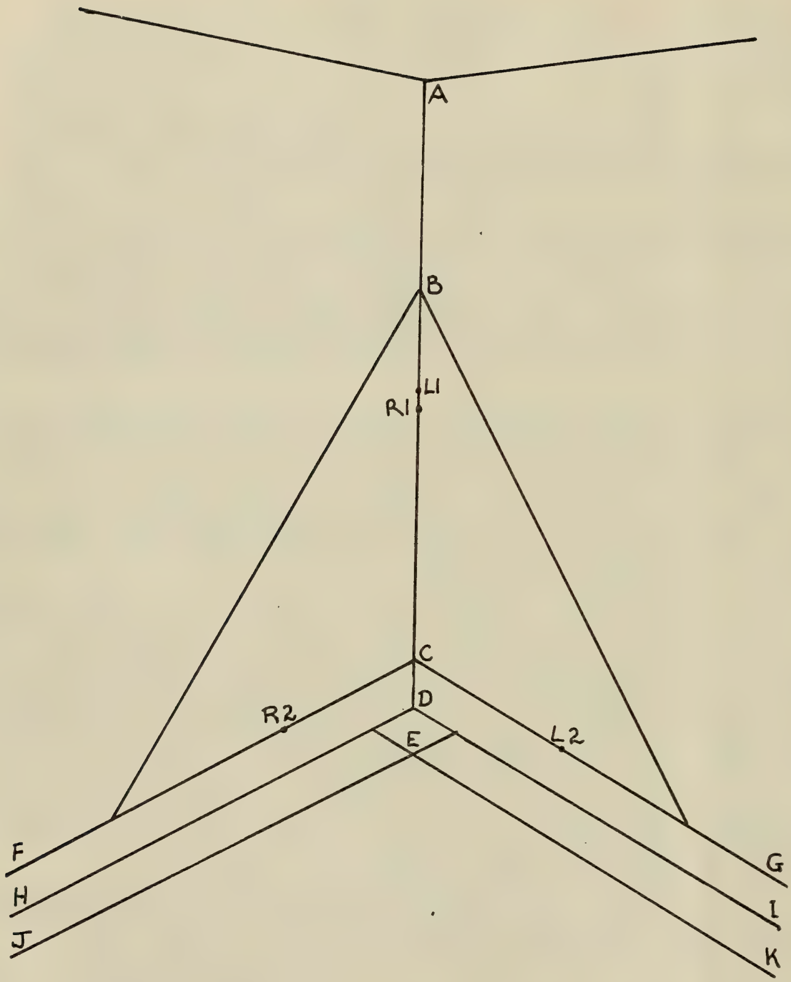

Figure 1.

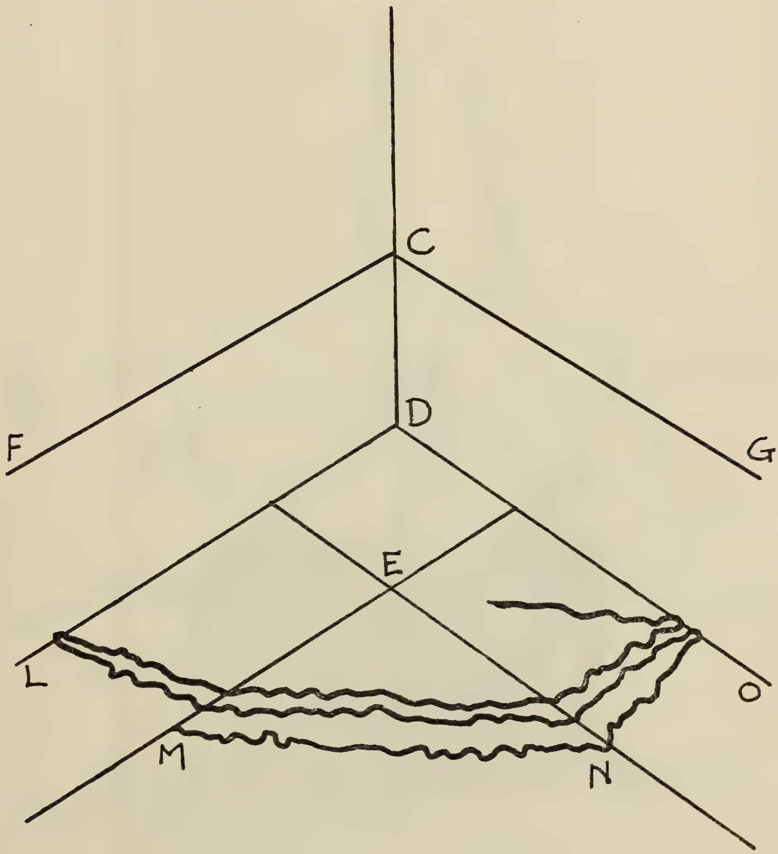

Figure 2.

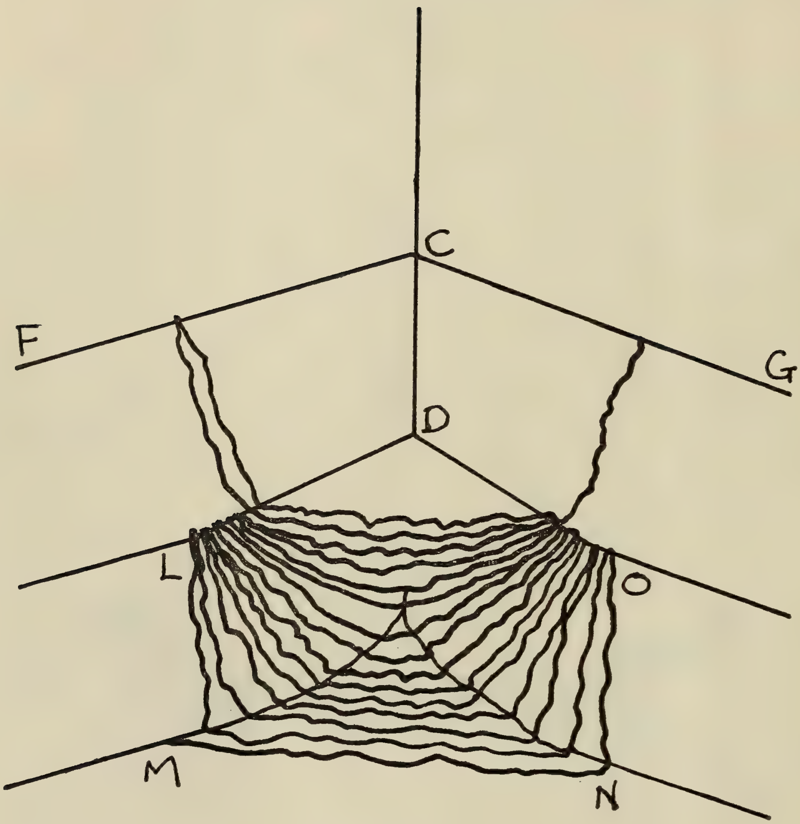

Figure 3.

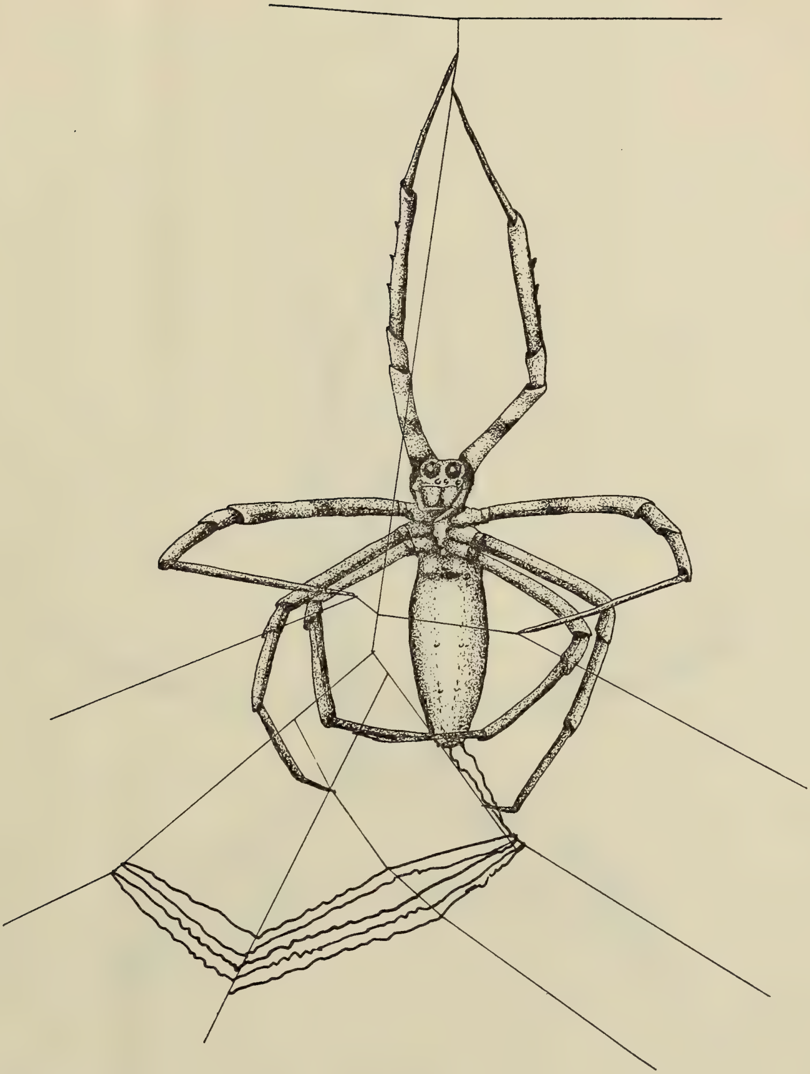

Figure 4.

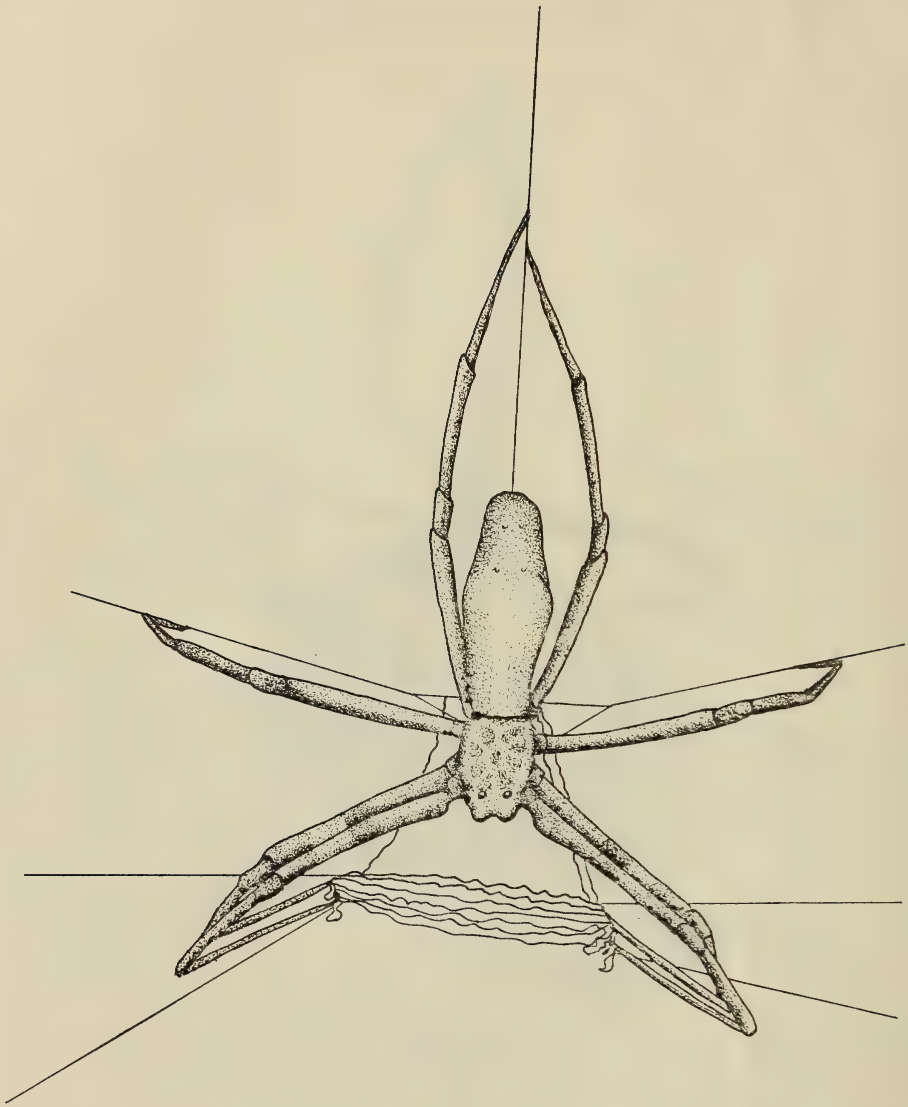

Figure 5.

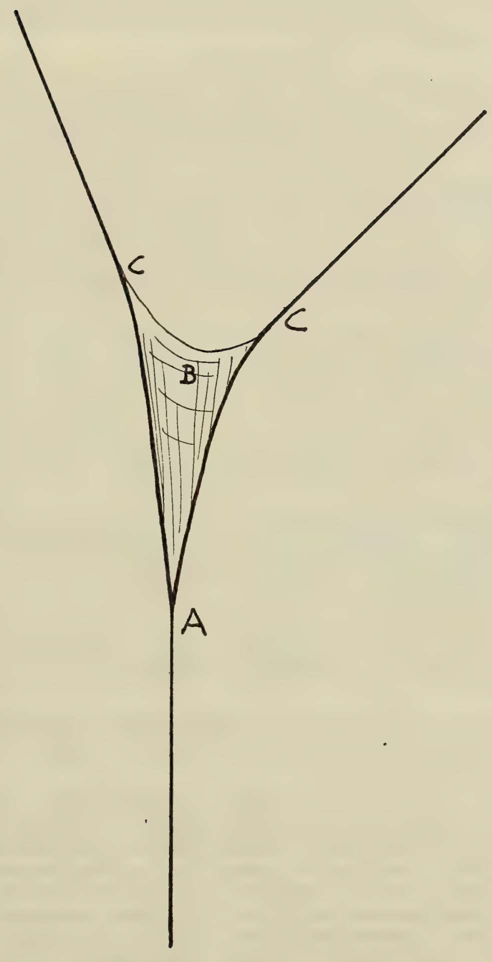

Figure 6.

The next length is combed out and attached this time with the help of R3 and R4 to point N. In whatever direction the spider is working, the leading third leg moves ahead ready to attach the new length, and the trailing third leg follows on to the last point of attachment. (Fig 4).

As this procedure continues, the centre sections of silk grow shorter and shorter as the lines of attachment converge at E. A little before E is reached, *Dinopis* starts to use only two sections of silk to span the required distance, and after it is reached, only one.

Gradually the shape of the structure has altered (Figs. 3 and 4). Probably by appropriate tensioning, the outer lengths of cribellate silk which to begin with were at only a slight angle to the horizontal, have been drawn up until they are almost vertical. The last few single lengths, connecting points L and O directly, put the finishing touches to what has now become a rectangle.

Now the final steps are taken. *Dinopis* combs out another length of silk, but instead of carrying it across to the opposite side of the net, she attaches it directly above its point of commencement on line F-C. Another length is produced, taken downward parallel to this, and attached at the same corner. A third is carried across the top of the rectangle to the opposite corner, and a fourth is taken up to line C-G directly above this corner.

The net is now complete, and *Dinopis* leaves it, to move slowly up to the top of the framework, turn around, and come down head first. On the way she bites through line B-C (Fig. 1) and the observer would expect much of the elaborate structure to fall in a tangle. However, by now the spider is firmly grasping lines F-C and C-G to which the net has just been secured; she herself is suspended by her fourth legs from an independent line still attached to her spinnerets, which hangs vertically behind the line she has just severed.

All that happens on the severance of line B-C is that this, together with the central complex of threads just above the net, collapses, and the net itself drops a little. It is now held in position by:

(1) lines L-D, D-O and M-N;

(2) the cribellate threads holding it to lines F-C and C-G; and

(3) the spider, which is suspended above and behind it, her first two pairs of legs curved forward to hold the four corners in their tarsi (Fig. 5).

It remains only for the net to be tested, which *Dinopis* does by stretching it out once or twice to several times its apparent dimensions. After this the spider remains motionless.

If a suitable insect comes within reach, the spider flings the instantly expanded net over and around it, letting herself drop sufficiently by releasing her fourth tarsi. The two elastic threads attaching the net to lines F-C and C-G allow the net to be carried forward and down without breaking away from the framework, and the spider still grasps the four corners of the net which she then wraps around her victim. If the prey turns out to be large and dangerous, the spider moves away and allows it to struggle free. A second net is sometimes constructed by *Dinopis* while she is still holding her prey in her jaws.

In the daytime, *Dinopis* hides amongst foliage, hanging head down with the legs held together in pairs in the form of a Maltese cross. If no prey has been obtained, the net is left in place during the day, and the spider returns to it at nightfall.

N. L. Roberts (Proc. Roy. Zool. Soc. N.S.W. 1953-4) has timed the construction of the net as varying between 22 and 34 minutes, and my own observations roughly correspond with this. Males at the penultimate stage appear to take a few minutes less than females. I have timed the rate of movement of the calamistrum across the cribellum and spinnerets at approximately

200 strokes (each stroke comprising an upward and a downward motion) per minute.

In the same paper, Mr. Roberts describes how *Dinopis* "eats" the silk of the old structure when making a new one. I have watched the same procedure. The silk is rolled up into a ball, and held and manipulated by the mouthparts while digestive fluid is secreted on to it, the spider often pausing in her work to dispose of a large portion.

2. SPERM-WEB

The male moves from his habitual head-down resting position on vegetation near the female and fixes into place a few silk lines in the form of a narrow Y. Grasping these, and now head upward, he fills in the lower part of the V with a fabric of non-cribellate silk threads.

After placing the first lines across the top of the area to be filled, he moves the tip of his abdomen up and down and sometimes across. When moving downward he places the silk with a series of dabs; when moving upward he lays it smoothly with one motion.

The web takes about five minutes to make and when finished measures approximately 1 cm. long by 5 mm. at the widest part.

The sperm-web completed, the male moves to its opposite face, grasping point A (Fig. 6) with his fourth legs, and points C with his third legs. He dabs his abdomen with an even motion approximately 70 times against the centre of the web at point B. When he moves away a small shining spot is visible to the unaided eye.

The spider now returns to the opposite face of the web, adopting a head-upward position with legs grasping the supporting threads. Now he places his palps alternately over the top of the web and on to the spot of sperm. Each palp is applied about 8 times. The time of induction by each palp varies from 30 seconds at the beginning to 10 seconds towards the end. While one palp is applied, the other is moved slowly up and down.

After sperm induction the spider resumes a head-down position above the sperm-web, which he does not devour or destroy.

"The Collection and Preservation of Insects", by K. R. Norris.
The Australian Entomological Society Handbook No. 1.
Brisbane, 1966. Price $1.00.

It is indeed encouraging to read in the foreword to this work that the Australian Entomological Society, in addition to producing a biannual Journal, which contains research papers, intends also to produce a series of Handbooks on topics of wide interest to entomologlsts. No clue, however, is given as to what topics may be covered by future Handbooks.

The first of this series, on collection and preservation of insects for scientific study, is remarkable for the wide coverage given to techniques, and, in the case of those techniques which will be most widely used by collectors, for the completeness with which the processes are explained. Thus the beginner will be able to avoid many pitfalls which he could otherwise experience in handling or carrying very fragile specimens, using unsuitable pins, mounting specimens after drying, failing to label every specimen of a series, or handling potassium cyanide. Where techniques are not fully explained or merely mentioned, references are generally given to more detailed accounts. It is presumed these more advanced techniques are most likely to be used by professionals who have an adequate scientific library at their disposal.

The question may be raised, as to what section of the entomologically-minded community will benefit most from this publication. Certainly it will be of some use to all those students of the Insecta, whose work or hobby involves the two processes mentioned in the title. On the other hand the vocabulary used suggests that the writer was thinking of the scientifically educated when preparing the book. Some insight into his purpose may be obtained by considering the history of its development. Mr. Norris, as an entomologist of long experience in many and diverse research projects, was initially approached several years ago to contribute a chapter on collection and preservation to a comprehensive textbook of Australian Entomology. This work, sponsored by C.S.I.R.O. Division of Entomology and edited by Dr. I. M. Mackerras, is expected to be on the market within the next year or so. It is intended as a textbook for senior entomology students in universities and as a reference work for the professional entomologist, though the probability is to be mentioned that it will be useful also to many more advanced amateurs. When Mr. Norris had finished his chapter it was circulated with several other of the chapters to a number of specialist entomologists for critical comments. Subsequently, after some revision, the chapter was published as the present Handbook. As a consequence the backroom entomologist who will have to substitute diluted methylated spirit for ethanol (which is not easily available), or who may not even know that ethanol and glycerol are unfamiliar (though highly sophisticated) synonyms for ethyl alcohol and glycerine respectively, has received little consideration from Mr. Norris. However there are some simpler publications available which should supply the needs of this worthy section.

One is obliged to acknowledge the need for a booklet on this level as it is not to be assumed that the university student can readily obtain all the information from other sources, or that the professional already knows everything on this topic. It should be noted that many universities in Australia do not provide adequate courses in Entomology, so that those entering the professional field may have still to learn their basic techniques.

The style of the book is abundantly clear, as are also the diagrammatic illustrations, and the printing is of good quality. The price of one dollar may slightly strain the resources of the full-time student, but should not unduly disturb others. Other features which add to the book's usefulness are the summary of preservation methods for each order of insects and a comprehensive subject index.

— D. K. McAlpine.

SOME PSEUDOSCORPIONIDEA FROM AUSTRALIA, CHIEFLY FROM CAVES

By M. Beier*

(Figures 1-4).

Summary

Miss Barbara Dew, of the University of Sydney, has collected, over recent years in various caves of New South Wales, four species of Pseudoscorpions, three of which (*Morikawia cavicola, Sundochernes guanophilus* and *Protochelifer cavernarum*) are here described as new. A fifth species, *Sundochernes dewae* n.sp., was taken from birds' nests in hollow trees.

Sathrochthonius tuena Chamberlin

3 ♂, 3 ♀, Southern Limestone, Jenolan Caves, N.S.W., in guano, 6. VII. 1963, B. Dew leg.; 7 ♀ from the same locality, 25. VI. 1964; 1 ♀, Basin cave, Wombeyan, N.S.W., in guano, 19. X. 1963, B. Dew leg.

This true cave-dwelling species was described by Chamberlin (1962) from an unnamed cave, perhaps in the Blue Mountains near Sydney.

Morikawia cavicola sp. nov.
(Fig. 1).

Pale yellowish brown. Carapace a little longer than broad, moderately narrowed in the basal third, sharply reticulate in the hind corners, with 18 relatively long bristles (the lateral preocular bristles only short), of which 4 are on the front border (the submedian pair rather close) and 2 on the posterior border; front border with broad, rounded, acutely dentate epistome; posterior border concave. Eyes and eye-pigment greatly reduced, very small and flat rudiments of lenses of the posterior eyes at most present. The two anterior abdominal tergites somewhat paler than the others. Tergites 1 to 4

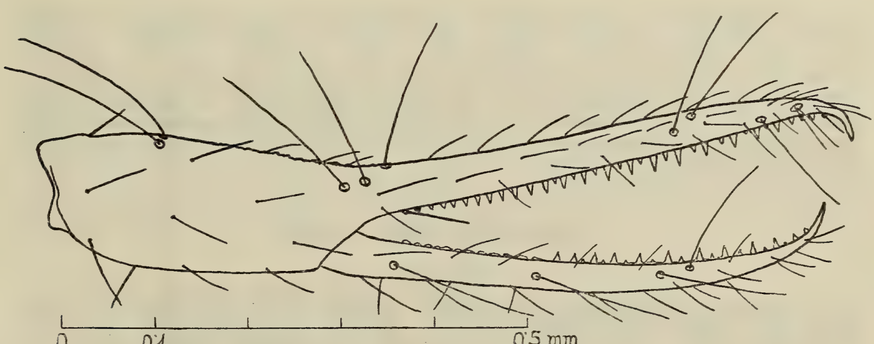

Fig. 1. *Morikawia cavicola,* nov. spec., chela of the male, lateral.

* Naturhistorisches Museum, Vienna, Austria.

each with 4, the following each with 6 bristles, the three bristles on each side of equal distance. 9th tergite with an unpaired median bristle. Last tergite with two long tactile bristles. Palm of chelicerae with 5 bristles. Fixed cheliceral finger with about 8 teeth, the last tooth enlarged; movable finger finely and uniformly denticulate. Spinneret hump wanting in the female also. Flagellum with 5 to 6 long pennate bristles. Palpal femur a little longer than carapace, flatly granulate laterally in the basal half. Palpal hand rather coarsely granulate dorsodistally, very narrow, twice as long as broad; chela 6.2 times longer than broad. Hand with a single moderately long and strong spike-bristle mediodistally at the base of the fingers. Fingers 1.9 times longer than hand. Fixed finger with about 36 erect, narrow, and acute teeth of very inequal size on its whole length (the intercalary teeth scarcely half as long as the primary teeth), only the 4 distal ones and the 11 or 12 basal ones equal in length. Movable finger toothed only in its distal half with 11 long, erect, and acute teeth, and with very small, mostly grain-shaped intercalary denticles; the row of teeth ends shortly distally of the tactile seta *sb;* about 12 flat rudimentary teeth in the basal half of the movable finger. The tactile setae *ib* and *isb,* as usually, shortly proximad of the middle of the dorsum of the hand; the remaining tactile setae also in normal position. Coxae of the first pair of legs with a blunt conical protruberance without bristles. Coxae of the second pair of legs with a row of 7 finely pennate coxal spines. Intercoxal tubercle absent. Margins of the genital opening of the male smooth, with fine marginal bristles.

Body: length ♂ 1.5 mm., ♀ 1.7 mm.

Carapace: length, ♂ 0.48 mm., ♀ 0.53 mm.; breadth, ♂ 0.42 mm., ♀ 0.48 mm.

Pedipalps: length femur, ♂ 0.52 mm., ♀ 0.59 mm.; length hand, ♂ 0.30 mm.; breadth hand, ♂ 0.145 mm.; length fingers, ♂ 0.56 mm.; length chela, ♀ 0.92 mm.

Holotype ♂ and *Allotype* ♀. Bungonia, N.S.W. The Grill Cave, in guano, 6.II.1965, B. Dew leg, (S. Aust. Mus., Adelaide, No. Ar 165-6).

Paratype. 1 ♂ from the same locality (Mus. Vienna).

Comments—The new species is distinguished from all the other species of the genus by the broad, rounded, and irregularly dentate epistome. It differs from the related *M. zonata* Beier from New Caledonia and *M. grimmeti* (Chamberlin) from New Zealand moreover by the absence of eyes, the equal distance of tergal bristles of the abdominal segments 5 to 8, and by the presence of a single moderately long spike-bristle of the palpal hand. This species is the first representative of the genus in Australia. It is a true cave-dwelling animal.

Sundochernes dewae sp. nov.

(Fig. 2).

Carapace and pedipalps rather dark reddish brown, the former a little paler in its basal half. Integument very densely and rather finely granulate. Vestitural bristles very short and distinctly clavate, the lateral bristles of pedipalps only dentate. Carapace about as long as broad, with 10 posterior border bristles, without eye spots; both transverse furrows rather narrow and not very deep but distinct, the sub-basal one scarcely one third closer to the posterior border than to the anterior furrow. Abdominal tergites divided, except the ultimate, which is not or incompletely divided. The half tergites of the middle segments each with 9 posterior border bristles and 1 lateral border bristle, without discal or median border bristles; those of the 10th segment with 4 posterior border and 2 discal bristles and with 1 lateral and 1 median border bristle; 11th tergite with 12 marginal and 4 discal bristles in all, without tactile bristles. Ultimate sternite granulate, without tactile bristles. Palm of chelicerae with 6-7 bristles, the shorter proximal ones stout and dentate. Galeal bristle short, scarcely reaching beyond the tip of the finger. Galea with very small terminal branches, which are but a little longer in female than in male. Pedipalps robust. Trochanteral humps, especially the ventral one, relatively high and prominent. Femur abruptly pedicellate, 2.3-2.4 times, tibia 2-2.1 times, longer than broad, the latter,

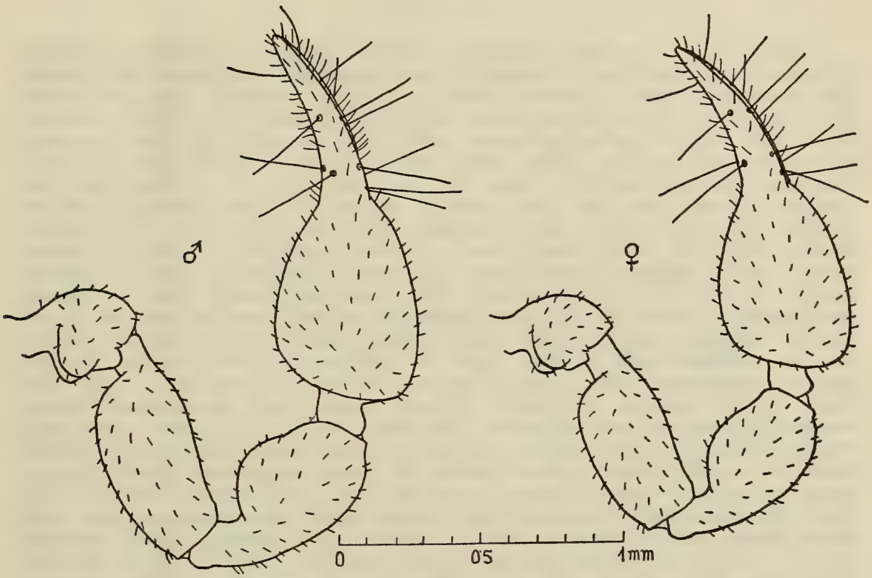

Fig. 2. *Sundochernes dewae*, nov. spec., right pedipalp of male and female.

especially in the male, very highly swollen medially; hand ovate, 1.6-1.7 times, chela with pedicel 2.9-3 times, without pedicel 2.7-2.8 times, longer than broad. Fingers nearly as long as hand without pedicel, the fixed one with about 34, the movable one with about 38 teeth; the fixed finger has laterally 7, medially 6, the movable one laterally 6, and medially 5 accessory teeth. Distribution of tactile setae as usual, *ist* scarcely distad of *est*, *it* subapically nearly opposite *et*; *st* of the movable finger but a little closer to *t* than to *sb*. Legs moderately slender, tarsus of the 4th pair without tactile bristle.

Body: length ♂, ♀, 3 mm.

Carapace: length ♂, ♀ 0.90 mm.; breadth ♂, 0.85 mm.; ♀ 0.90 mm.

Pedipalps: length femur, ♂ 0.78 mm.; ♀ 0.67 mm.; breadth femur, ♂ 0.32 mm.; ♀ 0.29 mm.; length tibia, ♂ 0.74 mm.; ♀ 0.66 mm.; breadth tibia, ♂ 0.37 mm.; ♀ 0.32 mm.; length hand, ♂ 0.82 mm.; ♀ 0.75 mm.; breadth hand, ♂ 0.50 mm.; ♀ 0.44 mm.; length fingers, ♂ 0.68 mm.; ♀ 0.63 mm.

Holotype. 1 ♂, Brewarrina, N.S.W., from nest of Galah (*Kokatoe roseicapilla*) (a native parrot) in hollow tree, June 1964, B. Dew, (Australian Museum, Sydney).

Paratypes. 1 ♂, 2 ♀, 7 nymphs from the same locality (Australian Museum, Sydney and Mus. Vienna).

Comments—This species is easily recognizable by its very clumsy pedipalps and the palpal tibia strongly convex medially.

Sundochernes guanophilus sp. nov.

(Fig. 3).

Carapace and pedipalps intensely reddish brown, the former somewhat lightened in its basal half, abdominal tergites brownish. Integument very densely and moderately finely granulate. Vestitural bristles relatively long and rather stout, the dorsal bristles of the body shorter and slightly but distinctly clavate, the bristles of the pedipalps dentate only. Carapace about as long as broad posteriorly, without eye spots, with 10-12 posterior border bristles; both transverse furrows sharply incised, the sub-basal one 1/3 farther from the anterior furrow than from the posterior border. All the abdominal tergites divided; the half tergites of the middle segments with 10 or 11 posterior border bristles, of which some have a subdiscal position, and with 2 lateral border and 1 median border bristle; 10th half tergite each with 8 posterior border, 3 discal, 2 lateral border, and 1 median border bristles; ultimate tergite with 6 border and 8 discal bristles of irregular position, without tactile bristles. Ultimate sternite finely and densely granulate, with weakly clavate bristles, without tactile bristles. Palm of chelicerae with 6 bristles, *B, SB,* and the accessory bristle roughly dentate. Galea of both sexes only with short apical branches. Pedipalps relatively stout. Both trochanteral humps rounded. Femur abruptly pedicellate, 2.6 times, tibia 2.2.-2.3 times, longer than broad, the latter rather strongly convex medially; hand ovate, 1.5-1.7 times, chela with stalk 3 times, without pedicel 2.8 times, longer than broad. Fingers, especially in the female, distinctly shorter than hand without pedicel, with 34-38 marginal teeth; accessory teeth rather small but numerous, the fixed finger laterally with 9, medially with 3, movable finger laterally with 7, medially with 4. Position of tactile setae as usual, *ist* scarcely distad from *est, it* close to *et* and a little nearer to the top of the finger than to *ist; st* of the movable finger closer to *t* than to *sb.* Legs rather slender; tarsus of the 4th pair without tactile bristle.

Body: length ♂, ♀ 3 mm.

Carapace: length ♂, ♀ 1 mm.; breadth ♂ 0.90 mm.; ♀ 1.05 mm.

Pedipalps: length femur, ♂ 0.88 mm.; ♀ 0.86 mm.; breadth femur, ♂ 0.34 mm.; ♀ 0.33 mm.; length tibia, ♂ 0.84 mm.; ♀ 0.83 mm.; breadth tibia, ♂ 0.38 mm.; ♀ 0.35 mm.; length hand, ♂ 0.85 mm.; ♀ 0.88 mm.; breadth hand, ♂, ♀ 0.49 mm.; length fingers, ♂ 0.66 mm.; ♀ 0.63 mm.

Holotype ♂ and *Allotype* ♀. Fig Tree cave, Wombeyan, N.S.W., in guano, 19.II.1963, B. Dew leg. (S. Austral. Museum, Adelaide, No. Ar 163-4).

Paratype. 1 ♀, from the same locality (Mus. Vienna).

Comments—Easily distinguishable from all the other species of the genus by the relatively long vestitural bristles. Closely related to *S. dewae* and very similar to this species in the shape of the stout pedipalps and in having the tibia strongly convex medially, but the ventral trochanteral hump

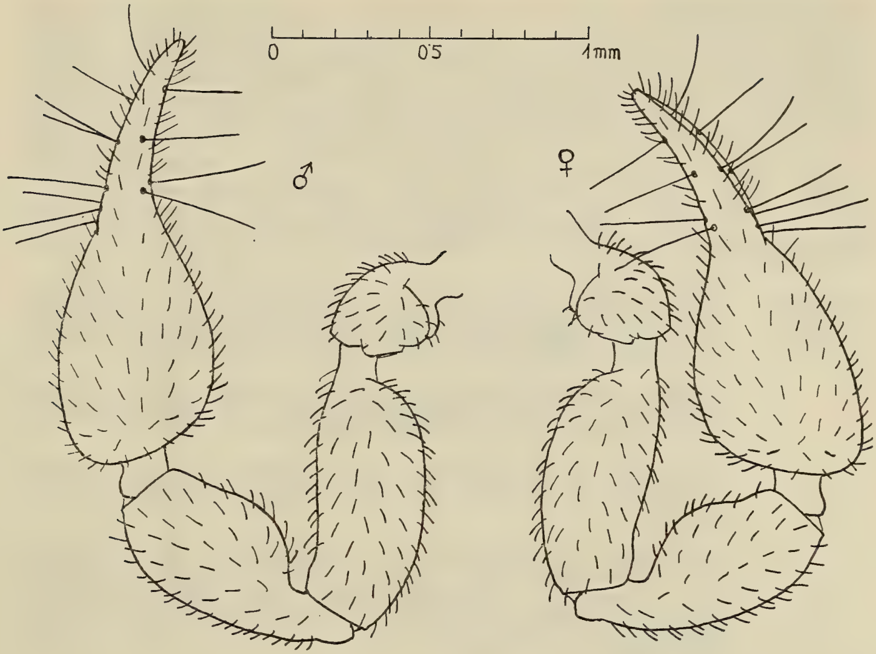

Fig. 3. *Sundochernes guanophilus,* nov. spec., pedipalp of male and female.

flatter and more rounded, the vestitural bristles much longer, and the legs more slender.

Protochelifer cavernarum sp. nov.

(Fig. 4).

Carapace and pedipalps intense reddish brown, abdominal tergites yellowish brown. Integument, the palpal hand inclusive, very densely granulate. Dorsal vestitural bristles of the body dentate and slightly clavate distally, those of the pedipalps dentate only, the medial bristles of the latter somewhat longer and thicker than the lateral ones. Carapace nearly 1.4 times longer than broad across the middle, without bigger granulae; both transverse furrows very distinct, the sub-basal one broader and flatter than the sharply incised anterior furrow, and from the latter at least twice as far as from the posterior border; posterior angles simple also in the male. Eyes normally developed. All the abdominal tergites divided, but the first of the male undivided; posterior angles also simple in the male. Half tergites mostly with 7 posterior border bristles and 1 lateral border bristle, but without discal or median border bristles. Ultimate tergite with 1 moderately long tactile bristle near the middle of each half tergite. Ultimate sternite with a pair of tactile bristles in the same position; 10th sternite with 2 longer bristles closer to the median line. Palm of chelicerae with 5 bristles. Galea nearly a simple awl-shape in the male, with small apical branches in the female. Galeal bristle reaching the tip of the galea in the male, almost so in the female (right galeal bristle of the male holotype teratologically duplicate). Pedipalps very slender. Trochanteral humps rounded. Femur shortly and rather indistinctly pedicellate, 6.6 times, tibia 5 times, longer than broad, very shortly pedicellate, both joints broadest distally; hand very narrow, cylindrical, 2.9 times, chela with pedicel 5.6 times, without pedicel 5.3 times, longer than broad. Fingers as long as hand with pedicel, densely and bluntly toothed. The tactile seta *ist* almost opposite *est*, *it* subapically; the tactile setae *t* and *st* of the movable finger approximate each other. Legs long and very slender. Hind coxae of the male scarcely excavate, with flat apical hump, more densely setose around the opening of the small and simple coxal sacs, without other significant features. Fore tibiae, especially in the male, distinctly curved. Fore tarsus of the male long and slender, but a little shorter than tibia, not specialized. Subterminal bristles and claws simple. Ramshorn organs very small and reduced.

Body: length ♂ 2.8 - 3 mm.; ♀ 3 - 3.2 mm.

Carapace: length ♂, ♀ 1.10 mm.; breadth across the middle 0.80 mm.; behind 0.90 mm.

Pedipalps: length femur, ♂, ♀ 1.52 mm.; breadth femur 0.23 mm.; length tibia 1.37 mm.; breadth tibia 0.28 mm.; length hand 1.12 mm.; breadth hand 0.38 mm.; length fingers 1.08 mm.

Syntypes. 3 ♂, 2 ♀, Murder Cave, Cliefden, N.S.W., in guano 19.II.1966, B. Dew leg. (S. Aust. Museum, Adelaide, No. Ar 167-71).

Paratypes. 3 ♂, 2 ♀ from the same locality (Mus. Vienna); 2 nymphs, Belfry Cave, Timor, N.S.W., in guano, 16.V.1964; G. S. Hunt leg.; 1 tritonymph, Timor Caves, Timor, N.S.W., in guano, 13.XI.1965, B. Dew leg. (S. Aust. Museum, Adelaide and Australian Mus., Sydney).

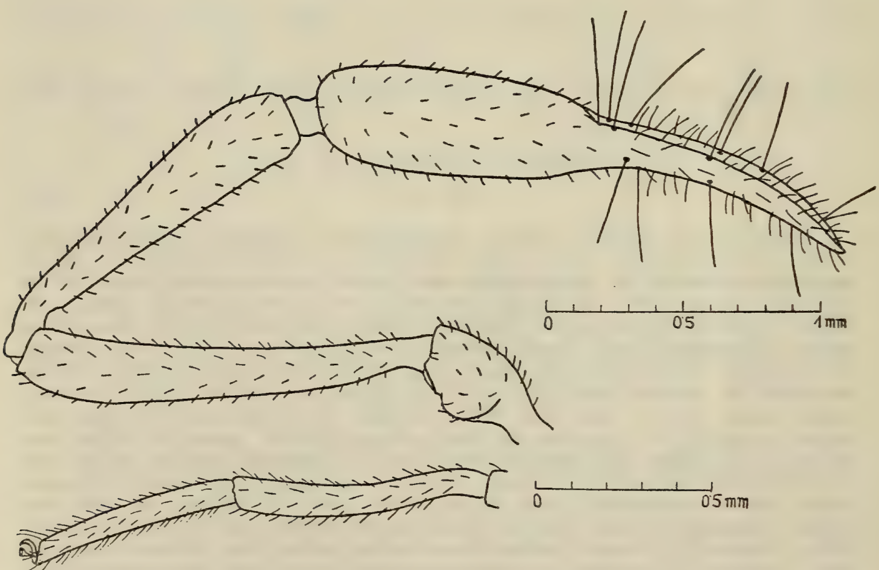

Fig. 4. *Protochelifer cavernarum* nov. spec., left pedipalp of female and tibia and tarsus of fore leg of male.

Comments—The new species is easily recognizable by the very slender pedipalps and the narrow palpal hand. It is related to *P. australis* (Tubb) but has the pedipalps longer, the abdominal tergites with fewer bristles, the hind corners of the anterior abdominal tergites of the male not prolonged, and all the tergal bristles clavate and dentate. It is the first known cavernicolous species of the genus *Protochelifer*, which is distributed in Australia and New Zealand.

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THE MEGALOPA STAGE OF THE HOMOLID CRAB **LATREILLIA AUSTRALIENSIS** HENDERSON AND COMMENTS ON OTHER HOMOLID MEGALOPAS

By D. I. Williamson,

Marine Biological Station, Port Erin, Isle of Man, British Isles.

(Figures 1-2).

There is, as yet, no published description of all the developmental stages of any member of the decapod family Homolidae, and the megalopa stage, which bridges the gap between the planktonic zoea larva and the bottom-living crab, is known for very few members of the family. Works on the development of *Latreillia australiensis* Henderson are confined to the present note and to the recent description of the first zoeal stage (Williamson, 1965).

Material and Identification

The single specimen on which the present account is based was obtained off Cronulla, New South Wales, in October 1964 by Dr. R. J. MacIntyre of C.S.I.R.O. Division of Fisheries and Oceanography. It was among the contents of a townet which touched the bottom (muddy sand) at a depth of 100 m. It lacks pereiopods 2 and 5 on both sides and pereiopod 3 of the left side is also missing. The dissected specimen is lodged with the Australian Museum, Sydney.

Since the megalopa was neither bred in captivity from an identified parent nor reared to a recognisable young crab, its identity cannot be considered as being definitely established. It bears, however, a strong resemblance to the megalopa of the Mediterranean species *Latreillia elegans* Roux, described by Cano (1893); the identity of that specimen was confirmed when it moulted to produce a stage identifiable on adult characters. The Cronulla specimen has a branchial formula agreeing with that of the genus *Latreillia* Roux and differing from those of all other known homolid genera. The only member of this genus recorded from Australian waters is *L. australiensis,* and the present specimen was taken in a region where this species is known to be very common (Williamson, 1965). In the light of this evidence the megalopa is considered as almost certainly belonging to *L. australiensis.*

Description (Figures 1-2)

Length, from tip of supraorbital spine to tip of extended telson, 10.2 mm; from sulcus between supraorbital spines to tip of telson, 6.5 mm. Width, between tips of supraorbital spines, 10.8 mm.

Carapace only slightly wider posteriorly than anteriorly. Ventrally-directed rostrum with broad base; pair of very prominent and widely divergent supra-orbital spines, each ending in hooked posterior spine and rather smaller anterior spine; prominent mediodorsal carapace spine behind level of eyes with smaller anteriorly-directed spine arising from its proximal half; pair of ventrolateral bulges, each with papilla, at about level of mouth; posterior dorsal tubercle; dorsal and dorsolateral carapace ridges; a few short setae on dorsal posterior margin of carapace.

Dorsal tubercle on 1st abdominal somite, larger dorsal prominence on 2nd somite. Pleura of somites 2-5 produced ventrally. Telson almost three times as broad as long, slightly convex posteriorly, without marginal setae or spines.

Eye + stalk only a little longer than maximum diameter of cornea.

Antennules bent back beneath carapace at base of rostrum; each consists of 3-segmented peduncle, 2-segmented ramus with stiff terminal seta and several short lateral setae, 7-segmented ramus with about 20 aesthetascs (olfactory

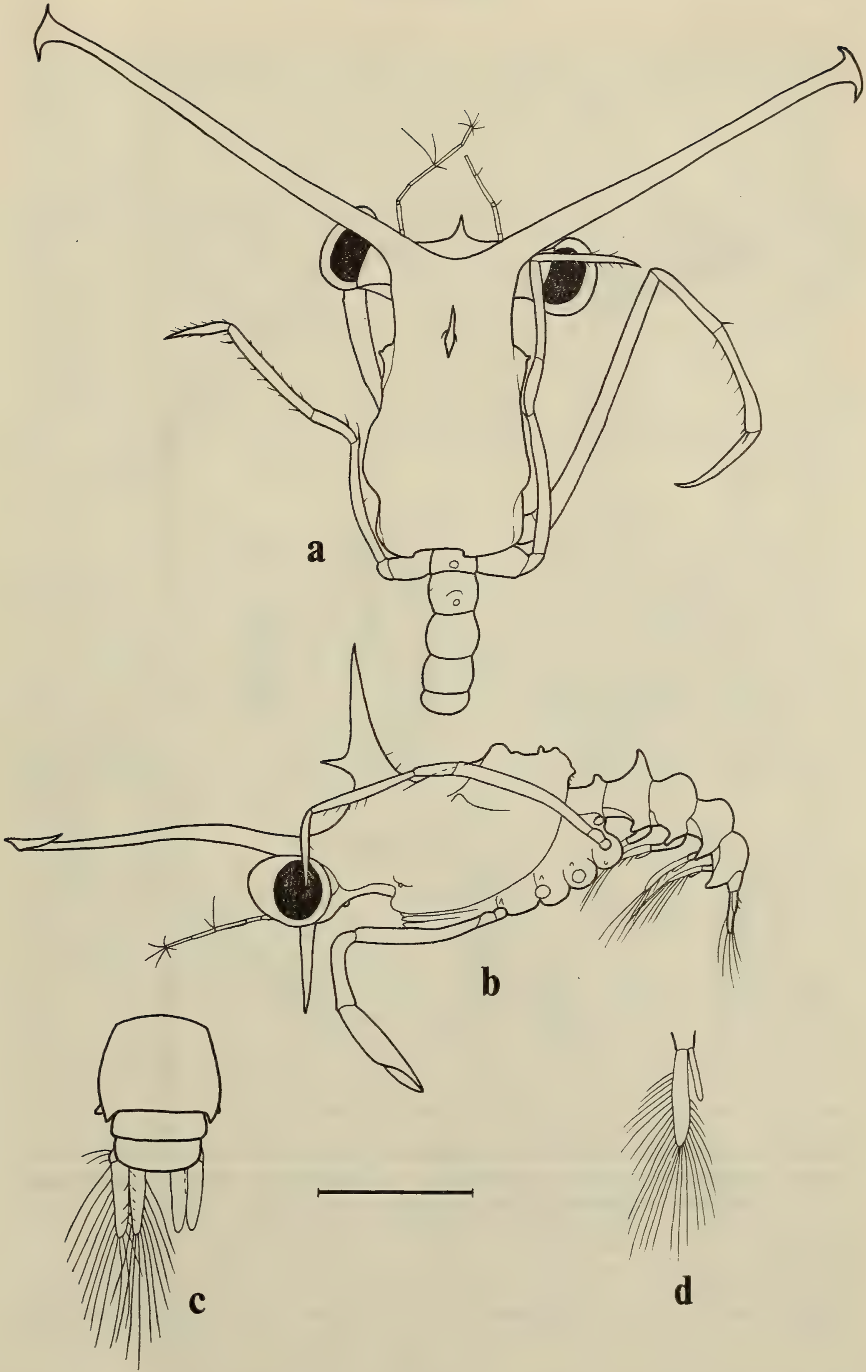

Figure 1.—*Latreillia australiensis,* megalopa. a, dorsal view; b, lateral view; c, posterior abdomen, dorsal (setae of right uropod omitted); d, pleopod of 5th somite. Scale-line represents 2 mm in a and b; 1 mm in c and d.

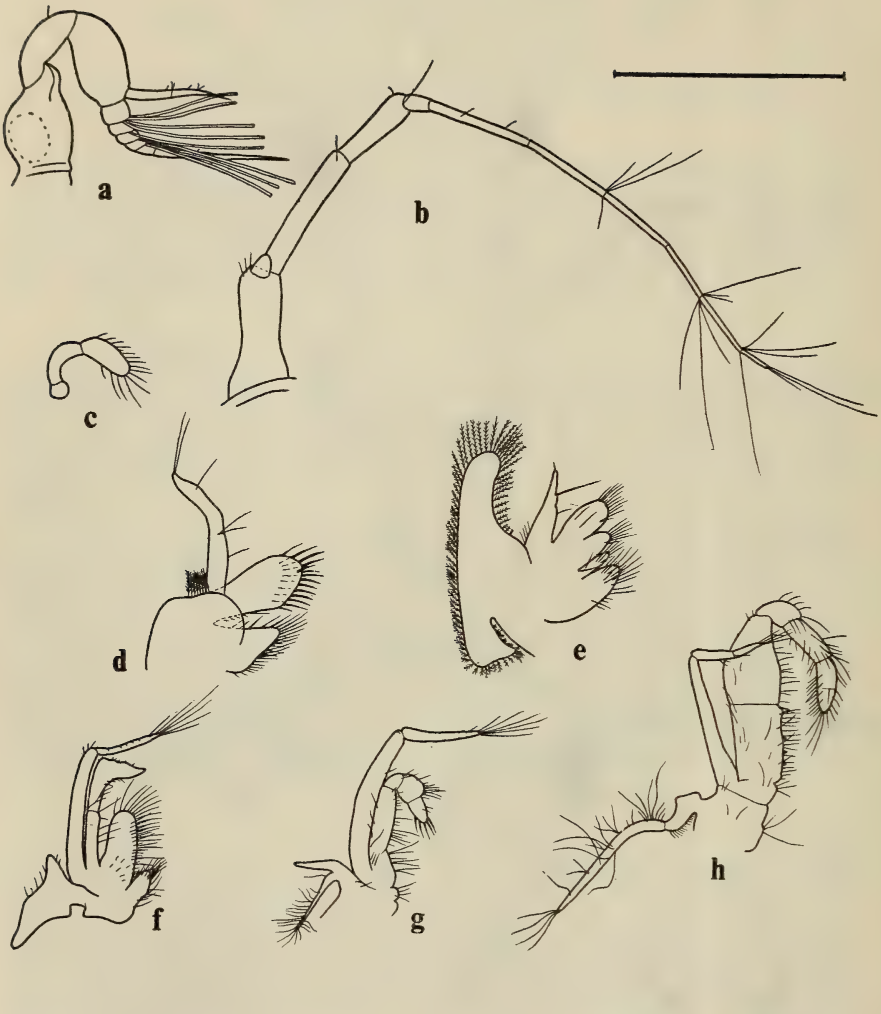

Figure 2.—*Latreillia australiensis,* megalopa. a, antennule; b, antenna; c, mandibular palp; d, maxillule; e, maxilla; f-h, 1st-3rd maxillipeds. Scale-line represents 1 mm in a to e; 1.5 mm in f to h.

filaments) on proximal 5 segments. Antennal peduncle of 3 segments, vestigial scale on proximal segment; flagellum of 7 segments. Mandibular palp large, 3-segmented. Maxillular palp incompletely divided into 2 segments. Maxillary palp undivided but variations in thickness give indications of 3 segments; scaphognathite of maxilla with proximal lobe only slightly wider than distal, none of setae conspicuously enlarged.

Epipod of 1st maxilliped an elongated triangle; coxal and basal endites well developed but latter much the larger; 2-segmented endopod with large inwardly-directed terminal expansion. Developing podobranch on 2nd maxilliped smooth but pinnae visible beneath cuticle; both 2nd and 3rd maxillipeds with slender setose epipods. Endopods of 2nd and 3rd maxillipeds each 5-segmented; ischium and merus of 3rd maxilliped large and flat, ischium with 4 inner teeth. Exopods of all three maxillipeds with rather short flagella, not more than 7 setae on each. Chelipeds slender. Bases of 5th pereiopods dorsal to those of 4th.

Eight pinnate gills on each side, including podobranch on 2nd maxilliped; no epipods on pereiopods.

Biramous pleopods on somites 2-5; endopod of each a smooth rod; exopod almost twice as long as endopod, flattened, with many long marginal setae. Endopod and exopod of each uropod about equal, with 13 and 17 setae respectively.

Discussion

In a previous paper (Williamson, 1965) I referred to the megalopa of the Mediterranean species *Latreillia elegans* as having paired dorsal spines on the anterior carapace. This was a misinterpretation of the figures given by Cano (1893), and closer inspection of these shows that the carapace armature of this megalopa and the present specimen show no important differences. The megalopa of *L. elegans* may be distinguished from that ascribed to *L. australiensis* on the following points: the supraorbital spines are rather less divergent and their terminal projections are longer; the mediodorsal spine on the anterior carapace is more slender but bears a similar anterior projection; the dorsal projection on the 2nd abdominal somite is more pointed and there is also a prominent pointed dorsal projection on the 3rd somite; the telson is longer. The general similarity between the two megalopas is fully consistent with their being members of the same genus.

The megalopa of *Homola barbata* (Fabricius) has been described by Rice (1964), and three other homolid megalopas whose identities are in some doubt have been described by Aikawa (1937), Williamson (1965) and Sakai (1965) respectively. Comparison of these megalopas of doubtful identity with the known megalopas of *Latreillia* Roux and *Homola* Leach prompts some further comments on the genera to which they might belong.

Aikawa's megalopa was taken in Sagami Bay, Japan, together with several specimens which probably represent the same species in the last zoeal stage. All were ascribed to the genus *Homola,* but they are very different from the authenticated last zoeal stage and megalopa of *Homola* described by Rice (1964). The megalopa is of about the same size as that of *L. australiensis.* Its carapace bears processes corresponding to those of the two known megalopas of *Latreillia* except that there are two (as opposed to one) mediodorsal tubercles in the posterior half. The rostrum is more forwardly directed than in these species of *Latreillia,* and the tip of the rostrum and the two extremities of the mediodorsal spine on the anterior carapace are all blunt. The supraorbital spines are long and divergent but incomplete. There are no dorsal projections on the abdominal somites and ventrolateral projections are confined to the last somite. The appendages described closely resemble those of the megalopa of *L. australiensis.* The differences between this Japanese megalopa and the corresponding stage of either *L. elegans* or *L. australiensis* are greater than the differences between these two last-named megalopas, but the resemblances are very considerable. The Japanese species seems likely to belong to *Latreillia* or, more probably, to a closely related genus.

In the same paper in which he described the planktonic homolid larvae from Sagami Bay, Aikawa (1937) described the 1st zoeal stage of both *L. phalangium* de Hann and *Paromola japonica* Parisi from laboratory hatchings. The stage I zoeas of these two species and of *L. australiensis* (cf. Williamson, 1965) are all very similar and show a number of differences from the stage I zoea of *Homola* (cf. Pike & Williamson, 1960). As the stage I zoeas of *Latreillia* and *Paromola* Wood Mason are so similar, considerable resemblance between the megalopas of the two genera is to be expected, and Aikawa's megalopa might well therefore belong to *Paromola*. Support for this tentative identification is provided by similarities between the last zoeal stage taken with the megalopa and the stage I zoea of *P. japonica*, which led Pike & Williamson (1960) to suggest that they may be developmental stages of the same species.

The megalopa which I earlier referred to *Paromola petterdi* (Grant) (cf. Williamson, 1965) was taken in the same area as the specimen now referred to *L. australiensis*. It differs conspicuously from megalopas of *Latreillia* and from Aikawa's megalopa; the long supraorbital spines are slightly convergent and there is a short dorsal spine at the base of each, there is a short mediodorsal prominence on the anterior carapace, a very long dorsal spine arises from the posterior half of the carapace, and there are extremely long lateral carapace spines. The recorded Homolidae from eastern Australian waters are *L. australiensis, H. orientalis* Henderson and *P. petterdi* (Dr. J. C. Yaldwyn, personal communication), and *P. spinimana* Griffin (1965) was described as a new species from waters off northern New Zealand while my account of the megalopa was in the press. This megalopa can definitely be excluded from *Latreillia* by both its branchial formula and its carapace armature, and it was considered that its very long carapace spines were inconsistent with its grouping in the same genus as *H. barbata*, although this point is re-examined below. The specimen was therefore described as the probable megalopa of *P. petterdi*, but this conflicts with the suggestion (above) that megalopas of *Paromola* probably resemble those of *Latreillia*. Griffin (1965) has pointed out that the adult characters of *P. petterdi* are not wholly consistent with its inclusion in the genus *Paromola*, and its transfer to another genus would appear to remove much of the difficulty in ascribing the megalopa to this species. A very different suggestion on the identity of this megalopa is, however, derived from a consideration of a second megalopa from Sagami Bay, Japan.

This second Japanese megalopa, briefly described by Sakai (1965), shows a marked resemblance to that from Cronulla previously ascribed to *?P. petterdi;* the principal difference is that the lateral carapace spines of the Japanese specimen are only about a quarter the length of those of the Australian specimen and end bluntly. Sakai named his megalopa *Thelxiope orientalis* (= *Homola orientalis*) with apparent certainty but without explanation. The differences between adults of *H. barbata* and *H. orientalis* were considered by Doflein (1904) to merit only subspecific separation, and although most authors have placed the two forms in separate species they have regarded them as being closely related. At first sight, therefore, it seems unlikely that their megalopas could be so strikingly different as those described by Rice (1964) and Sakai (1965). On the other hand, while there is a most conspicuous disparity in the development of the carapace processes of these two megalopas, there is close arrangement in the positioning of these processes, so that each of the spines of Sakai's megalopa is represented by a short blunt projection in the megalopa of *H. barbata*. Perhaps, then, these megalopas are more closely related than would at first sight appear possible, and Sakai's identification of his megalopa should be tentatively accepted.

The megalopa previously ascribed to *?P. petterdi* must certainly belong to the same genus as Sakai's megalopa. If this genus is *Homola* then the known distribution of species suggests that the Australian megalopa also should belong to *H. orientalis*. If the conspicuous differences in the development of the carapace spines between the megalopas described by Rice (1964) and Sakai (1965) represent only a specific distinction within the genus *Homola,* then it appears quite consistent that the much smaller corresponding differences between the megalopas described by Williamson (1965) and Sakai should represent only a subspecific or varietal distinction between geographically separated populations of *H. orientalis.* The evidence presented by Rice (1964) that late zoeal stages of *H. barbata* from different geographical areas may be morphologically quite distinct tends to support the general suggestion that the late larval stages of the genus *Homola* may show much greater variety of form than do the adults.

It will be seen that, in our present state of knowledge, the identification of homolid megalopas is more often a matter of conjecture than of certainty. More rearing in captivity appears to present the only prospect of more definite identification.

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NOTES ON AN OVERLOOKED NUDIBRANCH GENUS, **ROBOASTRA** Bergh 1877, AND TWO ALLIED GENERA (Mollusca: Gastropoda)

By Robert Burn*

(Text figures 1 - 6).

SUMMARY

The separation of the species formerly attributed to the nudibranch genus *Nembrotha* Bergh 1877 into three distinct genera (*Nembrotha* s. s., *Tambja* Burn 1962, *Roboastra* Bergh 1877) is justified by radular and genital differences. Introduced in a footnote 90 years ago and overlooked by later writers, *Roboastra* is defined for the first time. Two species of *Roboastra, gracilis* (Bergh) and *arika* sp. nov., are recorded from Australian seas; descriptions and figures of each are given.

INTRODUCTION

During a larger investigation of the Australian species of the Doridacean Phanerobranchia Nonsuctoria, it was noticed that several species previously assigned to the genus *Nembrotha* Bergh 1877 show sufficient differences to be reclassified. The discovery of a specimen of *N. gracilis* Bergh 1877 centred attention on this species and its allies, and led, in turn, to the rediscovery of an available generic taxon, *Roboastra* Bergh 1877, for this species and the recognition of a new species, *R. arika.*

The writer is greatly indebted to the Trustees of the Science and Industry Endowment Fund, C.S.I.R.O., for grants in aid of this and other research, and to Dr. D. F. McMichael, Curator of Molluscs, Australian Museum, for the loan of the material reported upon below. This research is part of a wider study of the Opisthobranchia of Australia.

THE GENUS *NEMBROTHA* BERGH.

The genus *Nembrotha* Bergh (1877: 450) was introduced with six new species, the first of which, *N. nigerrima* Bergh (p. 451) was later designated as type (O'Donoghue, 1924: 567). Since that time 16 nominal species have been added to the genus; some of these are probably synonyms and the actual number is probably considerably less.

Bergh's original six species, though very similar in many ways, are easily divided according to the shape of the radular teeth into three groups. Group I comprising *N. nigerrima* Bergh (p. 451), *N. kubaryana* Bergh (p. 454) and *N. cristata* Bergh (p. 458; 1905: 194) has a rectangular rhachidian with five denticles along the upper margin, a simple cusp on the lateral tooth and 10-11 marginal plates. Group II with species *N. diaphana* Bergh (p. 454) and *N. morosa* Bergh (p. 457: 1905: 195) has a rectangular rhachidian with a smooth upper margin, a bifid cusp on the lateral tooth and three marginal plates. Group III with only *N. gracilis* Bergh (p. 458) has a reduced three-pronged rhachidian, a deeply bifid lateral tooth and two reduced rectangular marginal plates.

The writer's studies of ten Australian species confirm these groups based solely on the differing radulae. Moreover, these studies show that other morphological differences exist by which the three groups can be effectively separated. Thus there is much to justify the proposal that the three groups be raised to full genera. The genera are named as follows (each is defined in detail below):

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Group I: *Nembrotha*. The type species of the original genus, *Nembrotha nigerrima* Bergh, comes within this group and therefore the generic taxon must apply here in the restricted sense (s. s.).
Group II: *Tambja*. The south-eastern Australian *N.* (?) *verconis* Basedow and Hedley (1905: 158) has the radular characteristics of this group. In a previous paper (Burn, 1962: 98), the genus *Tambja* was introduced with this species as its type. *Tambja* is therefore available for this group.
Group III: *Roboastra*. This rare group (of which only six or so specimens are recorded in the literature) has as its first species *N. gracilis* Bergh. A single-line footnote below the original description of this species (1877: 458) reads "Wahrscheinlich wird diese Art Typ eines neuen Geschlechts (Roboastra, Bgh) bilden". Thus, though not qualified by any sort of definition either then or later by Bergh, this name is available for this group. It follows that *N. gracilis* is the type species by original monotypy. Bergh himself appears to have overlooked this taxon as he fails to mention it in any of his later works dealing with *Nembrotha* (1881, 1883, 1890a, 1890b, 1892, 1905, 1907).

CLASSIFICATION

As the writer does not entirely agree with the current classification surrounding the three genera in question, the following arguments for certain alterations are offered.

At present the three genera are included in the family Gymnodorididae (Odhner, 1941: 12; Marcus, 1958: 32, 1965: 277; Marcus and Marcus, 1964: 200; Marcus and Burch, 1965: 236), or the subfamily Gymnodoridinae (Macnae, 1958: 342), the type genus of which is *Gymnodoris* Stimpson (1855: 379). This latter genus and its allies, *Angasiella* Crosse (1864: 50), *Paliolla* Burn (1958: 7). *Lecithophorus* Macnae (1958: 362) and *Analogium* Risbec (1928: 193), are all soft gelatinous bodied species-groups without labial armature, a little differentiated or greatly degenerated radula without rhachidian, and most significantly with a discrete hermaphrodite gland in all instances (except possibly *Lecithophorus*).

Nembrotha, Tambja and *Roboastra* have a somewhat stiffer or harder body with or without labial armature, a differentiated radula with a strong rhachidian and the hermaphrodite gland spread over the liver mass. These characteristics among others are also those that unite the subfamilies of the family Polyceridae. It therefore seems logical to separate these three genera from the Gymnodorididae on the basis of these different characters and to create for them a new subfamily, Nembrothinae, of the family Polyceridae. Like Macnae (1958: 342), the writer understands the units of the Polyceridae to be subfamilies not worthy of family status as proposed by Odhner (1941: 11-12).

The new subfamily may be defined as follows: Nembrothinae; Polycerids with strong rhachidian tooth, one large lateral tooth and 1-14 marginal plates each side, with smooth or slightly pustular body (without velum, velar processes and notal or branchial appendages), with weak or no labial armature.

The following key indicates the differences for the separation of the Polycerid subfamilies, and Table 1 lists the genera assigned to each subfamily.

1. Genera possessing ramose or compound processes .... 2.
   Genera with or without simple papillae on the head and notal margins .... 4.
2. Radula with numerous uniformly tricuspidate teeth
   .... KALINGINAE (Pruvot-Fol, 1955: 356).
   Radula with differentiated teeth (in some genera with one or more spurious rhachidial plates) .... TRIOPHINAE. (3).
3. Velum distinct from notal margin .... TRIOPHINAE s.s.
   Processes continuous round entire notal margin, velum not distinct
   .... LAILINAE nov.
4. With simple papillae and without rhachidian .... POLYCERIDAE.
   Without papillae and with strong rhachidian .... NEMBROTHINAE nov.

TABLE 1 — LIST OF GENERA

KALINGINAE	TRIOPHINAE	POLYCERINAE	NEMBROTHINAE
Kalinga Alder and Hancock, 1864.	Triophinae, s.s. *Triopha* Bergh, 1880. *Kaloplocamus* Bergh, 1880. *Plocamopherus* Rüppell and Leuckart, 1828 *Joubiniopsis* Risbec, 1928. Lailinae, nov. *Laila* MacFarland, 1905. *Limacia* Müller, 1778. *Holoplocamus* Odhner, 1926. *Crimora* Alder and Hancock, 1864. *Issena* Iredale and O'Donoghue, 1923.	*Polycera* Cuvier, 1816. (*Palio* Gray, 1857). (*Greilada* Bergh, 1894). *Polycerella* Verrill, 1881. *Thecacera* Fleming, 1828. *Ohola* Bergh, 1883. *Galacera* Risso-dominguez, 1960.	*Nembrotha* Bergh, 1877. *Tambja* Burn, 1962. *Roboastra* Bergh, 1877.

THE GENERA AND THEIR SPECIES

The writer has examined ten species from the Australian coastlines that are referable to the subfamily Nembrothinae. The generic diagnoses are based upon these examinations while the chronological lists of nominal species are derived from the literature without regard to possible synonymy.

NEMBROTHA Bergh (1887: 450). Rhachidian rectangular with 4-5 denticles along upper margin, lateral tooth with single cusp, marginal plates 6-14. Buccal collar weak; labial armature very weak or absent. Prostate gland large, racemose and spread over spermatheca.

Nominal species: *nigerrima* Bergh, 1877 (type).
kubaryana Bergh, 1877.
cristata Bergh, 1877.
caerula Eliot, 1904.
lineolata Bergh, 1905.
purpureolineata O'Donoghue, 1924.
livingstonei Allan, 1933 (rhachidian denticulate, type examined at Australian Museum, June 1961).

TAMBJA Burn (1962: 98). Rhachidian rectangular with notched or smooth upper margin, lateral tooth with bifid or simple cusp, marginal plates 3-7. Buccal collar strong; labial armature absent. Prostrate gland small, confined to a glandular section of the vas deferens.

Nominal species: *diaphana* (Bergh, 1877).
morosa (Bergh, 1877).
gratiosa (Bergh, 1890).
affinis (Eliot, 1904).
verconis (Basedow and Hedley, 1905) (type).
amitina (Bergh, 1905).

capensis (Bergh, 1907).
limaciformis (Eliot, 1908).
tabescens (Risbec, 1928).
sagamiana (Baba, 1955).
divae (Marcus, 1958).

ROBOASTRA Bergh (1877: 458). Oral tentacles strongly developed as dorso-laterally grooved cylindrical projections equal in length to the rhinophores. Rhachidian reduced with three prongs or well-defined denticles, lateral tooth deeply bifid, marginal plates reduced, linear, 1-3 in number. Buccal collar very weak; labial armature absent. Prostate gland small, confined to a coiled glandular section of the vas deferens.

Nominal species: *gracilis* (Bergh, 1877) (type).
rubropapulosa (Bergh, 1905).
luteolineata (Baba, 1936).
arika Burn, sp. nov.

THE GENUS *ROBOASTRA* IN AUSTRALIAN SEAS

Two specimens, representing two species, have been examined by the writer. Descriptions and figures of their anatomy are presented, together with comments on variation, synonymy and distribution.

ROBOASTRA GRACILIS (Bergh).
(Figs. 1 - 3).

Nembrotha gracilis Bergh, 1877: 458, pl. 56, figs. 11-17.

Nembrotha rubropapulosa Bergh, 1905: 198, pl. 5, fig. 14, pl. 18, figs. 19-22.

Nembrotha gracilis. Baba, 1949: 42, 136, pl. 13, fig. 45, text fig. 39.

Material: Brooms Head, south of Clarence River Heads, northern New South Wales, January 1966, 1 specimen and colour transparency, collected and photographed by Mr. Geoffrey Biddle; Australian Museum reg. no. C.65665.

Description: The single preserved specimen is 13 mm. long, 5.5 mm. high and 3.5 mm. wide; living length was about 25 mm. Alive, the body-colour was dark greenish-black with paler dull greenish foot margins. Along each side lay at least four rows of orange pustules; three or four shorter rows were present on the dorsum in front of and behind the branchiae. The oral tentacles and rhinophores were dull blue-green, the branchiae green. The preserved slug is blue-black with cream lines on the dorsum and sides, blue-black rhinophores and oral tentacles and bluish-green branchiae.

The living slug (Fig. 1) was very slender and highest at the branchial region. Projecting prominently from the head, the pair of cylindrical oral tentacles have a dorso-lateral groove (Baba, 1949: 136, pl. 13, fig. 45a). The four branchiae were simply pinnate. The contractile rhinophores have 15 or more strong lamellae. The whole body surface except the sole was covered with low pustules; the skin in the preserved slug is very thick and tough.

The anterior alimentary tract begins with a long thick-walled muscular oral tube. A very thin blue-green pigmented cuticle lines the oral tube towards the inner end. At the junction of the muscular pharynx and oral tube, a pair of elongate pouches open into the tract. The pouches have purple inner walls. The minute colourless radula (Fig. 2) comprises 26 rows of 2.1.1.1.2 teeth. The rhachidian has three slender denticles, of which the middle one

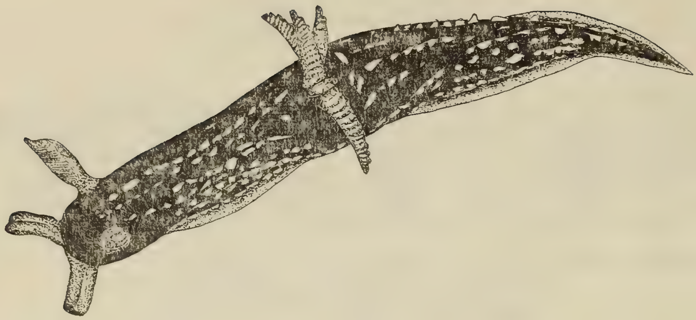

Figure 1.—*Roboastra gracilis*: living slug drawn from a coloured transparency (photo. Geoffrey Biddle).

is a little shorter. The lateral tooth has a strongly curved bifid cusp and a long spur-like denticle near the base. The marginal plates are small and not very distinct; when viewed from some angles, they appear to be a single plate (as in *N. rubropapulosa* Bergh, 1905: 198, pl. 18, fig. 21, b) but when viewed from the side, the two plates are readily visible.

The anterior genital mass (Fig. 3) fills the whole of the second quarter of the body cavity. The ampulla is large, folded thrice upon itself, thin-walled, soft and whitish in colour. The male branch commences with a long horseshoe-shaped soft glandular prostatic dilation that skirts round the spermatocyst. The outer muscular vas deferens is much narrower and a little shorter than the prostatic part. It terminates in a dilated penial section, comprising truncated conical penis armed with numerous hyaline hooks projecting into dark blue pigmented penial sheath. The vagina is long and straight; at its end attaches the large ovoid spermatheca and shortly before this joins the folded slenderer duct of the smaller pyriform spermatocyst. The slender unterine duct was not properly observed; it appears to leave the vagina before the duct of the spermatocyst, thus making the seminal vesicles vaginal in connection. The vagina shares a common aperture within the genital atrium with a rather large pyriform sac (vaginal gland) with narrow lumen and thick spongy vertically plicate walls.

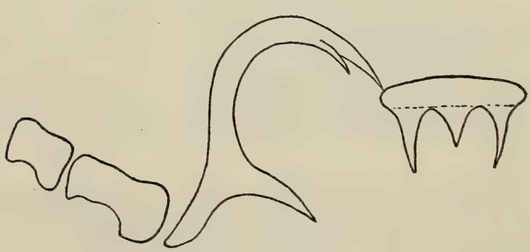

Figure 2.—*Roboastra gracilis*: half row of radula.

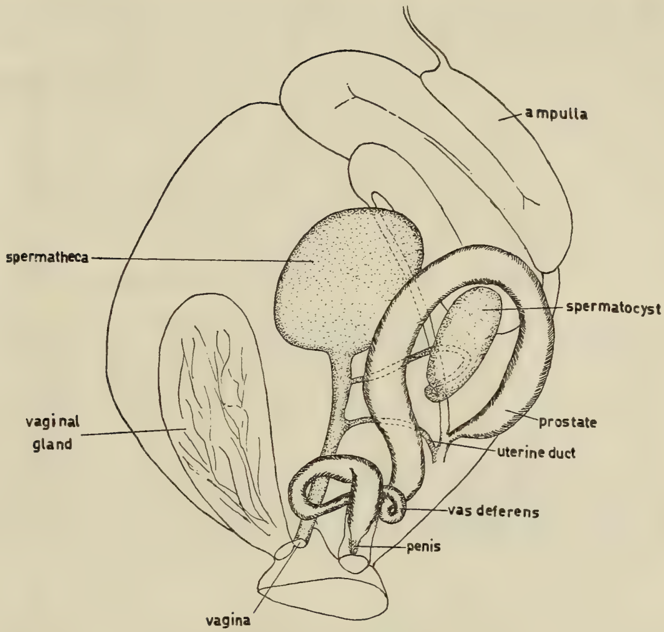

Figure 3.—*Roboastra gracilis*: anterior genital mass.

Discussion: *R. gracilis* is a handsome species at once recognized by its pustulate body and the bands of orange or yellow along the sides and dorsum. Other characteristics are the shorter second cusp of the lateral tooth, the pair of pouches at the anterior of the pharynx, the long prostatic dilation of the male branch, and possibly, the vaginal connection of the seminal vesicles.

Bergh's types were two specimens preserved in alcohol without either notes on or sketches of the living slugs. Subsequently, when the "Siboga" material was reported upon (1905), he described a brightly coloured papillate species as *N. rubropapulosa* (p. 198), which differed only from his *R. gracilis* in that there was one elongate marginal plate on each side of the radular rows. As noted in the above description of the present specimen, the division between the marginal plates can be very difficult to see. Thus *N. rubropapulosa* cannot be effectively separated from *R. gracilis* and must be placed in the synonymy of the latter.

Baba (1949: 136, text fig. 39, c) has shown that this species may have either two or three marginal plates. The number of plates is therefore not a specific characteristic by which the species can be separated from its congeners.

N. rubroocellata Bergh (1905: 201) from which the radula was lost before examination, is very similar to *R. gracilis* in body shape and colour. It may be identical with the latter in which case it will sink into the synonmy.

R. luteolineata (Baba, 1936: 26) and *R. arika* sp. nov. are separated from *R. gracilis* by their smooth skin, different colour patternings and details of the rhachidial and lateral radular teeth.

This is the first record of *R. gracilis* from both New South Wales and Australia. Previous records are from Camiguin Island, Mindanao Sea, Philippines (Bergh, 1877), Saleyer Island, Indonesia (Bergh, 1905), and Japan (Baba, 1949).

While the above description was in proof, a second specimen was received for study. It was collected and photographed by Mr. Geoffrey Biddle, at Minnie Waters, east of Grafton, northern New South Wales during March 1966; Australian Museum reg. no. C.65843. In life it was about 28 mm. long, and as preserved measures 17 mm. long, 6.5 mm. high and 4 mm. wide. Live coloration was almost identical with that of the first specimen with the exception that orange lines are present dorsally and laterally (instead of rows of orange spots, each spot capping a pustule). The specimen is very similar in colour to *N. rubroocellata* Bergh (1905: pl. 4, fig. 14) and strengthens the suggestion that this species is synonymous with *R. gracilis.*

Other data from this second specimen are as follows. Body pustular, skin tough, rhinophores with 20 fine lamellae, and branchiae five in number. Radula small (length about 1 mm.), half as wide as long, colourless, and with formula 28 x 3.1.1.1.3; rhachidian plates present in 28 rows, wider and more curved than in Figure 1; lateral teeth present in 25 rows, rather stronger than in the latter figure but with the same short second cusp; marginals present in 22 rows, each plate distinct, the outermost larger than in the Japanese material (Baba, 1949: text fig. 39). Uterine duct very much shorter than in Figure 3 with its point of insertion with the vagina lying in the crotch of the latter and the duct of the spermatocyst. Thus the vesicles are in vaginal connection as stated above.

ROBOASTRA ARIKA sp. nov.

(Figs. 4 - 6).

Material: On reef near Johnson's Reef, south end of Lord Howe Island, January 1963, 1 specimen (Holotype) collected by Miss Julie Booth, Australian Museum reg. no. C.65666.

Description: The single preserved slug (Fig. 4) is 12 mm. long, 6 mm. high and 3.5 mm. wide. Preserved coloration consists of dark blue-grey lines enclosing paler yellowish areas on the dorsum and sides. The lines run along the head and pallial margins and in addition, there is a median line and three or four lateral lines. The stems of the branchiae are blue-grey and the pinnulae yellowish. The rhinophores are yellowish in front and behind and dark blue at each side. The live slug was probably bright blue and yellow.

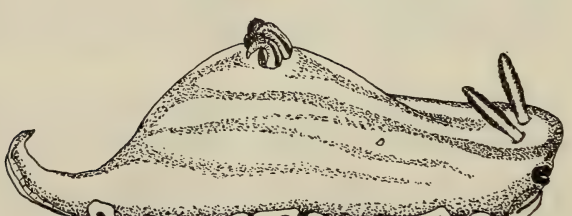

Figure 4.—*Roboastra arika*: preserved Holotype from right side.

The body is shaped like that of *R. gracilis* with a prominent pair of dorso-laterally grooved cylindrical oral tentacles. The skin is entirely smooth and thin. The five branchiae are simply pinnate. The rhinophores have about 18 weak lamellae on each side of the wide anterior and posterior rhachis. The rhinophores are wholly extended.

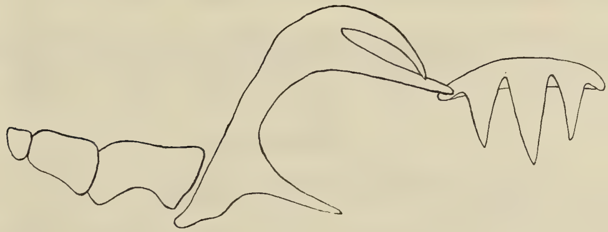

Figure 5.—*Roboastra arika*: half row of radula.

A very thin cuticle lines the oral tube; there is no labial armature. The radula (Fig. 5) has about 31 rows of 3.1.1.1.3 teeth. The rhachidian has three stout tapering denticles. The lateral tooth has a stronger and longer second cusp than in *R. gracilis* and a narrow tapering spur-like denticle near the base. The three marginal plates are more prominent than in *R. gracilis.*

The ampulla (Fig. 6) is small and turban-like. The first part of the male branch is short, twisted, prostatic and soft. The outer part is broader, longer, twisted and muscular. The penial sheath is dilated; the enclosed penis is truncate conical and armed with hyaline hooks. A large vaginal gland opens into the genital atrium. The female gland mass is small and the female ducts not developed.

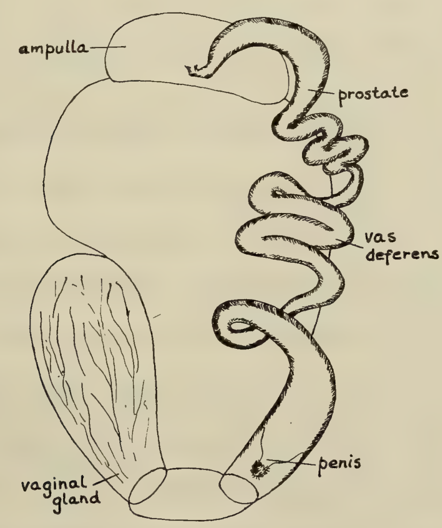

Figure 6.—*Roboastra arika*: anterior genital mass (female ducts not developed).

Discussion: *R. arika* is closely allied to *R. luteolineata* (Baba, 1936: 26) from Okinawa. Both have smooth bodies and overall similar radular shape. The latter species is black or blue-black in colour with narrow orange lines on the dorsum and sides and its radula has shorter denticles on the rhachidian and a more curved lateral tooth with a larger basal denticle. From *R. gracilis* the new species is separated by the smooth body, the detailed shape of the radular teeth, and the shorter, narrower prostatic part of the vas deferens.

This is the first record of *Roboastra* from Lord Howe Island. The specific name *arika* is an Australian aboriginal word meaning "blue water-lily", selected in allusion to the probable live coloration of the species.

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A SMALL COLLECTION OF SERPULID WORMS (ANNELIDA: POLYCHAETA)

FROM DARWIN, NORTHERN TERRITORY, AUSTRALIA

By Dale Straughan*

(Figs. 1a-d).

This material was collected by Miss Elizabeth Pope of the Australian Museum Staff during a visit to the Darwin region in October 1965. This is by no means a comprehensive collection from the area as the collector herself points out, but because the material is the first serpulid material collected from Darwin it is of sufficient interest to warrant publication. It is also interesting to note that all except one of the five species recorded from Darwin were recorded in a recently published review of the Serpulidae of Eastern Australia (Straughan, 1967).

Endean (1957) after an examination of the shallow water echinoderm fauna and Womersley (1959) suggest that the fauna occuring along the Queensland coast is similar to that occuring in the Dampierian Province of Northern and Western Australia. Pope (1965) found that of four species of barnacles of the family Chthamalidae recorded along the east coast of Queensland, three have been recorded from northern Australia west of Torres Strait. Kott (1966, tab. 1) has found that of 25 ascidians recorded from northern Australia, 19 have been found in both the Dampierian and Banksian faunistic Provinces.

Darwin is on the northern Australian coast (approx. 131°E longtitude and 12°26' S latitude). Records show the mean sea temperature to lie round about the 80°F mark and the minimum sea temperature, even in winter, is rarely less than 70°F.

Family *Serpulidae.*

Genus *Serpula* Linnaeus.

Serpula magna Straughan, 1967.

1 specimen, Dudley Point, Darwin, Northern Territory, 28-10-65.

This species has previously been collected along the Queensland coast with isolated specimens occuring as far south as Pt. Vernon (approx. 26°S latitude) and Dunwich (approx. 27°S latitude). Although Pillai (1965) collected from East Java and Madura in Indonesia, this species has not yet been recorded outside Australia.

Genus *Vermiliopsis* Saint-Joseph.

Vermiliopsis pygidialis (Willey, 1905).

1 specimen, from underside of rock bearing *Siliquaria ponderosa,* East Point, Darwin, Northern Territory, 25-10-65.

This species was recorded from Ceylon (Willey, 1905); Suez; Zanzibar (Fauvel, 1953); Queensland (Straughan, 1967).

Willey (1905), Pixell (1913), and Fauvel (1953) state that the branchiae are elongated, often with much swollen ends free from pinnae. Straughan (1967) records a specimen with branchiae of this type from Pialba, Queensland. Dew (1958) and Pillai (1960) do not comment on the state of the branchiae of their material.

The specimen collected at Darwin does not have a free tip on the branchiae and the terminal pinnae are at the end of the branchiae. The operculum resembles those figured by Willey (1905), Fauvel (1953), and Pillai (1960), and has a brown chitinous and elongate cap. The opercular stalk bears some annulations.

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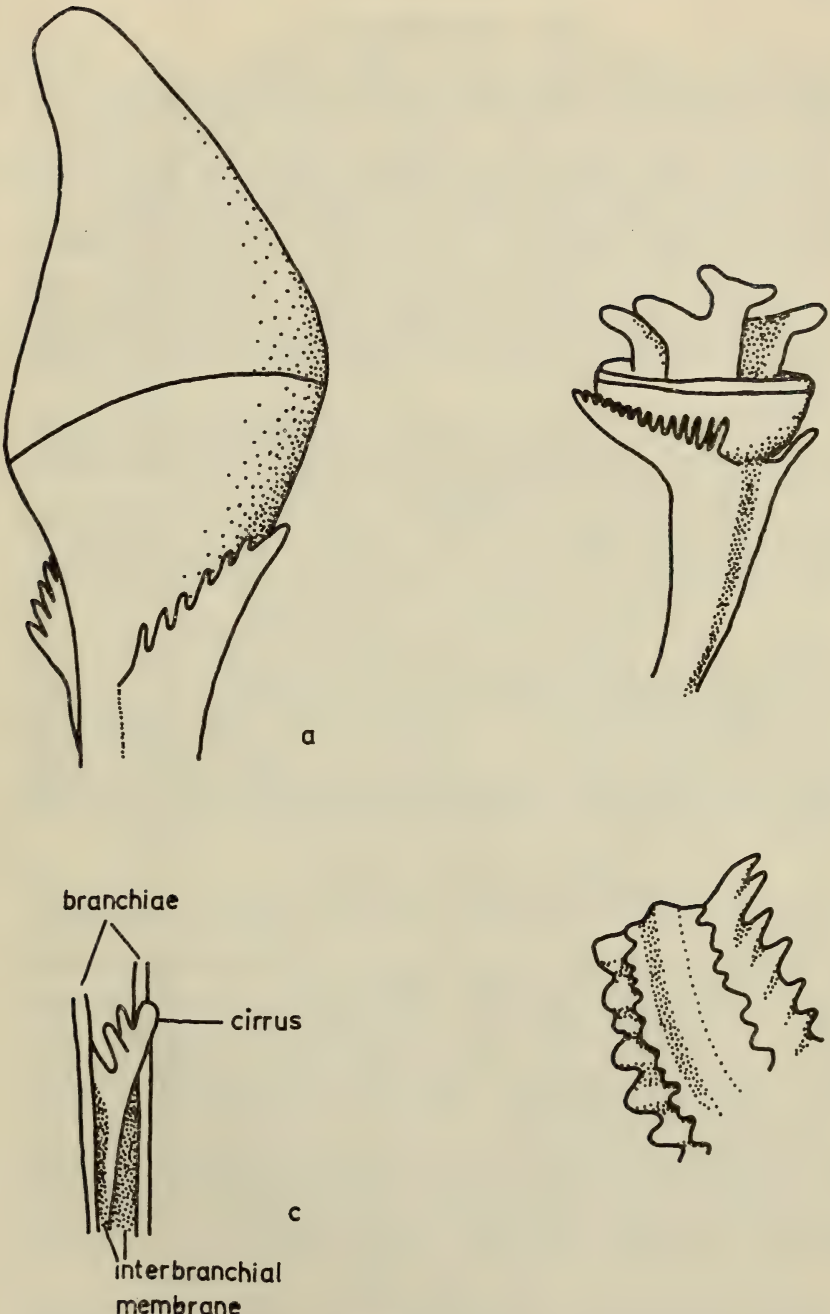

Figure 1.—*Spirobranchus coutierei* (Gravier). See text.

Genus *Pomatoleios* Pixell.

Pomatoleios kraussii (Baird, 1865).

Numerous specimens, on rocks at Fannie Bay, Darwin, Northern Territory, 11-10-1965; numerous specimens, below oyster zone on chain, supporting filter screens, Stokes Hill Power House, Darwin, Northern Territory, 22-10-1965; empty tubes, "mud zone", East Point, Darwin, Northern Territory, 26-10-1965; 10 specimens, Dudley Reef, Darwin, Northern Territory, 13-10-1965.

This species was previously recorded from Indian Ocean (Pixell, 1913); Madras, Red Sea (Fauvel, 1953); South Africa (Day, 1955); Queensland coast (Endean, Kenny, and Stephenson, 1956); Ceylon (Pillai, 1960); Japan (Imajima and Hartman, 1964); Philippines (Pillai, 1965).

Knox (1960, p. 593) states "One of the distinctive features of the southern shores of South Africa, Australia, and New Zealand is the development in the mid-littoral zone of encrusting serpulids" and on p. 594 "*Pomatoleios crosslandi* [=*kraussii*] occurs on the sub-tropical and warm temperate shores of East and South Africa, *Pomatoleios kraussii* on the sub-tropical coasts of Queensland . . ."

P. kraussii forms a zone in the tropics as well. Straughan (1967) records that it forms a zone at least as far north as Cooktown (about 16°S latitude) on the Queensland coast and, from the abundance and density of the material collected, it is an important zoning animal at Darwin.

As indicated above, the species extends into the northern hemisphere. Pillai (1960, 1965) notes that the species is abundant and often found in masses but does not mention the formation of zones. Imajima and Hartman (1964) do not indicate the abundance or distributional habits of the species.

Genus *Pomatostegus* Schmarda, 1861.

Pomatostegus stellatus (Abildgaard, 1789).

1 specimen, on reef, Cape Don, Northern Territory, 17-10-1965; 3 specimens, Dudley Point reef, Darwin, Northern Territory, 28-10-1965.

This species was previously recorded from the tropical waters of the Indian, Pacific and Atlantic Oceans (Fauvel, 1953). It was recorded from Shark Bay, Western Australia by Augener, (1914), from Thursday Island by Dew (1959) and from North Queensland by Straughan (1967). It now appears to have a continuous east west distribution through tropical Australian waters.

Genus *Spirobranchus* Blainville.

Spirobranchus coutierei (Gravier, 1905).

4 specimens, in coral among rocks, Fannie Bay, Darwin, Northern Territory, 11-10-1965.

This species was previously recorded from Suez (Gravier, 1905); Zanzibar, Red Sea (Pixell, 1913); and Panama (Monro, 1933).

As noted by Gravier (1905) and Pixell (1913) the number of opercular processes in this species is variable. The smallest of the specimens from Darwin has a cone-shaped top to the operculum with no processes (Fig. 1a) while the largest has a flat opercular plate bearing several processes (Fig. 1b). All have a cirrus with several processes arising from the interbranchial membrane between adjacent gills (Fig. 1c).

This species appears to settle on the outside of growing coral and the tube gradually becomes covered by coral. The three larger tubes from Darwin were covered by coral with only the tube apertures visible while the anterior of the smallest tube was not covered by coral. The tube has a dorsal ridge and a pair of indented lateral ridges. There are also a series of indentations along the edge of the tube where it joins the substrate. (Fig. 1d).

Empty tubes

Several tubes on oyster shell, Fannie Bay among rocks, Darwin, 11-10-1965. These appear to be empty tubes of *Protula* sp.

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OBITUARY NOTICES

Lieutenant-Colonel Henry Bertram Knowlding Burgh

During the early 1940's I first met Harry and Mrs. Burgh. They became active members of the Ornithological Section of the Royal Zoological Society of New South Wales, took keen interest in both the scientific and social activities of the Society, regularly attended meetings and joined in field-outings. When their children, Robyn and Phillip, were old enough they also became well-known among field-outing personnel. I well remember seeing Robyn holding her father's hand and Phillip astride his shoulders. Harry Burgh was then at his happiest — the perfectly equipped naturalist, eager to locate and explain what birds, mammals and flowers really meant to him. He had a good knowledge of birds and will be remembered as a competent field ornithologist.

Henry Burgh joined the Society in September 1942 and was a member of Council from May 1949 to September 1953. He had a distinguished military career. He served during World War II as a Major in various Pacific Islands operations, and afterwards with the occupation forces in Japan. Promoted to the rank of Lieutenant-Colonel, he served in Korea. From 1957 to 1960 he was Technical Staff Officer with the Australian Army in London. Since June 1963, he served as Commanding Officer of No. 2 Base Workshop at Moorebank, near Sydney, and held that position at the time of his death, on March 20th, 1967, at the age of 50. He was accorded a full military funeral.

We extend our sympathy to Mrs. Ada May Burgh, Robyn and Phillip and mourn the loss, all too early in life, of one who possessed a great love of the outdoors, and found so much interest not only in ornithology, but zoology in general.

— A. R. McGill.

Dr. P. D. F. Murray

The sudden death of Dr. P. D. F. Murray on 18th May 1967, during a voyage from Australia to England removed from the circle of his friends a man of unaffected charm and considerable attainments and a member of a famous family, distinguished in varied walks of life. The *Australian Genealogist* 8 (3), 1956: 47-49 indicated this relationship.

Patrick Desmond Fitzgerald Murray was the son of the noted Administrator of Papua, Sir Hubert Murray, and was born on 18th June 1900 at Dorchester in England. He was educated at Riverview College, Sydney, and the University of Sydney.

He was a member of the Royal Zoological Society of New South Wales as long ago as 1919, but not continuously since, for he rejoined in November 1949. He was Librarian of the Naturalists' Society of New South Wales in the early 1920's. In 1922 he went to Oxford University where he received his B.Sc. degree in 1924. He had studied under Professor Goodrich and Julian Huxley. With the latter he worked on the effects of grafting animal tissues on to the membranes of embryo chicks. In April 1924, Murray became a Macleay Fellow in Zoology of the Linnean Society of New South Wales, continuing his research on limb-buds of the embryo chick and on the reactions of tissues to the introduction into them of foreign bodies (especially other tissues) with special reference to metaplasia. He also worked on the influence of different quantities of yolk on the development of allied species of the frog, *Pseudophryne,* and on the transplanting of insect tissues. He contributed several papers to the Linnean Society of New South Wales on the anatomy of sharks and of the frog. He next became lecturer and demonstrator in zoology at the University of Sydney, from 1926 to 1929, receiving the degree of D.Sc. His unpretentious behaviour made him popular with students: he cycled to lectures, which he timed with a gold watch on the end of a piece of string. I am grateful to him for introducing me to the wonders of plankton when I was one of his party tow-netting from a rowing-boat in Port Hacking in 1926.

In the 1930's, Murray was a Royal Society Smithson Research Fellow at Cambridge where he graduated M.A. (Hon.). From 1938-39 he was demonstrator at Bedford College, London, thence until 1948 was University Reader in Biology at St. Bartholomew's Hospital Medical College in London. "Pat" Murray was Challis Professor of Zoology at the University of Sydney from 1949 and was a Trustee of the Australian Museum from 1950 until January 1960 when he resigned both positions to take up that of Reader in the Department of Zoology at the University of New England, Armidale, New South Wales. In 1954, he became a Fellow of the American Academy of Arts and Sciences and in 1966 was elected a Life Member of the Royal Zoological Society of New South Wales as a tribute to his zoological work.

It will be for others to compile his bibliography. Here I may merely note that Murray wrote short articles on the crab, *Pinnotheres,* and other subjects in the *Australian Naturalist* from 1922 onwards. His researches, or some of them, on the nerve-endings of frog limb-muscles, on the muscles of the dog-fish, *Squalus,* and the Wolffian duct of another dog-fish, *Scylliorhinus* appeared in the *Proceedings* of the Linnean Society of New South Wales in the 1920's. He published a work on Bones in 1936 and various articles in academic journals. His major work was the text-book, *Biology*: *an introduction to medical and other studies* (London: Macmillan, 1950; second edition, 1960).

— G. P. Whitley.

BOOK REVIEW

"Underwater Guideposts. Homing of Salmon."

By Arthur D. Hasler, University of Wisconsin Press, Madison, 1966.

Price $6.00 (U.S.)

It has been shown over and over again that salmon are able to return some years later to the very tributary in which they were born, often after travelling a thousand miles and more in the sea from the mouth of their home river system. This implies open ocean directional swimming, as well as ability to find their home stream. Professor Hasler and his students have been determinedly attempting to solve these problems over the last fifteen years, and he has now given us a review of his work, and that of others, on salmon migration.

The method used is a statement of the general problem, and then an outline of experiments, or series of experiments, to test hypotheses made. This book also gives credit to the work of many other researchers, and one is led easily through the maze of literature on the subject, being shown how experiment after experiment solves various sections of the puzzle.

Professor Hasler shows with clarity that fishes can smell the difference between the waters of two streams, that they can learn and remember these differences, and that it is very likely that early learning of the "bouquet" of a home stream is the method of finding the "home tributary". He points out that still much will have to be done to prove this beyond doubt.

Professor Hasler also proposes that in the open ocean phase of migration the salmon are oriented by a sun-compass mechanism. He describes briefly some experiments to suggest that white bass in Lake Mendota, Wisconsin use a sun-compass mechanism, and feels the salmon may do the same. This is not fully substantiated.

To give Professor Hasler credit he often puts an opposing authority's view-point.

This book is stimulating in its (generally) simple explanation of the whole process of scientific inquiry. As in much scientific work far more questions are opened than solved.

This book does not talk down to the reader, and yet is in understandable language refreshingly free from scientific jargon. The specialist will find it a good account of the subject, if admittedly based on the work of one school. Non-specialists will get an excellent insight into the fascinating migratory behaviour of the salmon, and the enthusiastic scientific behaviour of Professor Hasler.

— F. H. Talbot.

PERSONAL OBSERVATIONS

IN

VICTORIA

BY

WILLIAM VON BLANDOWSKI,

CURATOR OF THE MUSEUM OF NATURAL HISTORY
IN MELBOURNE.

PAPERS REPRINTED FROM THE TRANSACTIONS OF THE PHILOSOPHICAL SOCIETY.

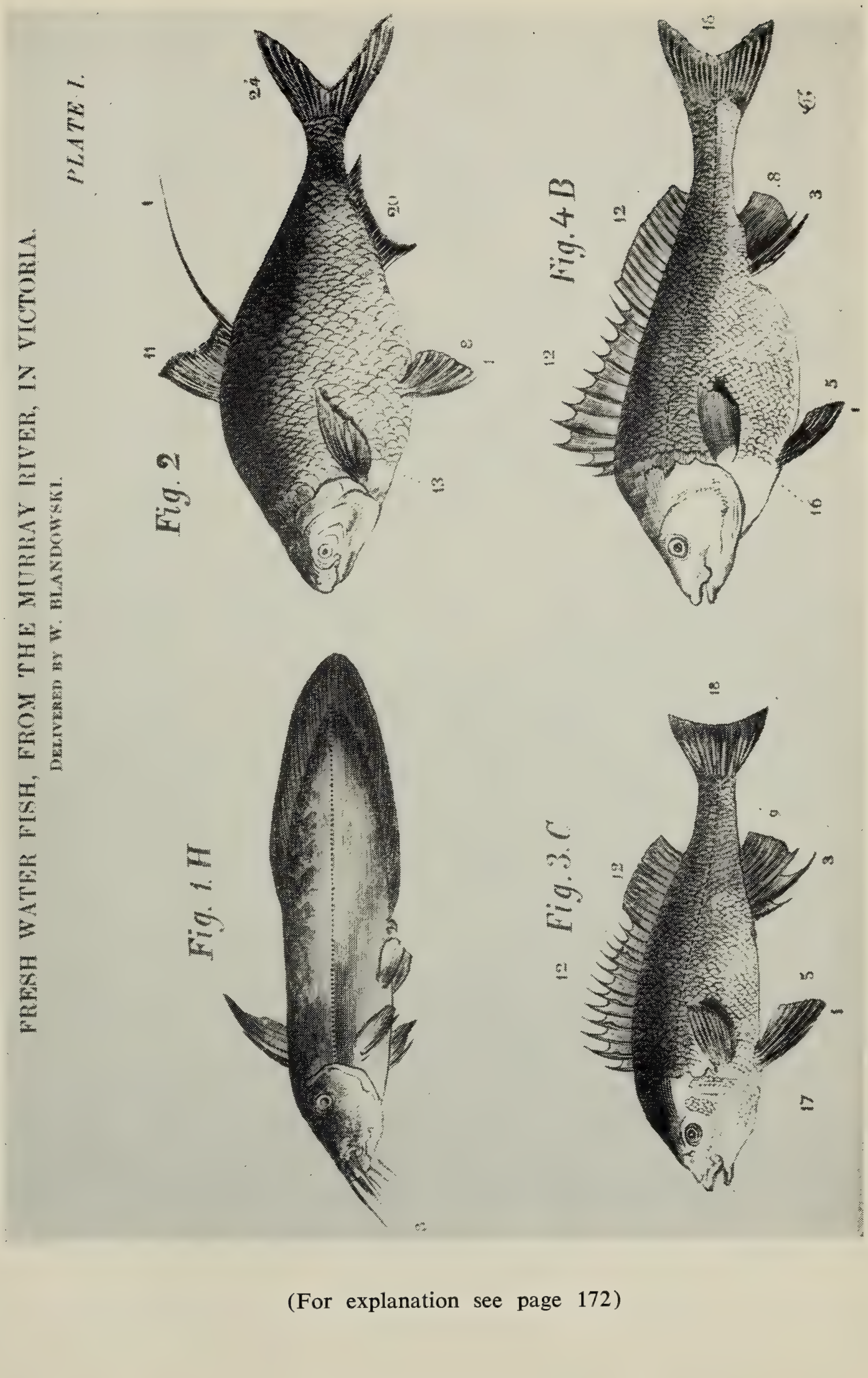
MELBOURNE:
GOODHUGH & TREMBATH, FLINDERS LANE, EAST.
1855.

Blandowski.

(For explanation see page 172)

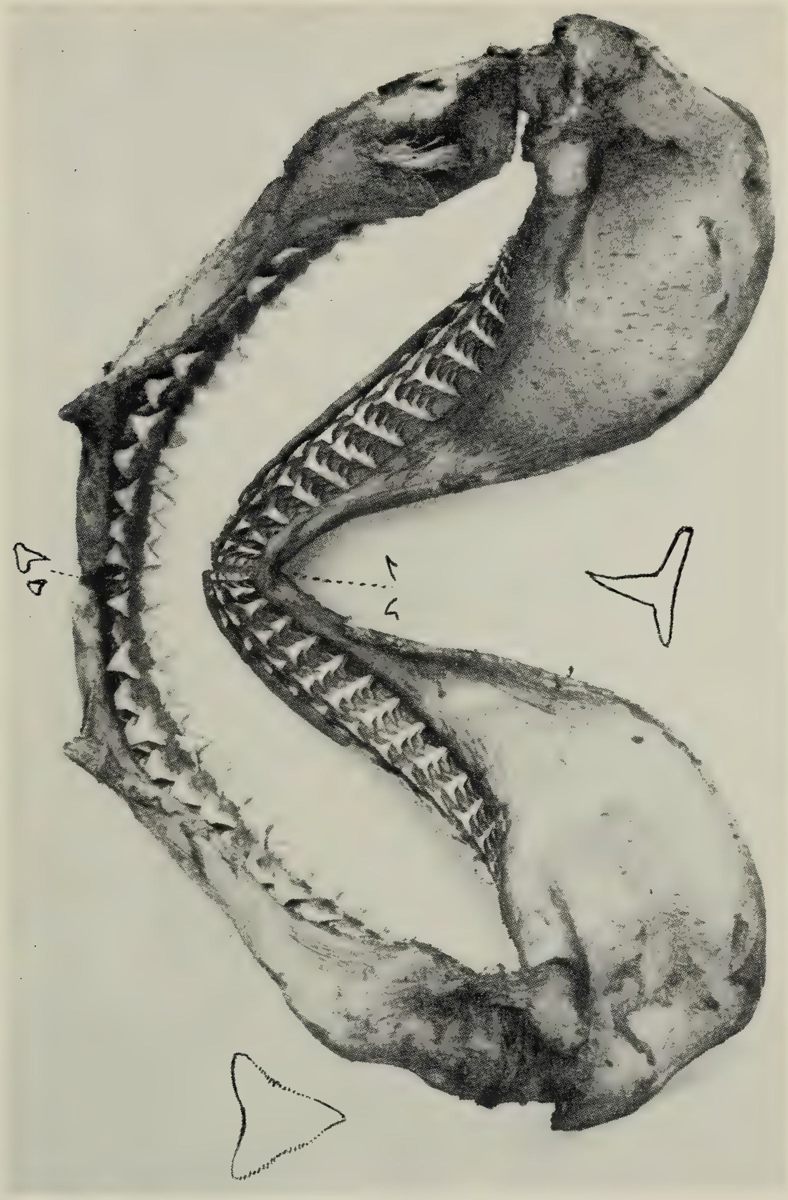
Blandowski's camp.

(For explanation see page 172)



Blandowski

(For explanation see page 172)



Jaws of holotype of *Galeolamna greyi* Owen in the Museum of the Royal College of Surgeons, London.

(See page 178).

ROYAL ZOOLOGICAL SOCIETY OF NEW SOUTH WALES

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(The Society's year commences on 1st July)

Fees are as follows:—

Class	*Amount of Subscription*
Associate Member	$ 2.10 per annum
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Life Associate Member	$21.00 in one sum
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Junior Members (aged 16 or under)	50 cents per annum

TITLES

(Conferred by the Council)

Fellow	For valuable services to the Society or to Australian Zoology
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PRIVILEGES:

Members of all classes may attend all meetings of the Society and its various Sections. Every member (other than an Associate, Life Associate or Junior Member) receives a free pass to Taronga Zoological Park and Aquarium, and twelve tickets each year, admitting 12 adults or 24 children to the Park only.

APPLICATION FOR MEMBERSHIP

should be addressed to the Honorary Secretary, Royal Zoological Society of New South Wales, c/o Australian Museum, P.O. Box A.285, Sydney South, New South Wales.

PUBLICATIONS

The Australian Zoologist, published at irregular intervals since 1914.

Proceedings, published since 1933-34.

AUSTRALIAN ZOOLOGICAL HANDBOOKS AND SPECIAL REPRINTS.

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"A Reclassification of the Order Odonata", by F. C. Fraser, 1957.

"Dragonflies of Australia", by F. C. Fraser, 1960.

Orders and enquiries should be sent to the Honorary Secretary, Royal Zoological Society of New South Wales, c/o Australian Museum, P.O. Box A.285, Sydney South, New South Wales, 2001.

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THE

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THE AUSTRALIAN ZOOLOGIST

VOLUME XIV PART 3

JOSEPH LEATHOM HOLE WASSELL AND HIS CONTRIBUTION TO AUSTRALIAN NATURAL HISTORY

By ELIZABETH N. MARKS

National Mosquito Control Committee, Department of Entomology, University of Queensland.

(Plates V-VI).

Cape York Peninsula was Lea Wassell's home in every sense and his delight was to match himself against the Peninsula bush in physical tussles which called for all his strength, endurance and bushcraft, and in intellectual contests using his natural history knowledge, his powers of observation, and his ingenuity to wrest from it its strange and undescribed animals and plants and secrets of their life-histories.

Here was a many-sided man indeed—an over-optimistic adventurer who landed himself in an incredible multiplicity of predicaments, an intrepid and resourceful bushman who successfully extricated himself from these situations; a man of gentle manners and a graceful courtesy to all his fellows, whose favourite outfit comprised a pair of khaki shorts and a wrist watch; apiarist, store-keeper, soldier, scientific assistant, mail contractor, hotel keeper, pastoralist; skilled mechanic and worker in wood and metals, ingenious gadgeteer, whose description of himself as a "jack-of-all-trades with a bias towards bug hunting" was a characteristically humorous and modest assessment of a consummately skilful collector of natural history specimens.

Lea's father, Dr. Joseph Wassell, son of a Brisbane family, after a brilliant academic and sporting career at the University of Sydney, became Government Resident Medical Officer at Thursday Island in 1902 and in 1915 died there, respected and beloved by all classes throughout the Torres Straits. Lea, born at Thursday Island in 1908, went then with his mother and sister to live at Manly, Sydney. With them went an Islander nursemaid who taught the small boy to swim long distances under water, often to the astonishment of visitors to Manly beach. He started school at Manly Public School in 1915 and a teacher there, Mr. Woods, noticed and encouraged his interest in insect life. During the years he attended that school, all Lea's pocket money was spent at Cherry & Sons on entomological pins, boxes, setting gear and killing bottles, and all his spare time in collecting around Manly and French's Forest. H. J. Carter was interested in the boy and helped him and he often accompanied Carter, Dr. G. A. Waterhouse and Dr. E. W. Ferguson on collecting trips. These men were distinguished entomologists specializing respectively in Coleoptera, Lepidoptera and Diptera.

From 1922-4 Lea was at King's School, Parramatta. Duncan Mackay recalls that when they were new boys together, Lea at 14 was possibly the tallest boy in Thomas House, knew the Latin names for his insects, and was a keen photographer with a flair for taking a balanced picture. He writes: "One day in mid 1922 a chemist in Parramatta rang the housemaster to warn him that one of his boys had just had a Cyanide bottle recharged and he presumed the master knew all about it. The 'fat' WAS in the fire then but H. C. Blaxland was of an understanding nature and allowed the bottles (others of us had bottles also by then) to be locked up under the stairs, and beetles and butterflies given the lethal dose every now and then."

During 1923 and 1924 the two friends frequently were gated after taking French leave to go into the bush after beetles and birds' eggs.

Lea spent 1925 in Brisbane where he attended Brisbane Grammar School and the following year, returning south, he won the All Schools Open High Jump for Sydney Grammar.

Looking back in 1966, he wrote of his early collecting days, "Days spent with Dr. Ferguson, Dr. Waterhouse, H. J. Carter and days spent roaming French's Forest collecting Buprestids for A. M. Lea. Always remember wonderful days on horseback with H.J.C. in the Blue Mountains. We used to hold the reins and the spike of an open umbrella in one hand and shake flowering gums with the other hand.

"French's Forest was a wonderful place and I used to walk miles and miles when collecting beetles from the *Angophora* flowers. I think a couple of dozen *Stigmodera grandis* would be a good average season's haul but I recall one season that I walked every third day and was very energetic and sent Lea 80 *S. grandis.*

"I used to collect a lot around Sydney and around the Narrabeen Lakes with Dr. K. K. Spence [a coleopterist]. Used to have my own collection in the N.S.Wales days but gave it up. Have little to remind me, a few letters and a small string of beetles *wasselli.*"

The South Australian Museum printed labels for him "in return for the copious supply of beetles I used to send from N.S.W." In 1956, sending specimens of *Delias aruna inferna* to Mr. Perkins, he said, "Have hardly touched a butterfly since the days when Dr. Waterhouse and I used to collect Hesperidae and I did a bit of setting for him".

In 1931 Lea Wassell was in Brisbane and joined the Entomological Society of Queensland; he succeeded G. H. Hardy to become its second Treasurer 1932-3. At that time the Society held excursions and he took part in these, being particularly interested in Helminthidae (then thought to be Dryopidae) on which he gave a talk in June 1932, acknowledging identifications by H. J. Carter. Over the years since the Society had many and varied exhibits from him, though he was seldom there to present them himself. He was a foundation member of the Australian Entomological Society.

Lea was bee-keeping at Blackbutt in the upper Brisbane Valley in 1936 when he met Eileen Thompson, a trained nurse whose father, H. J. Thompson, had business and pastoral interests in the Coen district of Cape York Peninsula. They were married in 1938 and went to live at Coen, assisting her parents in their business.

In 1940 he enlisted in the Army. J. L. Groom, his C.O in New Guinea, writes, "Lea worked as a member of the 5th Field Hygiene Section stationed at Enoggera in 1940 and 1941, and played a very important part in the district mapping of mosquito breeding places in co-operation with Mr. F. A. Perkins and a number of other staff members of the unit. This work was of considerable importance to the health of both military personnel and the civilian population.

He left for New Guinea on the *Aquitania* on, I think, Christmas Day, 1941. Following the first Japanese bombings and the rapid evacuation of civilians, considerable health problems arose. Lea was responsible for the supervision of teams charged with the cleaning up of health risks in the town [Port Moresby] area. He did an excellent job and I deeply regretted that he was boarded medically unfit for service in that area."

Invalided out of the Army after six months in New Guinea, Lea was asked by Major N. M. Gutteridge to re-enlist on a live-at-home basis, to become Field Instructor for the L.H.Q. School of Malaria Control, located in the Department of Entomology, University of Queensland, under the command of Captain F. A. Perkins. Many of the personnel of Malaria Control Units that served in New Guinea passed through this School. He filled this post until the end of the war, rising from Sergeant to Lieutenant and taking pleasure then in the opportunity to wear his father's officer's sword on a ceremonial occasion.

The years with the School, besides adding mosquitoes to his special interests, established his friendship with many of the University staff, both academic and technical, and from 1946-50 he was himself on the staff as collector of class material for the Departments of Zoology and Botany. His colleagues of those days remember well this very tall, lean, bronzed man with the high forehead, twinkling brown eyes, and long springy stride that made him hard to keep up with in the field.

During this period he usually managed to fit in an annual trip to Coen and Silver Plains Station. An east-west line through the centre of Silver Plains was the southern limit of many New Guinea animals and plants and Lea became fascinated with the area, particularly the vast and almost impenetrable rainforest known as the Massy and Rocky Scrubs.

In 1951 he resigned from the University and in 1952 was appointed to C.S.I.R.O. and worked on pearl culture at Thursday Island. In late 1952 his father-in-law's illness necessitated the family's moving to Coen where they lived until 1955 when they moved to Silver Plains station near Port Stewart. Here Lea's time was occupied with the building of a new homestead and sheds, yards and fencing, making roads and later an airstrip, cutting timber and carting supplies. Among honorary duties, he was a Fauna Protector and a Coast Watcher. The stock work, which his wife enjoyed and supervised, never appealed to him. He wrote, "I exasperate my family and neighbours by my inability to tell a horse from a gelding or a droughtmaster from a devon-shorthorn cross." Work was interspersed with illness, operations and accidents, including in 1960 the loss of three joints of the first and second fingers of his left hand in a circular saw he had rigged up from one of the old gold mines. It was typical of Lea that when the accident happened, he looked at the mangled hand and said, "You chaps carry on here and I'll go and fix this up", which he did. Nobody was at the homestead at the time but his son David arrived to find him snipping off a finger hanging by a thread of skin, and was able to obtain the help of Cairns Aerial Ambulance with advice on interim treatment, and transport to Cairns Hospital. On arriving home again Lea took supplies by jeep to a mustering camp on the station's northern boundary. On the way back the jeep broke down, so that afternoon and the next day he walked back to the homestead—"About a 42 mile walk which wasn't so bad as the week before I could hardly manage twice round a Cairns city block." A few months later he wrote that "the hand is well healed and does not give me any bother, have already trained it for pinning microlepidoptera . . . quite OK with .22 or .303 . . . have caught and handled 4 snakes and 1 venomous one so far." He was able to "handle my chain saw like a veteran cake cutter except when left hand tires when changing types of cut and then my shorts or right leg gets a bit frayed."

Lea was now able to spend all his spare time doing what he liked doing more than anything else, exploring the rainforest, an exhausting and hazardous occupation for it had to be done on foot, following the pads of wild cattle, and he often found it necessary to shoot a wild charging scrub bull. Fortunately he was a crack shot. Commenting on a crocodile skull in the last photo taken of his wife and himself before leaving Silver Plains, he said, "It is doubtful if professional croc. shooters ever get the thrill of unexpected encounter shooting with lights as I do when wandering around by day. This croc. came from holes between Massy Creek and Rocky River, a male 16 ft. 8 in. Two other large ones that gave me a thrill were 16 ft. 7 in. and 17 ft. 5 in. both of which I shot at the mouth of the first creek south of the Rocky River, 50 ft. 8 in. of croc. for 3 shots." Some of his trips were in a fibreglass boat along the coast and to off-shore islands.

The country that most fascinated and yet eluded him was at the top of the McIllwraith Range, where his ambition was to camp and collect for several months. Whenever he could he worked to cut himself a track up through the Massy scrub, but the needs of the station, the physical mishaps that befell him, and the weather all operated against completion of this project. In 1963 he told Mr. Perkins, "It is galling to me to be so tied down with work in an area like this that I now seldom get out to collect." In May 1964 he wrote, "The trip has not really eventuated yet. I started cutting a track up the valley of the main Massy Creek. Wanted to complete the track to the top of the McIllwraith Range, move all my gear up and collect. To dodge patches of horizontal scrub and lengths of creek banks covered with jumbled sharp stones I had to have a number of crossings and found that the Massy was too high this year. The area I am heading for is the highest land between the Bloomfield River and New Guinea and the high part has now been definitely found to be 2,700 ft. I got up to about 1,700 ft. and it is a wild and very promising spot."

In 1965 the station was sold and the Wassells moved to Cairns. Despite illness, Lea's ambition remained. He wrote in July 1966 that he would be going to Coen "to pack for a trip to that high country. I will travel by landrover as far, or as near to, as I can the edge of the rainforest. I will not set out from Silver Plains and use my tracks to the edge of the rainforest on the Massy but travel by foot along the crest or eastern edge of the McIllwraith Range till I reach my goal. It will be slow going as I will wander back and forth till I have all gear and food in the area, then I'll have a good look round for everything I want and hope to find." In December 1966, against doctor's orders, he went to Coen, to the little old cottage where he had stored all his collecting gear, to prepare for this trip. There on 22 December, a friend found him collapsed and he died on the way to the aerodrome.

Lea Wassell was a worthy successor to the notable amateur entomologists and naturalists who had encouraged him as a boy, though his contribution to knowledge was not in published works. (His 1966 article "Coprophagous weevils", *J. ent. Soc. Qd. 5*: 73-4, developed from notes and specimens he sent to Mr. Perkins, was possibly his only entomological publication.) His pleasure and his achievement was in the provision of scientific material, accompanied by careful field observations, to persons or institutions that he knew could make good use of it. Thus directly, and also indirectly by guiding visiting scientists, he made an immeasurable contribution to knowledge of the flora and fauna of Cape York Peninsula. He had hoped at one stage to obtain sufficient commissions from institutions to enable him to spend half the year in the field but for a variety of reasons this proved impracticable, though he did undertake some. He gave freely of his time and work to scientific bodies and his gain was the satisfaction he received through this work.

Lea fostered an interest in nature study in many children. To the Coen State School he donated an insect collection and books on nature study, no doubt remembering Mr. Woods and his own early schooldays at Manly.

Specimens that he gave to the Department of Geology, University of Queensland, included the type of a cretaceous decapod, *Enoploclytia tenuidigitata* Woods, collected on the Walsh River. A large geological collection was ready to be sent when lost in floods. Under charter to the Department of National Development, in 1963 he took Mr. K. G. Lucas of the Bureau of Mineral Resources to various parts of the coast and islands, incidentally finding aboriginal paintings on Cliff Island and being bitten by a Myall snake, *Denisonia suta*, which he caught at Port Stewart and sent to the Australian Museum.

Interesting plants sent to the Queensland Herbarium included two new orchids, *Vanda whiteana* Herbert and Blake and *Dendrobium wasselli* Blake.

In 1958 he undertook a commission for the Royal Botanic Gardens and National Herbarium, Melbourne. Mr. J. H. Willis writes "During 1958 he sent us 89 different orchid plants (and a few others) that he had collected in the Rocky River region of the McIllwraith Range, in June and July of that year. Most of these Cape York orchids have done well and several of them have flowered, thus enabling us to make identifications. Among them were some apparently new records for Australia (including the New Guinean *Dendrobium d'Albertisii*) and two genera that are quite new to Australia—viz. *Robiquetia* and *Thelasis,* represented by what are almost certainly undescribed species. Together with an undescribed *Sarchochilus,* these were the highlights of Lea's consignment. His habitat notes accompanying the various numbers are helpful, e.g. "Found on fallen tree at edge of river, full sunlight. Also originally found on top of boulder in Massy Cr. in full sunlight many years ago." Lea also helped the C.S.I.R.O.'s Australian Phytochemical Survey, supplying *Lunasia,* an understory plant from inaccessible areas in the Coen district, which provided a link in the chemical study of the Rutaceae; helping in the work on Finger Cherry; and guiding botanical parties, one such, which included Dr. L. J. Webb and Mr. L. S. Smith, being to the McIllwraith Range in 1962.

Dr. F. H. Talbot, Director of the Australian Museum, has written "Mr. J. L. H. Wassell was an Honorary Associate of the Australian Museum and over a period of many years collected a great number of valuable specimens from Cape York for the Museum. Mr. Wassell collected [mollusca] for Dr. McMichael for some years prior to the Australian Museum-Cape York expedition in 1960. At this time the Department of Reptiles became closely associated with him. Since that time he has sent us small but fairly regular shipments of reptiles and frogs, a number of which constituted new additions to our collection. On the expedition just mentioned Mr. Wassell and his wife were hosts to Mr. Smithers and Mr. Marlow and Mr. Cogger during their stay on Silver Plains and subsequently Mr. Wassell acted as guide and mentor during the party's work in the Rocky River area. The success of the 1960 expedition was in large part due to the help given to us by Mr. Wassell and his family. Mr. Wassell's unflagging enthusiasm for all things biological was contagious and his death deprived the Museum and its staff of a very good friend."

Contributions to the Australian National Insect Collection included Tetrigidae and Morabinae sent to Dr. K. H. L. Key and some hundreds of microlepidoptera sent to Mr. I. F. B. Common. The latter, collected as they came to light at the homestead, were unspread but carefully pinned and in excellent condition. Lea also reared a few Lepidoptera, and sent a fine series of galls from which was reared a large, probably undescribed, species of Alucitidae (Orneodidae).

The Department of Entomology, University of Queensland, with which he had been so closely associated during the war, was one of the chief beneficiaries of Lea's generosity. To its head, Mr. F. A. Perkins, he sent a great variety of specimens, among them trap-door spiders with their tunnels ingeniously preserved by a coating of grass-tree gum; scorpions which his aboriginal helpers caught by the tail; ant-plants with their associated insects; a new mite, *Laelaps wasselli* Domrow, from the white-tailed water rat; a specimen of *Cylindrachaeta* the primitive burrowing cricket; marine midges, *Pontomyia natans,* from Princess Charlotte Bay; a nest of the native bee, *Trigona hockingsii,* whose behaviour Professor C. D. Michener wished to study while he was visiting the Department. To Lea Mr. Perkins sent some of the Department's overseas visitors, Dr. and Mrs. J. L. Gressitt, Bishop Museum, in 1961 (Mrs. Gressitt has a hair-raising tale about her encounter with a scrub bull, shot by Lea in the nick of time); and Professor P. J. Darlington of Harvard. Professor Darlington wrote "He was a fine naturalist and a fine collector of natural history specimens. My wife and son and I visited the Wassells at Silver Plains in 1958, and Lea took my son and me to the Rocky River and into the scrub there for several days, travelling cross-country of course, and camping. He was an exciting companion and a tremendous worker, with an unrivalled knowledge of that part of the country and of the animals in it. He will be very greatly missed." It was fitting that the last entomologists Mr. Perkins sent to Lea, in 1964, were two of the younger generation from his own staff, Miss L. A. Powell (now Mrs. Ballantyne) and Mr. G. B. Monteith.

Many of the specimens sent to the Department were accompanied by photographs or transparencies of habitat or host animal or plant. Lea's interest in photography had continued since boyhood. Major floods at Silver Plains in 1958 destroyed many of his slides as well as notebooks and equipment.

Some of Lea's major entomological contributions concerned mosquitoes, in which he collaborated with E. N. Marks, who started her research in the Department in the days of the Army Schools, and her field work under his and Mr. Perkins' tuition. On a field trip together from Coen in 1953, driving through dry savannah country, she told him of collecting larvae of *Aedes longirostris* from crabholes among mangroves near Cape York, and of finding *Aedes culiciformis,* a species previously known from two specimens, biting in large numbers on Badu I., without finding its breeding place. Lea almost immediately pulled up at a small waterhole, located fresh water crab-holes within a few yards of it from which resting mosquitoes flew, inserted a rubber tube more than 18 in. to reach water, and sucked up larvae which when reared proved to be *A. culiciformis.* Later, in the wet season, he checked that the larvae were still confined to crabholes and photographed them there; he also dug out many holes in an unsuccessful attempt to discover whether this species, like one in Africa, lays its eggs on the crab.

On that same trip, following a route used only once by another vehicle between Violet Vale and Marina Plains, the faint tracks were lost on a claypan. Dr. Marks, convinced she had found them, called to Lea to drive up a bank and that there were no obstructions. Up he drove and crashed into a stump hidden in long grass, bending the landrover's steering rod. There were no recriminations, he merely said, "I think we'll have a cup of tea." While the billy boiled he removed the rod, heated it in the coals while the tea was drunk, belted it straight with the back of an axe, replaced it, and the trip continued.

Lea worked out numerous life histories. He was the sole or joint collector of the type specimens of six species of *Aedes,* including *A. wasselli* Marks, and the first to discover two genera in Australia, *Malaya* (formerly *Harpagomyia*) at Cairns in 1944 and *Orthopodomyia* at Rocky River in 1958. The single larva of *O. andamanensis* that he collected remains the only specimen of the genus known from Australia.

His outstanding achievement was to work out the first life history of a species of *Aedes* (*Chaetocruiomyia*). This endemic Australian subgenus had been known for 50 years, and six species described, but specimens were rare in collections and only one damaged male was available. Lea wrote in April 1960, "I am concentrating on high and difficultly accessible bodies of water i.e. tree top holes. First fruits are No. 1. Our natives quite understood me climbing tall trees and peering into holes as everyone likes wild honey and it is well known that us poor whites can't always see beehives from the ground, they are a bit wary of me now, however, after seeing me perched in forks of trees paring branches down with a draw knife. Very often carry a good pair of binoculars and examine trees thoroughly before exerting myself." His "No. 1" included a male and a female of *A.* (*C.*) *tulliae* each with its larval and pupal skins; the larvae were from two holes of about 1 in. diameter and 6-12 in. depth 25-30 ft. above ground in limbs of a dead bloodwood.

Undoubtedly other persons and other institutions have benefited from Lea Wassell's collections. As with other great collectors, it will be many years before all the new species that he added to collections have been recognised and described. His friends will hope that they come into the hands of workers who make due acknowledgement of the contributions of collectors, for they represent part of a substantial gift to science by a very remarkable man.

Kind and generous, courteous and considerate, Lea Wassell will be warmly remembered by all his friends, who realise too that he could not have achieved what he did without the sympathetic understanding and unselfish support of his wife, Eileen. With her, with their sons Joseph and David, and with his sister Melanie, all who knew Lea feel a profound sympathy.

Besides the sources acknowledged in the above account, it is based on information received from Lea's wife, on his correspondence with F. A. Perkins and E. N. Marks, and on the personal recollections of his friends.

AMALIE DIETRICH

By (the late) Robert H. Lowie

(Submitted by Luella Cole Lowie (Mrs. R. H. Lowie), Berkeley, California).

In the little Saxon town of Siebenlehn, west of Dresden and southwest of Meissen, Amalie Nelle was born in the year 1823. She was the only girl in a family of four brothers, of whom only one—Karl—lived beyond childhood. Their father was a leather-worker who specialized in pocket-books and bags. The only living son learned the same trade and went as a journeyman during his wander-years to far off Romania, where he settled down as a master worker. The elder Nelle planned the future of his daughter in the ordinary way by hiring an apprentice who might, if he turned out well, become Amalie's husband. Until then, after her confirmation, she was to help her father with the needlework. The girl was a talented pupil at school, and her mother was extremely proud of her daughter's attainments. Her father, however, bemoaned the endless reading and learning. Later on, when she had to help him with his work, she read secretly many reports of journeys into foreign lands or romantic stories of adventure. Amalie had many suitors, and the old man was impatient when she turned down a weaver, a saddler, and a well-to-do grain handler. This last suitor lived in the Oberstadt, a part of Siebenlehn into which the Nelles rarely ventured. The girl seemed to be a changeling, and the people of the town began to joke about her: "Nelle's daughter talks like a book," they said. Even her age-mates could not understand her, especially because she was not interested in hearing about their love affairs.

Amalie was about twenty years old when one day her godmother from the Oberstadt brought news about a strange roomer, who was a druggist by trade. However, he had recently given up his job and had hung before the house a placard with the announcement: "W. A. S. Dietrich, Naturalist." The old lady believed that he must be practicing magic because he had his room full of curious containers and he gathered snakes, turtles, and unusual plants. Often he muttered magic words and—or so the godmother believed—had through magic caused a young apprentice to a tailor to carry willingly the utensils needed by his master while they journeyed about in strange countries where Turks and other heathen lived.

One day Frau Nelle and her daughter went into the woods to gather mushrooms. There they accidentally met a slender, elegant-appearing man who was studying a bit of moss intently through a microscope. She recognized in him immediately the enigmatic stranger. He, after he had examined the mushrooms already collected, led them to a place deep in the woods, where there were mushrooms in abundance and warned them against the poisonous ones. Soon they had filled an enormous basket and the grateful mother invited Herr Dietrich to her house the following evening in order to partake of the mushrooms.

For Amalie this experience was the most exciting event of her life. The blue-eyed, slender scientist had fascinated her, just as he had charmed the apprentice. From then on he visited the Nelle family again and again and brought books with coloured illustrations. The young woman listened spellbound to his explanations about the similarities and differences among mushrooms. One evening when she accompanied him outside, he pressed into her hand a slip of paper with the words, "Your heart is my heart." The next morning he asked her parents for her hand in marriage. The elderly couple were disturbed, the father especially for practical reasons. The profession of druggist he could understand and respect, but what would be the yearly income of a scientist? The young man spoke often and without hesitation saying that he had great hopes for the future, although he had little interest in money. At the moment however he could not promise anything. His wife would have to devote herself without reservation to the forwarding of his career and in the immediate future to give up the refinements of living. She must be willing, perhaps for years, to bear deprivation and discouragement. These prospects did not discourage the lovesick Amalie in the least, but her parents worried a great deal over them. With heavy hearts they gave her their permission, even though the suitor mentioned various members of his family who had become famous through their knowledge of botany. One of his ancestors, the landed proprietor in Ziegenhain in the neighborhood of Jena, had supplied the University with botanical specimens for puropses of demonstration and was a correspondent of Linnaeus. Also his uncle as a young man had aroused the interest of Goethe and later as Hofrat Dietrich became the overseer of the great ducal gardens in Eisenach. Another uncle had been a professor of botany at Jena.

It soon became clear that Dietrich had meant literally just what he had said during the courtship of his wife. All considerations that were not advantageous to his calling were put aside. He rented a large building that lay far from the middle of the town, in order to be near the woods that were his hunting grounds. For his collections he needed a great deal of room, especially room for drying specimens, so that the collected material would not become mouldy. He was delighted with the great wardrobes that his parents-in-law sent him. They were however not filled with linens, clothes, or kitchen utensils because they were so appropriate for his collections of insects. As for the three hundred taler dowry, he used this to buy presses for his plants, holders for his herbarium, flypaper, and alcohol.

Mother Nelle could neither visit her daughter daily in the distantly located house, nor could she bear it not to see her often. Therefore she persuaded her hesistant husband to sell the little house in which they had lived for years and to move into the neighbourhood of the young couple. She kept house for her daughter while William introduced his young wife into the collecting tricks of his profession. Amalie waded barefoot through the brooks in order to collect plants that grew on the other side. She wandered uphill and downhill. After the travail of the day they worked far into the night in order to prepare their assembled treasures of nature. William even dragged the old Nelles into the work, to help him after the evening meal. He taught his wife to see nature with new eyes—to find beauty in humble mosses and in the mud on the edge of a ditch. He explained to her the system of the famous classification of botanical names by Linnaeus, and, in winter, when there was no chance to gather specimens, he began to assign to her the assembling of materials that their customers had ordered, for instance: medicinal herbs for an apothecary, grasses and plants for farmers, mosses, ferns, and wreaths for scientists and specialists, poisonous plants for demonstration in schools. Amalie learned quickly, and the approval of her husband gave her unspeakable joy. She helped him with the preparation of classified lists and also with the endless work of mounting the plants on cardboard. Their financial situation was sometimes good and sometimes bad. They were beside themselves with joy to receive a threefold order for an exhibition of the entire flora of Saxony and were plunged into gloom when the client, who was unable to pay, sent them only nine taler instead of the expected ninety.

Soon William had to overcome an even greater disappointment. His greatest desire was to have a son who would become his companion upon his collecting trips and who could eventually become another Linnaeus or Humboldt. But when in 1848 Amalie bore her first child, it was a girl to whom they gave the name of Charitas. For four years Frau Nelle looked after the child, so that her daughter might have enough time to help her husband further with his work: but then she suddenly became sick and died. The loss of her mother was a severe blow to Amalie, and the results were incalculable. Amalie's father, who had never felt happy so far from

Siebenlehn, decided to move back into the lower part of the town where he found a housekeeper for his house. Moreover, Amalie was from the beginning of her marriage entirely engrossed in her husband's work and had completely left the housework to her mother. So it came about that the care of the house became thoroughly disorganized. Even though the financial situation of the Dietrich family was not good, they had to have a housekeeper, because William knew that as a technical assistant Amalie was of invaluable worth to him. A pretty, cheerful young woman applied for the job. She was endowed with all natural charms, in contrast to the lady of the house. She polished off the housework at great speed and attempted to help Herr Dietrich in his technical work, for which however she had no talent. One day Amalie heard that the girl had beaten Charitas for some small offence, whereat she dismissed her. Soon after this event William travelled to Berlin, in the hope of raising money to pay their debts and to find some new commissions. In the meantime Amalie was to prove her knowledge by assembling, independently of him, a collection of poisonous plants of a specified type. By accident Amalie discovered, while searching through her husband's notes for some needed information, a letter which proved that her beloved husband and teacher had been carrying on an affair with the pretty maid. It was a bitter blow for Amalie, and she believed that life was no longer to be borne, at least not in that house. Her brother Karl had been doing very well in Bucharest where he had married the daughter of his employer; Amalie obtained a travel permit from the mayor of the town and travelled with little Charitas to Romania. A payment from a client arrived at just the right moment to enable her to make the journey.

Mother and daughter travelled through Dresden, Vienna, and Budapest to reach Bucharest. Upon her arrival there she was warmly welcomed by her brother and his wife, Leanka. They saw to all the formalities, and, because she had a little child, wanted very much to adopt Charitas. Amalie and her sister-in-law, who had lived her entire life in the lap of luxury, were so completely different from each other in personality, that it was not possible for them to develop common interests and an understanding of each other. Amalie did not want to separate from Wilhelm and was unhappy because she had nothing to do. Through her inactivity she became nervous and therefore undertook a position as housekeeper for a miller. A thirst for the science of her husband had, however, so taken possession of her that during a vacation she made a trip into the Carpathians to search for unknown plants and fossils. Suddenly a great longing overcame her, and in spite of all objections from Karl and Leanka, she decided to return to Siebenlehn. Her brother and his wife wanted her to leave Charitas with them and promised to bring her up in great comfort, but to Amalie the thought of leaving her child there was unbearable. A year after her departure from Siebenlehn she and Charitas were again back home, where she became reconciled with Wilhelm. In Romania she had learned housekeeping thoroughly and was willing to undertake the work of a housekeeper and at the same time to be active as an assistant to a scientist. Soon a business trip became necessary for the pair. Charitas had to be left for seventeen weeks in the care of a suitable widow, while her parents went on foot through Thuringen, Hesse, Westfallen, and along the Rhine as far as Cologne.

In the cities they sought out whenever possible many clients: schools, universities, scientists, druggists, anyone who showed an interest in natural history. When their business visits came to an end, they visited museums, picture galleries, and interesting old churches. After a while, during a newly-undertaken trip, Amalie suggested an improvement. Instead of their former carrying of everything on their own backs, she bought a dog and a little cart to serve as transport for their collections and goods. Amalie and the dog pulled the cart, and when it was necessary to go uphill, Wilhelm shoved the wagon from behind. In this way they travelled for four months through

Silesia to Krakow and into Bohemia. They then returned home tired and discouraged. Because the times were bad, they had been able to obtain only a few orders. Upon her return she discovered that things had not gone well with Charitas. The good-natured widow had in the meantime remarried, and could not any longer keep the child with her. The only available substitute, a saddler by trade, had not given the child enough to eat and had mistreated her frightfully. Sometimes he made Charitas work until midnight. Because the child helped herself to an apple the wife of the saddler had beaten her unmercifully and had given her no supper on Christmas Day. It was a tragic story that Amalie had to hear.

Fortunately Amalie and her daughter were not always separated. On one trip Wilhelm travelled with a young stocking-knitter into Poland. This outstanding scientist, who usually hated social contacts like the plague, exercised a hypnotic effect upon men with similar interests, so that these were often willing to travel with him for little or nothing in place of his wife. From time to time, when it was a matter of a short trip, Amalie took the child with her and tried to educate her in the knowledge that she had gained from her husband. Wilhelm did not value such instruction in the least and never ceased bemoaning his lack of a son. Amalie racked her brains to find a way of giving Charitas a good education. The outlook remained dark and uncertain, because they rarely had success in their work.

In long letters to her brother she narrated the history of her joys and tribulations. She valued and respected the thoughtfulness and readiness to help on the part of her brother, but she refused financial aid from him: "Wilhelm is very proud, and I believe he would rather starve than allow himself to be aided in this way." She explained in detail why they had to make these trips and what she experienced during them:

"I have myself asked to accompany him: Wilhelm has not demanded it of me.—You ask angrily why, if burdens have to be carried, Wilhelm should not carry them. Have I not often told you that Wilhelm is an educated, refined, scholarly gentleman who has a tender body? Consider the matter! He can't carry things, but I can, and why shouldn't I? . . . When in the Siebengebirgen he decided to return home, I took it upon myself to carry everything. Wilhelm did not put the burden upon me: I voluntarily asked for it. And because we are so poor I knew literally no other solution. . . . The outer man starves, that I admit, but not the inner. Dear Karl, what I have experienced! I could write books about it, and I would like to describe to you the impressions that the various countries have left upon my soul, and I wish I could repeat to you the conversations that I have heard or in which I have taken part . . . That is the lovely thing about our calling: it brings us always together with educated and scholarly men."[1]

Naturally, Amalie told her brother that she was always very shy when she had to do business with a strange professor, but as soon as she gave her name the shyness disappeared because he would ask her if she were related to the botanist Adam from Ziegenhain or sometimes one would show her the ancestral tree of the Dietrichs in the encyclopaedia. "Then I parry laughingly and say: 'as if I had not been acquainted with Adam ever since my marriage'."[2] Everywhere she had to deal with educated people and often a professor would ask to see her.

"I am delighted when I can give information about my observations of nature. These can then be bought, ordered, or exchanged; and one so exciting contact compensates me for the forthcoming hardships . . . It is much more advantageous if I travel alone and Wilhelm works at home. Also, when there are further demands, Wilhelm cannot manage alone, as I can. I make no complaints about him, notice! It lies in the nature of things.

[1] Bischoff, Charitas: *Amalie Dietrich: Ein Leben*, G. Grote'sche Verlagsbuchhandlung, Berlin, 1913, p. 166.
[2] ibid. pp. 165-167.

At night Wilhelm must have a real bed to sleep in, whereas to me it is all one: in the evening I am always so tired that I sleep just as well on a pile of straw as in a soft bed. Many times I am also quite without courage"[3]

It was a reward for her work when a professor in Marburg asked her to give his students a talk about her methods of making collections. To be sure, she refused, because she felt herself incapable as a person to give instruction. William, in contrast, was not embarassed to hold such lectures. He led teachers, pupils, or students of the forestry school into the nearby woods, held a lecture for them there, and encouraged them in the collection of various kinds of plants. He received numerous offers of jobs from museums and schools, but he nonetheless refused all of them because he did not wish to bind himself to such duties.

"But I would happily take everything upon my shoulders, if only Wilhelm would again be as he was in the first years. How love helped to carry the burden! . . . However, it is still a great joy to me that Wilhelm at least notices my progress; he says that I could now well represent our name; and above all else, if it were practical, that I should in summer undertake the collecting-trip alone."[4]

At the time of this letter, she had already been for eleven weeks wandering alone on foot through the Salzburg Alps, where she clambered about in order to catch a rare type of butterfly and to assemble a complete collection of Alpine plants.

"How many inspiring and magnificent impressions I have again received from my trip! I cannot describe it all for you. But if the wonderful, beautiful world lay at my feet, then I would reproach myself for all the petty cares that so often distress my soul . . . Wilhelm expressed himself as delighted over what I had collected."[5]

Amalie never gave up the belief that she owed all her knowledge and ability to her husband, but she no longer worshipped him nor did she follow him blindly. Once when she returned home with a comparatively large sum of money, he wanted immediately to purchase a large botanical lexicon. But she did not permit this expenditure until she had paid off their debt to the grocery store. Whatever concerned their work she still entrusted to her husband. When he pushed her to undertake a trip into the Netherlands and Belgium in order to gather sea plants, she consented although she raised objections because of her temporarily weakened state of health. Indeed, she had great success on this journey and was able to sell all her collected specimens. However, in Haarlem she fell in a faint on the street, and had to be taken to a hospital, where the medical expenses swallowed up the major part of her hard-earned money. When, after an absence of several weeks, she again came home, her husband and her daughter had disappeared. Things had gone badly with Wilhelm in the meantime and he had completely lost his courage. Because no news came from her, he had concluded that she was dead. He had accepted a position as tutor in a castle that stood close by. His task was to instruct the sons of the Count. He had never bothered himself about Charitas and expected her to take care of herself, although he permitted her to take with her as many beds and linens as she wanted. Amalie hunted for her husband and finally found him. She listened to his story and decided to separate from him. She tried to get the neglected business back on its feet with the duplicate specimens that he had left behind him. Charitas was now her assistant, but the girl did not adapt herself to the work. She was willing, but she had not inherited from her parents an interest in natural history and

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[3] ibid. pp. 167-168.
[4] ibid., p. 171.
[5] ibid., p. 172.

could not get highly excited over an unusual plant. Moreover, she had school lessons to study and had to prepare herself for her confirmation.

The turning point in Amalie's life came during a business trip to Hamburg. An indigent private teacher who was not able to buy her mosses advised her to seek out in Hamburg the wealthy factory owner, Doctor H. A. Meyer, who was an enthusiastic amateur collector of natural products. He also played an important role as backer of the zoological and botanical gardens. Because of her earlier disappointments Amalie was not without doubts when she presented some of her plants to the examination of Dr. Meyer. To her amazement he bought at once plants to the value of 25 taler, which to one in her situation was a fortune. The Meyers thereafter often invited her to their house. They had a presentiment of her talents and, since she was greatly concerned about her present income, took the trouble to create for her a position in which she could fully develop her talent. At this time there lived in Hamburg a certain Johann Cäsar Godeffroy (1813-1895), one of the great business men of the Hanseatic city. He had so built up an inherited business that he was associated with the leading copra merchants of the world. He owned or controlled forty-six trade establishments sprinkled over the islands of the South Sea. In the year 1861 he had founded a museum in Hamburg and had equipped expeditions for the collecting of biological and ethnographical materials in Oceania. The Meyers recommended Frau Dietrich to Herr Godeffroy. When she—after an introductory letter of recommendation—laid evidences of her scientific knowledge before him, he offered her a contract with a fixed income to travel to Australia for an unlimited period of time and there to complete numerous collections. She accepted the contract with joy; from then on she no longer had to live from hand to mouth.

In the Godeffroy Museum Amalie learned the newest methods of stuffing animals, because the fields of her search were to be wider than ever before. A serious personal problem agitated her a good deal. What would become of her fourteen-year-old Charitas? Daughter and mother had in the past so often been separated from each other—the girl being sent from pillar to post, so that she longed for a life together with her mother. She could naturally not accompany her mother on the trip to Australia, but she could at least get a good education, which Amalie could now afford to give her. However, what kind of an education should she have, and who would care for and advise her? In this matter the wife of Dr. Meyer was helpful and promised to act as guardian for the girl during the mother's absence. Nevertheless, it was a painful parting, but the die had been cast, and in 1863, at the age of forty, Amalie sailed toward Brisbane.

During the next ten years the life of this lonely woman was reflected in her letters. Dangers and disappointments were not spared her in this foreign land. Once, for instance, an extraordinaily beautiful waterlily beckoned her into a swamp, which threatened to suck her down; but in the last moment came a group of aborigines, who had heard her screams, and rescued her in their canoe. As a result of this adventure she fell ill of a recurrent fever which condemned her to six weeks of idleness. The high point of all horror came when a fire burned to the ground her bamboo hut, and destroyed both her equipment and her already-completed collections. Her one thought was: What would the Museum say? Would it call her back as an incompetent?

However, Godeffroy and Sons had in the meantime become acquainted with her worth. Every letter from Hamburg with instructions had been answered by her with the sending of valuable and perfectly prepared specimens, often of types that had been until then unknown. Therefore, the director of the Museum saw no tragedy in the unlucky incident. A sympathetic letter informed her that new equipment was on the way—also that two types of wasp had been named after her. Because of their concern for her, it was suggested that Amalie should have an assistant. Amalie reacted to the suggestion in an unusual but quite characteristic manner: without promoting herself, but with a feeling of doing her duty, she invited Wilhelm to share her work and again to take up their common life that had been so worthwhile in the first years of their marriage, only with the difference that they would not need to worry about their daily bread.

Wilhelm, however, was a beaten man, who felt that he had been a failure in life. His answer contained a moving acknowledgement of his earlier mistakes:

"How young you still feel! What energy, what eagnerness you must still have! Do you really believe that anything so beautiful as the first years of our marriage could ever occur again? I do not believe it. For us, too much lies between and has left ineradicable traces behind it . . . You heap burning coals upon my head, and believe me, they do burn! . . . No, no, I cannot come to you; no one can now make use of my strength, because I no longer have any. I am listless and sick in body and soul, as you can see for yourself in my handwriting. It is an effort for me to write these lines to you. Why do you go on thinking of me? Do you even suspect how painful it is for me? . . . That you always showed a talent for botany, I have always known, but I am astounded that you occupy yourself with what Australia has to offer . . . Everything remains a failure for me and a success for you. And yet I thought—fool that I was—that I would be in these matters the one who was called upon and signalled out. What would Uncle 'Hofrat' in Eisenach have to say to this, if he were still alive? How opposed he was to my choice of a wife! And I expressed to him the hope that in the course of time I would raise you to my level. Already even then a fire blazed in your eyes, but I did not understand its meaning. I depended in my judgement of your nature always upon externals, on non-essentials. And now give me once again in spirit your courageous, ever-busy hands and think without horror upon your Wilhelm Dietrich."[6] A year later he died.

Amalie had pressing need for helpers to speed up her work. She hired two assistants and upon the advice of Godeffroy even a horse and cart. Every letter from Hamburg expressed the satisfaction of her employer, and his Australian agent received the order to furnish her with whatever money she considered necessary for her expeditions. She then collected everything imaginable: mammals and birds, fishes and insects, and even primitive utensils and weapons, skulls and skeletons. Her insight into the scientific world grew day by day; the Entomological Society of Stettin elected her to membership, and for her model collection of Australian types of wood she was awarded a gold medal as the first prize in a horticultural exhibit.

Amalie saw nature not only with the eye of a scientist. From Rockhampton in Queensland she wrote: "Under the giant trees grow ferns, beneath which I disappear entirely and sometimes I am anxious, whether or not I can work my way out from among luxurious climbing plants, ferns, and bushes. Great orchids hang down by almost invisible threads from the trees; they are wonderfully formed, they have beautiful colouring, and they look at me so secretly that my hand picks them only with a certain shuddering, as if they were living creatures that would reproach me for disturbing their peaceful existence."[7] From a point even further north she travelled in a canoe to a forty-mile-distant island. "What a paradisical, beautiful journey! Words fail me for giving you a true picture of what I was allowed to see. Over us we had a clear, blue sky, and under us—well, a world that left me stunned with wonder, a fairy world that enchanted my eyes. Luxuriant seaweed, dark coloured, intermingled with soft, finely formed algae, whose colours varied from dark brown to the softest green

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[6] Bischoff, Charitas, *loc. cit.*, pp. 315-317.
[7] ibid., p. 278.

and even rose . . . This plantworld is lived in by an animal world of the richest form and colour. Near the gracefully moving seaweed and algae stands rigidly the beautifully formed coral that is almost a blinding white which gleams red and dark violet. And still there is life in this stiff form. Nearby you see many-coloured mussels, cylindrical sea-urchins, starfish, sea roses, the whole area inhabited by ponderous crabs. Like spirits from the underworld shimmer the great, transparent jellyfish, but the most interesting are the fishes. Oh! You should see the fishes! This kingdom of form and colour! . . . I am delighted . . . that Godeffroy allows me to paint with the colours of nature, as they show themselves here; otherwise I fear that the spirit of the colour magic would be destroyed."[8]

A sensitive and observant woman was this daughter of a leather worker. However, she was not without weaknesses. As much as she loved Charitas, it was still impossible for her to transpose herself with complete sympathy into the soul of her daughter. Because she herself was carved out of hard material, she could not realize how it broke the girl's heart never to be allowed to get together with her father; she was at one time even sent away from the dinner table when she refused to eat a meal of cooked caterpillars, and she had been forced to live for months with stern and unfriendly people. Often Amalie had not once written her during her expeditions, because the postage was too expensive, and everything had to be reckoned down to the last penny. Above everything else the mother could not reconcile herself to accept the fact that Charitas' mentality was different from that of her parents.

During the ten long years of separation Charitas had made great progress under the motherly concern of Frau Meyer. She attended a boarding school and obtained an education as a kindergarten teacher from a former student of Froebel's. At the Meyer home she made the acquaintance of numerous personalities, especially Karl Schurz, a brother-in-law of Dr. Meyer's who stayed with the family when he was on a visit from America. When Charitas was twenty-one years old the Meyers found her a position as a governess in London with some friends who accepted her as a member of the family. Frau Dietrich was overjoyed at this good fortune but she could not really understand this shy young girl who since her earliest childhood had suffered from a sense of insecurity and feared every change of domicile, nor could she refrain from making comparisons between her daughter's good luck and her own struggles in youth: "But how can you say that the journey so frightened you? Everything was made easy for you, and you never came into a completely strange environment. Just think how I had to travel in the early days!"[9] For Amalie every sign of sentiment was an affront. When Charitas wrote of her great longing to see her mother, Amalie replied: "Do you imagine that I also do not have longings? But let us not become sentimental about each other. You have such a tendency to be soft."[10] In London Charitas had many new experiences. Among others she saw Hamlet and attended a lecture by Dickens, shortly before his death. Her excited description of these experiences called forth the following remarks from her mother: "I see from your letter that you have an interest in all possible kinds of things, but it seems to me that precisely for natural science you have none at all. It is high time that I should soon come home and introduce you into the wonder world in which I live. You write me about all kinds of things, but I have not yet heard whether you have visited the zoological garden in London or whether you were at the aquarium . . ." Then Charitas protested: "Dear Mother, are there not other things in the world in which one can

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[8] ibid., pp. 403-404.
[9] ibid., p. 372.
[10] ibid., p. 375.

be interested, aside from the fishes of the South Sea or the flora and fauna of Australia?"[11]

In spite of her seriousness, Frau Dietrich did not lack humour. Charitas described to her the World's Fair in London in 1871, where she had seen the Queen and the Prince Consort very close to. Amalie, who on her trip had tarried for a short time in Polynesia, answered as follows: "My dear child, hush and be still about your queen and the Danish prince and how the higher ranks call themselves, for whatever you can bring forth, I can cap it (or go you one better). I have made a visit to the king of Tongatabu, George I, and as a reminder of our friendship he sent me his photograph. When I come home, I want to give it to you . . . The queen also sent me a powder box . . . That intimate you haven't been with the wearers of crowns."[12]

From time to time her deep maternal love broke through the hard shell of her heart: "I have in the whole world now no one but you, and my hope is that God will keep me in good health, so that in a couple of years I can return home. And what sense would there be to my return if I were not there together with you. Finally, finally, there will no more separation for us."[13]

The homecoming was however not entirely as she had pictured it to herself. In January 1873 she returned to Hamburg. She had the appearance of an old woman, her back bent, and her weathered face crisscrossed with wrinkles. When Charitas came to her she called out to her daughter: "At last. No more separation as long as I live! With what longing have we awaited this day! Now you need never again ask or beg that I remain with you."[14] However, a letter to Australia had been lost en route, and Amalie heard for the first time now that her daughter was betrothed to a young clergyman, who had already entered into his ecclesiastical duties with a congregation near the Danish border.

Therefore, the longed for union of mother and daughter could not take place, especially as Amalie did not want to live in the parsonage. She believed that she would not fit in well in a parsonage and would be too old to adjust herself. Frau Meyer explained to Charitas that for Amalie it was a disappointment to have a minister for a son-in-law—if only it could have been a naturalist!

The great amount of work that awaited Amalie kept her busy and helped her to overcome her disappointment. For thirteen years she worked as curator for the Godeffroy Museum on her own collections; and when this museum was suddenly transferred to control by the city, she was offered a position in the Botanical Gardens in Hamburg. Moreover, aside from this work she was busy enough. Because she was always sensitive about the lacunae in her education, she regularly attended all the public lectures. On one occasion she learned that certain documents about Australia were to be presented at an anthropological Congress in Berlin. She travelled to the capital by train—but the servant at the door of the meeting room denied her entrance because the session was closed to women. When she begged him to find her a corner seat in the gallery, he brought the problem to the attention of the chairman, Councillor Neumeyer, who immediately introduced her to the assembled scholars and conducted her to an outstanding place of honour. So she was in her old age not entirely without recognition.

She remained—or perhaps better—she was once again poor. The extensive savings from her salary in Australia she loaned or gave away recklessly and

[11] ibid., p. 410.
[12] ibid., p. 426.
[13] ibid., pp. 340-341.
[14] ibid., p. 436.

she lost everything. Her greatest regret was that now she had nothing to leave to her daughter and grandchildren. For herself she had enough to live on; she found a place in a simple, city-owned foundation. There was no break between herself and her daughter, and in summer Amalie often came unannounced for a visit. With her three grandchildren she wandered a good deal through the fields, explained to them the secrets of botany, and showed the two oldest how one planted a herbarium. On her oldest grandchild, a boy, she hung a toga made of tree bark which she had brought with her and draped him with the decorations of the natives, and laughed over his antics until the tears rolled down her cheeks.

In March of 1891 when she was again on a visit in Schleswig, she had another attack of lung infection, from which she died. "The death," as her daughter wrote, "smoothed out the many wrinkles and creases in her face. All the folds, stiffnesses, and drooping disappeared and those standing near could recognize in the noble face the simple distinction of the courageous fighter."[15]

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[15] ibid., p. 448.

CHARLES DARWIN AND STRZELECKI'S BOOK "PHYSICAL DESCRIPTION OF NEW SOUTH WALES AND VAN DIEMEN'S LAND"

By Lech Paszkowski

Readers of the *Australian Zoologist* do not need any introduction to Charles Darwin. His fine, honest, observing and modest mind of true scientific greatness has influenced not only the Natural Sciences but also human thought in general. One could expect that Darwin's biographers would have combed and recombed all the libraries of the world and to have published all his precious manuscripts. But even so, from time to time, some material is still found.

An unknown letter by Charles Darwin was found in 1957, and what is more interesting, its contents refer to the book about Australia, *Physical Description of New South Wales and Van Diemen's Land* by Paul Edmund de Strzelecki.

The letter was found at the Yale University Library during a search made at the request of Mr. Waclaw Slabczyński, a Librarian at the National Library of Warsaw, and an eminent biographer of Sir Paul Strzelecki. Slabczyński devoted a decade to his well-documented biography* recording material and documents held in no less than two hundred libraries and institutions from all over the world. He rightly suspected that there had been some personal contacts between these two scientists. Firstly, Strzelecki's book was illustrated with some fossils borrowed from Darwin's collection (four specimens) and secondly, Darwin, in his *Journal of Researches into Natural History and Geology of the Countries visited during the Voyage of H.M.S. Beagle round the World . . .*, London, 1870, quoted Strzelecki (p. 448).

The Letter by Charles Darwin

Darwin's letter consisting of three octavo pages was written at Down, Bromley, Kent in the middle of 1845, and was in the form of an acknowledgement for a copy of Strzelecki's book. It reads as follows:

Down Bromley Kent
Sunday

My dear Sir

I received a few days since your kind & valuable present. I am exceedingly obliged to you for it, though I feel that I have no claim on so magnificent a present.

I congratulate you on having completed a work which must have cost you so much labour & I am astonished at the number of deep subjects which you discuss. I must be permitted to express my sorrow that there are not far more copious extracts from 'M.S. Journal'. I hope some day to see it fully published.—You speak of your unidiomatic English; I heartily wish that one quarter of our English authors could think & write in language one half as spirited yet so simple. Once again allow me to thank you very sincerely & believe me dear Sir

Yours very faithfully
C. Darwin

You were so good when I last saw you as to say that you would take trouble of informing me (as a guide for myself) what you paid for the engraving of the *shells* alone. The plates appear to me admirable.

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* *Pawel Edmund Strzelecki. Podróze—Odkrycia—Prace* (Paul Edmund Strzelecki. Voyages—Explorations—Works), Warsaw, 1957.

In the first instance Darwin referred to "the number of deep subjects" which he found in the book. What, then, are these "deep subjects" which "astonished" the great scientist. Certainly the climbing of Mt. Kosciusko was not the issue impressing Darwin, but perhaps it was Strzelecki's philosophical reflections on humanity, the beauty of nature, the conquest of free people, slavery, change of nationality, difficulty in learning English, the lot of Aborigines, the behaviour of so-called savages, projects for the improvement of Australian agriculture and the irrigation of New South Wales.

"Mon Journal" and Strzelecki's Literary Style

Many of these reflections were given in the footnotes to Strzelecki's book and taken from his "Mon Journal" written in French. Darwin expressed his regret that only a few pages of the "Journal" were included and hoped that this work would be published one day.

It seems most probable that this precious "Journal" is still held in the archives of the London Appeals Court, as it was consulted by this Court in 1877, four years after Strzelecki's death, when his relatives in Poland attempted to probe the validity of his last will. As it is not the custom of the British Courts to destroy papers and documents, there is a fair chance that "Mon Journal" will be found one day and no doubt it will cause a major sensation among Australian scientists and historians.

The next important fact in the letter is Darwin's remarkable praise for Strzelecki's literary style. As Hume Dow in his excellent Selection of English Prose, *Science Speaks* (Cheshire, Melbourne, 1966, 3rd Edition), pointed out to the students of English, "Darwin had a feeling for words and exercised care in the way he used them. However, his comments on writing are rare" (p. 87).

From the postscript we can perceive that the two scientists met from time to time and assisted each other in the field of Natural History.

The Chapters on Botany and Zoology

The chapter on zoology in Strzelecki's book consists of 73 pages and starts with the following words: "To the vegetation to which the physiognomy or general aspect of Terra Australis owes its main features, must now be added, in order to complete the delineation of that physiognomy, a notice of the Zoology of the country. Variety, beauty, and elegance, in forms and colours, and in their combinations, characterise some of the zoological classes; while striking and wonderful peculiarities of external and internal organisation distinguish others. All the classes may be said to offer, in their physiological structure, subjects for most interesting and instructive study."

The chapter is divided into two sections: "Fossil Fauna" (53 pages) and "Recent Fauna" (20 pages). Beside his own introduction, general notes and few descriptions Strzelecki was helped by two scientists, John Morrison and William Lonsdale, who examined the collection which he brought from Australia. Morrison, apart from describing all Fossil Flora, gave an account of the fossil *Mollusca* found in Strzelecki's collection, while Lonsdale covered a good deal of Fossil Fauna including *Polyparia*. Lonsdale also stated (*Physical Description*, p. 262) that "The examination of Strzelecki's collection of fossil *Polyparia*, from Van Diemen's Land, has extended the knowledge of the corals, for which the name of *Stenopora* was proposed in the Appendix to Mr. Darwin's work on Volcanic Islands . . ." and "It is not to allude to the occurrence of a *Favosites* and an *Amplexus*, in Strzelecki's collection without soliciting attention to the additional evidence they afford in support of previous inferences respecting the age of the deposits in which fossil polyparia were found by Mr. C. Darwin; or to the curious increase of agreement thus presented the *Palaeozoic Fauna* of Europe and extinct *Faunae* of New South Wales and Van Diemen's Land" (*ibid.*, p. 268).

In this chapter there are also quotations from J. Sowerby and R. Owen. While the "Fossil Fauna" was a collective work by Lonsdale, Morris and Strzelecki, the "Recent Fauna" was mainly provided by John Gould who prepared the list of Australian mammals and birds.

It is perhaps worth mentioning, that one of the very first findings by Strzelecki, in September, 1839, was a fossil tooth of a mastodon. Sir Richard Owen published an account of this in the "Description of a Fossil Molar Tooth of a Mastodon discovered by Count Strzelecki in Australia" in the *Annals and Magazine of Natural History,* October, 1844, vol. XIV, pp. 268-271. Strzelecki actually bought the tooth from a native while exploring ossiferous caves in Wellington Valley. "The native stated that the fossil was taken out of a cave further in the interior than those of Wellington, and which Count Strzelecki was deterred from exploring by the hostility of the tribe then in possession of the district." The incident was also mentioned by Strzelecki himself in the *Physical Description,* p. 312.

While in Australia he also collected a lot of other curiosities and objects of natural history, which he sold to the Museums of Europe. Strzelecki stated that he spent about £5,000 on exploration in Australia, but his whole income during those four years amounted to no more than £1,200. Therefore, his earnings from the sale of the Australian natural objects were really astounding.

The Praise of a Geologist

As his interest was mainly directed to Australian mineralogy, geology and agriculture, the chapters on these subjects seem to be the most valuable, especially for palaeontologists. Dr. A. N. Lewis, an eminent Australian geologist, evaluated the work of Strzelecki in these words:

"Strzelecki was the first writer to publish a systematic account of any scientific studies in Tasmania. The records of his work are practically entirely contained in his *Physical Description of New South Wales and Van Diemen's Land.* This book is a classic and held the field as the important work on geography and geology of Tasmania until superseded by R. M. Johnston's *Geology* published in 1888. Now, 100 years later, it is appropriate for us to pause to consider Strzelecki's real contribution to science as far as he dealt with Tasmania. This contribution, even considering the virgin field in which he worked, was outstanding. My personal tribute to Strzelecki is that 100 years after he wrote, I make constant reference to his book and I have found help thereby which has materially aided my work in the same field.

"The descriptive paragraphs opening Chapter III are as good to-day as they were when written and form an admirably concise statement of the physical description of the country which has never been bettered in published literature.

"It is in the department of palaeontology that Strzelecki's work had assumed prime importance. I have no direct evidence that he possessed any particular knowledge of this branch. He handed his collections to Lonsdale and Morris for description. The results are printed in the *Physical Description* and form the real basis of Australian Palaeontology, unimpaired by the passage of time. Strzelecki, however, did the collecting. The collection was remarkably complete and shews a wide grip of the subject to enable such a comprehensive and well located group of representative fossils to be got together. It shows a painstaking labour for which Australian geology will always be grateful.

"The other chapters on Botany and Zoology, the Aborigines, Agriculture and Soils are now mainly interesting as historical records but shew that Strzelecki was a keen observer and, above all, a writer remarkable for the brevity and lucidity of his descriptions. The book is not much read now but still raises a feeling of amazement in the minds of those students who spare time to dip into it. A scientist's claim to fame rests not so much on the final truth he discovered as on his contribution to the distance he carries their knowledge towards the final goal. According to this test Strzelecki still stands first amongst Tasmanian scientific writers." (Quotations from "Strzelecki in Tasmania" by A. N. Lewis, *Royal Australian Historical Society Journal and Proceedings,* vol. XXVI, part 1, Sydney 1940, pp. 76-78).

The Reviews

The *Physical Description* was published in May, 1845, and almost immediately was warmly received by many reviewers: *Journal of the Royal Geographical Society,* 1845, vol. XV, pp. LVII-LVIII; *The Atheneum,* 19.7.1845; *The Times,* 8.10.1845; *Sydney M. Herald,* 20.1.1846; *Sydney M. Herald,* 28.1.1846; *Quarterly Review,* Feb., 1846; *Launceston Examiner,* 7.2.1846; *Sydney M. Herald,* 16.3.1846; *Port Phillip Herald,* 17.3.1846. The list of reviews was not confined to England and Australia, as the *Berlinische Nachrichten* of 2.5.1846 and even *Calcutta Englishman* discussed the book.

Without doubt the reading of *Physical Description* induced an American, James H. Perkins, to express the following enthusiastic opinion: "Strzelecki . . . has done more to make New South Wales and Tasmania scientifically intelligible than all other inquirers" (*North American Review,* 1850, vol. LXX, pp. 196-197 and *The Memoir and Writings,* Boston 1851, vol. II, p. 499).

However, there was not a single review of Strzelecki's book in Poland. At the time the Poles, occupied as they were with the main task of national survival were not at all interested in Strzelecki. They simply did not care about the fact that one more able man had left the country.

Perhaps the best tribute to the book is, that after more than a century two new editions of *Physical Description* have appeared in recent years. In Poland the Scientific Publishers produced a fine translation by Dr. J. Flis (*Nowa Poludniowa Walia,* Warsaw, 1958), while in Australia a splendid facsimile edition was published in 1967, by the Public Libraries Board of South Australia, and is available now for the modest price of $6.

Scientific Names in Honour of Sir Paul Strzelecki

The English writers, F. Boase (*Modern English Biography,* London, 1901, vol. 3, p. 806) and Thomas Seccombe (*Dictionary of National Biography,* London, 1909, vol. 19, p. 70), stated that several species among Australian fauna and flora were named after Sir Paul Strzelecki.

Mr. J. H. Willis, Assistant Government Botanist of Melbourne informed me that we have no accepted plant name commemorating Strzelecki, although, in 1857, Ferdinand von Mueller did name a new genus, *Strzleckya,* in honour of Sir Paul, but this has long since been abandoned, as a synonym for *Flindersia,* genus of the "native teak", "cudgerie" and "crow's ash". Later Mueller described the species *Flindersia strzeleckiana,* which too was long ago superseded by the name *F. maculosa,* "Leopard tree'.

I was not able to trace any names referring to living fauna, but there are at least three names of fossils: *Pleurotomaria strzeleckiana* (Gastropod), named by John Morris in 1845; *Brachymetopus strzeleckii* (Trilobite), Prof. Frederick McCoy in 1847 and *Spirifer strzeleckii* (Brachiopod), named by the Belgian scientist L. G. de Koninck in 1877. Mr. F. Hadzel, a geologist of Canberra, informed me also that another three trilobites were given the adjective *strzeleckiensis* by the Polish palaeontologist Zygmunt Grzybowski.

It would seem that the geographers were much more generous to Sir Paul, as, in his biography, Mr. Slabczyński lists fourteen official names of geographical features named after Strzelecki (one in Canada and thirteen in Australia). I have found another four, not to mention several street names: however not all of them are official.

Little Boys' Dreams

It is interesting to note, in passing that, as little boys, both Darwin and Strzelecki liked to draw the attention of their elders to their actions. This "showing off" was quite normal and a healthy indication of the future intelligence and individuality of both boys. While Darwin was stealing apples, or pretending to do so, and running away fast in order to arouse the admiration of adults, Strzelecki charmed his family and servants with very talented declamation and composition of speeches and sermons. In both cases the boys made a success of their lives.

Darwin's Remarks

In 1958, W. Slabczyński traced the original copy of *Physical Description* presented by Strzelecki to Darwin. At present, the book is held in the Library of the Botany School, Cambridge University. It bears Strzelecki's autographed dedication: "To Charles Darwin Esqr M.A. from the author 19th of May." and the ex-libris of Sir Francis Darwin, who received his father's book collection. Subsequently Sir Francis offered the copy, along with many other of his father's books, to the University of Cambridge.

At the end of the afore-mentioned copy there are inscriptions in pencil, which, according to the opinion of Mr. Alexander Watt, the Librarian at the Botany School, Cambridge, were most probably made by Charles Darwin himself. The inscriptions are as follow:

"So that animals cannot have pressed [*sic.* passed?] from one island to another, recently"

"143—Van Diemen's long an island for coast elevated 100 ft"

"254—Proteaceous leaf Bulinus & Helix"

"296—Van Diemen Carboniferous Series—Morris (?)"

"p. 302 Diprotodon Marsupial. Pachyderm Fossil to 312 (not important)"

"347—Sterility of one race of mankind with another"

"p. 352 Number of natives Van Diemens Land."

Slabczyński twice published photographs of Darwin's letter: the first time being in the Polish scientific periodical *Kosmos A* (Warsaw), vol. VII, 1958, part 4, pp. 379-383 and the second time in a book under his editorship *P. E. Strzelecki—Pisma wybrane* (Selected Writings of P. E. Strzelecki), Warsaw 1960, Scientific Publishers. The latter volume was reviewed, mentioning Darwin's letter, in *The Australian Geographer* (March, 1962) and also in the English and German periodicals: *The Times Literary Supplement* (29.12.1961), *The Geographical Journal* (London, vol. CXXVIII, part 4, pp. 557-558) and *Petermanns Geographische Mitteilungen,* 1962, part 2, p. 119.

The Contrasting Opinions

In spite of his many services to Australia Sir Paul Strzelecki has not always received fair treatment from Australian historians and writers. For example, in contrast to Darwin's unreserved praise of Strzelecki's literary style and ability an Australian lady novelist, when referring to the *Physical Description,* wrote in her "Story" of Paul Edmond (*sic*) Strzelecki that, "It is grammatically correct; it is in the Victorian manner, and probably appreciated by its first readers; but, all the same, it is the heavy writing of a not very imaginative mind, using conventional images without freshness. It makes the reader wonder about the praise given his childish compositions; it is in a foreign language, but it has much in common with his French letters, which are also extremely heavy, and, even making allowance for language, it is hard to understand the praise some critics have given to his style."

The reason for such contrasting opinions could be attributed to the lack of a satisfactory English biography of Sir Paul of a high scholarly standard along the lines of Joselyn Baines' *Joseph Conrad: A Critical Biography* (London, 1959). But without doubt, it will be written one day.

It is worth recalling, that the Australian writer, who, by remarkable intuition first associated Darwin with Strzelecki, was John Reynolds of Hobart. Many years before the previously discussed letter of Darwin was found at the Yale University, Reynolds published in the *Illustrated Tasmanian Mail* of 12th June, 1929, a fine and penetrating article in which he stated: "Strzelecki belongs to that great band of men which made the Nineteenth Century so remarkable. With Humboldt, Franklin, Darwin, and Wallace, he must be regarded as one of the leading scientific explorers of his time."

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THREE EARLY NATURAL HISTORY BOOKS

By K. A. Hindwood

(Plates VII-X)

In 1793, there was commenced in London a publication dealing with the animals and plants of the recently-established settlement at Sydney, New South Wales. The authors of this work, which was issued in parts and titled *Zoology and Botany of New Holland,* were Dr. George Shaw and Dr. (afterwards Sir) James Edward Smith.

Dr. George Shaw was born at Bierton, Buckinghamshire, England, on December 10, 1751. He was educated at Oxford and later attained the degree of Doctor of Medicine. Subsequently he became Director of the British Museum where he died in residence on July 22, 1813. Dr. James Edward Smith, his co-worker at the time, was an eminent botanist, a close friend of Sir Joseph Banks and one of the founders, in 1788, of the Linnean Society of London, of which institution he was president for forty years. He it was who purchased Linnaeus' collection in 1784. He was born in 1759, knighted in 1814 and he died in 1828.

The *Zoology and Botany of New Holland* is the first book to deal exclusively with Australian natural history and, because of that fact, is of considerable historical interest. The subjects described and illustrated are birds, mammals, plants, a fish, a snake, a tortoise and a crayfish. Earlier books, such as Phillip's *Voyage* (1789) and White's *Journal* (1790) discussed animals and plants of the new Colony in some detail and also contained a number of relevant illustrations, but they were not concerned entirely with natural history.

Apparently it was the intention of the authors to publish the *Zoology and Botany of New Holland* in parts over an extended period. However, it seems that only two parts, each of four plates with related text, were issued: then the zoological and the botanical sections were separated and, with additional plates, produced under different titles and individual authorship, the final result being three books instead of one as first planned. The full titles of the three works are:- *Zoology and Botany of New Holland; Zoology of New Holland,* and *A Specimen of the Botany of New Holland.*

The *Zoology and Botany of New Holland* contains four botanical plates and four zoological plates, all of which were used again in parts 1 and 2 of the *Zoology of New Holland* and in *A Specimen of the Botany of New Holland* respectively in a sequence that agreed with the pagination of their original issue.

Copies of the *Zoology and Botany* are extremely rare. I have seen only one set and that is in the Library of the Australian Museum, Sydney. It is bound with a copy of the *Museum Leverianum,* a work by Dr. George Shaw dealing with the objects in that famous London Institution. The *Museum Leverianum* was issued in parts between 1792 and 1796. Also bound with this copy of the *Zoology and Botany* are four plates from one of its offshoots, *A Specimen of the Botany of New Holland*: these plates are Nos. 1 and 2 and 5 and 6; plates 3 and 4 having previously been issued in part 1 of the *Zoology and Botany.*

It should be stressed that the original work is the *Zoology and Botany;* this publication was then broken into two separate books, (1) the *Zoology* and (2) the *Botany.* A copy of the *Zoology* in the Mitchell Library, Sydney, is bound with the half and full title-pages of the *Zoology and Botany,* but only has the plates of the *Zoology.* A combined copy of the *Zoology* and of the *Botany* in the Dixson Collection, Public Library of N.S.Wales, has the title-page of the *Zoology and Botany* and the title-page of the *Botany*, together with the dedication and preface (which was the same in both books), followed by the complete text and plates of the *Botany* and then the title-page of the *Zoology* and the complete issue of that book. The volume is titled on the spine "Zoology and Botany of New Holland, Shaw and Smith", giving the impression that it is the original *Zoology and Botany*, whereas it is, in effect, two separate publications, i.e. the *Zoology* and the *Botany*, bound together.

Why Drs. Shaw and Smith decided to discontinue the *Zoology and Botany* and then carry on in their own fields is a matter for speculation. Shaw is said to have been a "laborious writer and compiler" (1840), while Gregory Mathews noted (1925) that he was reported by his contemporaries as being "lazy, so there must have been [according to Mathews] some good workers in his age, as the following list [bibliography] will show". Dr. Smith was the son of a rich Norwich silk-merchant and doubtless of independent means and outlook. Possibly different interests and a divergence of opinion caused the separation.

Five of the eight plates in the *Zoology and Botany* bear dates; one of these, lettered 1, but issued as plate 2 of the first part, is inscribed August 1, 1793, and four (Nos. 5, 6, 7 & 8) of the second part are dated October 1, 1793. The title-page is undated but the preface is dated December, 1793. It is known that part 1 was received by the Linnean Society of London on October 1, 1793 and part 2, which contained the half and full title-pages, on November 5, 1793.

In the Minutes of the Linnean Society's meetings for the years 1793 and 1794 are the following relevant donation records:-

Zoology and Botany of New Holland.
No. 1 received October 1, 1793; No. 2 received November 5, 1793; No. 3 received February 4, 1794.

Zoology of New Holland.
No. 2 received May 6, 1794.

A Specimen of the Botany of New Holland.
No. 3 received July 2, 1794; No. 4 received January 6, 1795.

It will be noted that a part 3 of the *Zoology and Botany* is recorded, but I cannot confirm that more than two parts of that work were issued. When the *Zoology and Botany* ceased being published as such, the printed labels that were pasted on the limp covers of the parts were used also for the early numbers of both the *Zoology* and the *Botany*. In the case of the *Zoology* the word "Botany" was crossed out in ink, and with the *Botany* the word "Zoology" was so scored. Perhaps some confusion in the marking of the labels is the explanation of the recorded issue of a third part of the *Zoology and Botany* as noted in the Minutes of the Linnean Society.

Bound with a combined copy of the *Zoology* and the *Botany* in the Mathews' Collection, National Library, Canberra, are the original covers of the *Zoology and Botany* (part 2), the *Zoology* (parts 1 and 3) and the *Botany* (parts 1, 2, 3 and 4). Mathews apparently acquired the parts in the state as issued but later removed the wrappers when binding the set, so that he was not certain what particular plates some of the parts contained: for instance, he has written on the wrapper of part 2 of the *Botany* that "This part contained plates v-viii and their respective letterpress . . . [which is correct, K.A.H.] and, I think, *Columba antarctica* and *Chaetodon constrictus* with their respective letterpress . . ." [which is incorrect, K.A.H.]. The two latter plates were first issued as plates 5 and 6 of part 2 of the *Zoology and Botany* and then as plates 5 and 6 of the *Zoology*. In the *Emu* (1912) Mathews has commented on the issue and the contents of the three works herein discussed.

Following the cessation of the *Zoology and Botany* the issue of the zoological plates was continued by Shaw under the title *Zoology of New Holland,* a work which ran to three parts each of four plates and accompanying letterpress. The title-page of the *Zoology* is dated 1794 but, unlike the *Zoology and Botany,* there is no dedication or preface. Four of the twelve plates therein had already appeared in parts 1 and 2 of the *Zoology and Botany* and three of them bear dates of the year 1793, while the four plates of part 3 (the final part) are dated either September 1, 1794 (plate 11) or September 10, 1794 (plates 9 and 10) and November 1, 1794 (plate 12). The date of September 1, 1794 on plate 11 may be an error for September 10, which is the date appearing on the two preceding plates. Although some of the plates in this work have the year 1793 on them they are the ones used earlier in the *Zoology and Botany*: therefore, the year of publication of the *Zoology* can be taken as being 1794. Part 2 was received by the Linnean Society on May 6, 1794 so that part 1 was probably issued earlier in the same year. Five birds, three mammals, a fish, a lobster, a snake and a tortoise are illustrated and discussed in the *Zoology.*

The issue of the botanical plates and letterpress was continued by Dr. Smith under the title *A Specimen of the Botany of New Holland.* The title-page is dated 1793 and the preface, which is dated December 1793, is the same as that in the *Zoology and Botany,* but whether the first part of the *Botany* was issued in 1793 has not been ascertained. Parts 3 and 4 were received by the Linnean Society on July 2, 1794 and January 6, 1795 respectively, so it is just possible that part 1 may have appeared late in 1793. The fourth and final part was received by the Linnean Society on January 6, 1795; the cover is dated 1794 though three of the plates (14, 15 and 16) are dated January 1, 1795.

The *Botany* is dedicated to Thomas Wilson who supplied the original coloured drawings from which the plates were prepared by James Sowerby. Sowerby was also the publisher of all three works. The drawings, said to be "made on the spot", were sent to Wilson from the Colony by Surgeon-General John White "along with a most copious and finely-preserved collection of dried specimens . . ." (preface, p. viii). The artist may have been the convict Thomas Watling who is known to have been "employed" by White to paint the "non-descript" productions (i.e. the zoology and botany) of the country.

One plate, at least, of the *Botany,* that of *Styphelia tubiflora* was prepared from a drawing "obligingly communicated by the late Major Ross, and assisted by very magnificent specimens from Mr. White" (p. 46). Major Ross, who died in 1794, was Lieut-Governor under Phillip. He had a poor opinion of the Colony, referring to it in a letter written to Evan Nepean, the Under-Secretary for the Home Department, as "this vile country", and "All that is contiguous to us is so very barren and forbidding, that it may in truth be said, here nature is reversed" (1894).

The figures in the *Zoology of New Holland* (which book is without a preface) were probably taken from specimens in most cases. An unexplained matter arises in relation to the Squirrel Opossum (plate 11) of which it is stated in the text that no living specimens had yet been imported. However, Professor T. G. Vallance, of Sydney, has in his library a contemporary manuscript (undated) from Dr. Shaw to James Sowerby giving explicit instructions for the preparation of the figure of that species from a living animal. The letter reads:-

> Dr. Shaws Comps. to Mr. Sowerby & informs him that the quadruped intended for the ensuing No. of [th]e New-Holland Zoology is now

at Mr. Wilson's, & if Mr. S. will send a messenger for it he may have it at his own house for some days, which will be necessary, in order to study its several attitudes, & to give as elegant a figure of it as possible. It is an Opossum with the aspect of a Squirrel, & is a very beautiful animal. As soon as the drawing is made Dr. S. will be glad to see it. Mr. S. will take notice that the tail is strongly prehensile, & may therefore be represented in such a manner as to shew that particular, unless it shd. be thought to interfere with the elegance of the plate; But the best way will be to make several sketches in different attitudes.

It is to be fed with bread & milk. It is nearly torpid by day, but very active by night. Care must be taken to express well & clearly the lateral membrane of the sides & feet, as in the flying Squirrel.

Dr. Shaw has named the snake {Coluber porphyriacus.
The crimson-sided Snake

Brit. Mus.

Monday morn.

The reference to the naming of the Crimson-sided Snake is of interest because it was one of the four species (including the Squirrel Opossum) figured in part 3 (1794) of the *Zoology of New Holland.* The above letter was exhibited by Professor Vallance at a meeting of the Linnean Society of New South Wales (1967).

Thomas Wilson, mentioned earlier, was interested in the natural sciences. He was elected a Fellow of the Linnean Society of London in 1792, being sponsored by Dr. George Shaw, Thomas Marsham and Jonas Dryander, the last-named then being Sir Joseph Banks' botanist-librarian, having succeeded Solander. Surgeon-General White's *Journal* is dedicated to Wilson who arranged the material in that book for publication. Shaw and Smith dedicated their *Zoology and Botany* to Wilson, whose name also appears in the dedication to *A Specimen of the Botany of New Holland.*

James Sowerby (1757-1822), the publisher and artist of the three books discussed, was the first of a large family whose members illustrated botanical and conchological books for nearly a century. He was a considerable scientist of wide interests, a Fellow of the Linnean Society, an artist of distinction and a talented engraver (1950).

Apart from their historical interest, the *Zoology and Botany of New Holland,* the *Zoology of New Holland* and *A Specimen of the Botany of New Holland* are important because several of the birds and other animals were named therein for the first time. Doubtless "new" plants were also described by Smith in the *Botany.*

I have in my library a copy of the first part of the *Zoology* in original wrappers which are of thin laid paper, dull purple in colour. A printed label on the front cover measures 4" x 3¼". The sheet size of the plates and the letterpress pages is 12" x 9½".

A collation of the three books is as follows:-

ZOOLOGY AND BOTANY OF NEW HOLLAND (Shaw and Smith)

Half title-page; full title-page, n.d.; dedication; preface, dated December, 1793, pp. i-viii, pp. 1-24 and plates 1-8.

Plates order of issue	Plate Nos.	Dates	Page Nos.	Subjects
part 1, 1	2	n.d. (erased)	1-3 (4 blank)	*Psittacus eximius* Nonpareil Parrot
2	1	Aug. 1, 1793	5-7 (8 blank)	*Didelphis pygmaea* Pygmy Opossum
3	3	n.d.	9-12	*Ceratopetalum gummiferum* Three-leaved Red-gum Tree
4	4	n.d.	13-14	*Banksia spinulosa* Prickly-leaved Banksia
part 2, 5	5	Oct. 1, 1793	15-16	*Columba antarctica* Antarctic Pigeon
6	6	Oct. 1, 1793	17-18	*Chaetodon constrictus* Constricted Chaetodon
7	7	Oct. 1, 1793	19-21 (22 blank)	*Embothrium speciosissimum* Great Embothrium, or Waratah
8	8	Oct. 1, 1793	23-24	*Embothrium silaifolium* Cut-leaved Embothrium

ZOOLOGY OF NEW HOLLAND (Shaw)

Half title-page, full title-page, 1794; no dedication or preface; pp. 1-33, plates 1-12.

part 1, 1	2	n.d. (erased)	1-3 (4 blank)	*Psittacus eximius* Nonpareil Parrot
2	1	Aug. 1, 1793	5-7 (8 blank)	*Didelphis pygmaea* Pygmy Opossum
3	3	n.d.	9-11 (12 blank)	*Psittacus terrestris* Ground Parrot
4	1	n.d. (erased)	13-14	*Merops phrygius* Embroidered Merops
part 2, 5	5	Oct. 1, 1793	15-16	*Columba antarctica* Antarctic Pigeon
6	6	Oct. 1, 1793	17-18	*Chaetodon constrictus* Constricted Chaetodon
7	7	n.d.	19-20	*Testudo longicollis* Long-necked Tortoise
8	8	n.d.	21-24 (24 blank)	*Cancer serratus* Serrated Lobster
part 3, 9	9	Sept. 10, 1794	25-26	*Turdus punctatus* Spotted-shouldered Thrush
10	10	Sept. 10, 1794	27-28	*Coluber porphyriacus* Crimson-sided Snake
11	11	Sept. 1, 1794	29-31 (32 blank)	*Didelphis sciurea* Squirrel Opossum
12	12	Nov. 1, 1794	33 (34 blank)	*Didelphis macroura* Long-tailed Opossum

A SPECIMEN OF THE BOTANY OF NEW HOLLAND (Smith)
Half-title-page; title-page, dated 1793; dedication; preface, dated December, 1793; pp. i-viii, pp. 1-54, and plates 1-16.

part 1, 1	1	n.d.	1-4	*Billardiera scandens* Climbing Apple-berry
2	2	n.d.	5-7 (8 blank)	*Tetratheca juncea* Rushy Tetratheca
3	3	n.d.	9-12	*Ceratopetalum gummiferum* Three-leaved Red-gum Tree
4	4	n.d.	13-14	*Banksia spinulosa* Prickly-leaved Banksia
part 2, 5	5	n.d.	15-16	*Goodenia ramosissima* Branching blue Goodenia
6	6	n.d.	17-18	*Platylobium formosum* Orange Flat-Pea
7	7	Oct. 1, 1793	19-21 (22 blank)	*Embothrium speciosissimum* Great Embothrium, or Waratah
8	8	Oct. 1, 1793	23-24	*Embothrium silaifolium* Cut-leaved Embothrium
part 3, 9	9	n.d.	25-27 (28 blank)	*Embothrium sericeum* Silky Embothrium
10	10	n.d.	29-30	*Embothrium buxifolium* Box-leaved Embothrium
11	11	n.d.	31-33 (34 blank)	*Pimelea linifolia* Flax-leaved Pimelea
12	12	n.d.	35-38	*Pultenaea stipularis* Scaly Pultenea
part 4, 13	13	n.d.	39-44	*Eucalyptus robusta* Brown Gum Tree, or New Holland Mahogany
14	14	Jan. 1, 1795	45-49 (50 blank)	*Styphelia tubiflora* Crimson Styphelia
15	15	Jan. 1, 1795	51-52	*Mimosa myrtifolia* Myrtle-leaved Mimosa
16	16	Jan. 1, 1795	53-54	*Mimosa hispidula* Little Harsh Mimosa

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THE CIRCULAR HEAD SCIENTIFIC JOURNAL AND SOME OTHER EARLY TASMANIAN NATURAL HISTORY MANUSCRIPTS

By Tom Iredale and G. P. Whitley

A Sydney bibliophile, Mr Kenneth Stewart, possesses some manuscripts and drawings which date back to the early years of natural history in northern Tasmania. These do not appear to have been noticed in zoological or historical literature, neither have we observed their like in libraries[1]. We are grateful to him for placing this material at our disposal for this brief, preliminary report. The items date from 1836 to about 1838 and may be sorted chronologically as follows:

1836 [no month given]: [Water-colour painting of a pentatomid bug captioned] Cimex Query. Launceston. 1836.
- Feb.-March: Extracts from a Journal of a Visit to the South Coast of New Holland in Febr. & March 1836.
- June 21: The Circular Head Scientific Journal, Vol. 1, No. 1. Gratis to our Correspondents. [And] Supplement [to same. R. C. Gunn[2] writes on birds. The Supplement deals with birds and black snake].
- July 5: To the Editor of the Circular Head Scientific Journal. Contribution 1st. Wednesday 5 July 1836 [Birds].
- July 29: The Circular Head Scientific Journal. Vol. I, No. 2. [Aves, Mammalia, Table of the Distribution of Mammalia.]
- Oct. 23: To the Editor of the Circular Head Scientific Journal. Communication 2d. [Birds.]
- Nov. 29: Circular Head Scientific Journal. Vol. I, No. 3 [Birds.]

1837, April 29: Circular Head Scientific Journal, Vol. I, No. 4 [Birds.]
- July 11: Circular Head Scientific Journal, Vol. II, No. [1]. [Birds.]
- Aug. 1: Circular Head Scientific Journal, No. 2, Second Series [i.e. Vol. II, No. 2]. [Birds.]
- Nov. 11: Letter dated Sunday afternoon . . . "Worn to a Stump." Recd. 11 Nov. 1837.
- Nov. 20: Notes on the Birds of Van Diemen's Land by Ronald C. Gunn. No. 1. Circular Head.

1838, Jan. 1: Remarks on the Birds of Van Diemen's Land by Ronald C Gunn. Circular Head.
- Feb. 15: Notes on some of the Birds of Van Diemen's Land by Ronald C. Gunn. Circular Head.
- May 30: Continued from our last on the Birds of Van Diemen's Land. May 30, 1838. Dedicated to the Light of the North. [Launceston.] Ornithological Journal. Edited by I. Grant. [Kingfisher, shrikes, etc., etc.]
- June 26: Notes on the Birds of Van Diemen's Land. Circular Head.

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1 With the possible exception of another set seen years ago amongst some miscellaneous uncatalogued pamphlets which cannot at the moment be traced.

2 Ronald Campbell Gunn (1808-1881) became police magistrate at Circular Head, a remote part of north-western Tasmania, in 1836. Here he must have employed his leisure in writing and editing his *Circular Head Scientific Journal.* In 1838 he was back in Hobart in other official positions. He was a fine naturalist, leaning more towards botany than zoology. For further particulars of Gunn, see Whittell, 1954, *The Literature of Australian Birds,* p. 308, and the *Australian Dictionary of Biography,* 1966.

[1838] December: Supplement to the [Circular Head] Scientific Journal. Launceston.

Years? Undated: On the Digestive organs of Birds. Profr. R. E. Grant, London.

To the Editor of the Circular Head Scientific Journal. Contribution 1st. [Bears device with Latin motto: *flammam alere* (i.e. to feed the flame) and contains description of owl. Undated, but evidently written in July 1836.]

To the Editor of Circular Head Scientific Journal. Communication 3d. [Undated, but perhaps written in 1836. Includes sketch of bird's claw.]

Loose sheets of paper with writings concerning birds, letters (including some from I. Grant and James Lee to R. C. Gunn), and lists.

Water-colour painting of bird, *Vanellus gallinaceous* [the Spur-winged Plover, *Lobibyx novaehollandiae*].

Water-colour painting of [a Tasmanian] land shell.

The layout of some of the above items is in the style of a newspaper or periodical. Copies of the *Circular Head Scientific Journal* must have been laboriously written and were sometimes illustrated by small pen-drawings of parts of birds. There was probably a printing press at Circular Head in the 1830's [compare K. R. Von Stieglitz, 1952, A Short History of Circular Head, p. 49]. The *Australian Encyclopaedia* (6, 1958, p. 331) tells us that a newspaper, the *Circular Head Chronicle* (Smithton, Tasmania) is still in existence, but does not say when it was founded. [It began 18 July 1906.]

The first Australian newspapers were printed in Sydney from the year 1803 and in Hobart from 1810 and Launceston had the *Tasmanian* in 1825. Examples of handwritten newspapers in Australia are given in Alan Finch's book, *Pens & Ems* (Adelaide: Rigby), 1965, wherein we read of one having been "appended to a stately eucalyptus tree" in Perth in 1828, another which appeared in Fremantle in 1830, the *Melbourne Advertiser* of 1838, and so on. Therefore the *Circular Head Scientific Journal* was not the first of its genre.

Although not a formal publication in the modern taxonomic sense, Ronald Gunn's manuscript *Circular Head Scientific Journal* should be saved from obscurity, studied by ornithologists for its information on northern Tasmanian birds of long ago, and recognized as a collector's piece of exceptional rarity amongst Australiana.

Since the above was written, we learn that Mr. Stewart has transferred his valuable material to the Australian National Library, Canberra.

The items formerly belonged to Mr. J. R. Kinghorn, of Northwood, New South Wales, who tells us that they most probably came from Dr. E. P. Ramsay's papers: of their earlier provenance, nothing is known. Xerox copies of some of the manuscripts, chiefly the *Circular Head Scientific Journals,* are in the Mitchell Library, Sydney (MSS. 1180. Primary sources *5-242 B).

FROG CALLS AND THE SPECIES PROBLEM

by M. J. Littlejohn

Department of Zoology, University of Melbourne

(Plates XI-XIII; text-fig. 1)

Until fairly recently, conventional taxonomical procedures were generally based on the examination of morphological characters. With the advent of adequate techniques for objectively describing and quantifying behaviour patterns, these ephemeral attributes have been receiving increased attention in systematic studies at various levels of classification. While the use of a wider range of characters in taxonomy is of value *per se*, the important point about behavioural (or ethological) attributes at the species level is that they often operate as premating reproductive isolating mechanisms. These are factors which increase reproductive efficiency by reducing the frequency of attempts at cross-mating between species which breed in the same places at the same time (i.e. sympatric species). Thus, a study of ethological isolating mechanisms in closely related species can provide valuable and interesting information about the importance of behavioural differences in maintaining their genetic distinctness. It also permits an assessment of how different these species-specific behaviour patterns must be in order to operate efficiently. In addition, knowledge of mating behaviour and ethological isolation in a group of closely related species may provide clues about the evolution of behaviour. Because of their role in maintaining species-distinctness, premating isolating mechanisms are the most important taxonomic characters that a species possesses. Accordingly, they should carry maximal value in species recognition and diagnosis. However, from the viewpoint of the other principal aim of taxonomy (the establishment of relationships) premating isolating mechanisms, being th emost distinctive characteristics of closely related sympatric species, may be of little phylogenetic value.

Ethological isolation in frogs

The conspicuous male call of frogs operates as a major ethological isolating mechanism between sympatric species. Since it is a quite usual occurrence for five to seven species of frogs to call simultaneously at the same breeding site, problems of specificity and efficient acoustical communication can be considerable. Some aspects of this subject were discussed in an earlier article (Littlejohn, 1965, *Austr. Nat. Hist.*, 15:52-55). The normal sequence of breeding behaviour in frogs is as follows. A reproductively ripe female becomes responsive to the mating call and moves towards a calling male of the same species (a positive phonotaxis). She eventually is seen by, or she touches the male who then clasps her. Oviposition and external fertilization follow. The specific male mating call and the associated female response to the call ensure that the chances of cross-mating are reduced to a minimum. But this mating system is not a perfect one, for males appear to be rather indiscriminate and a female moving towards a calling male of her own species may pass near a male of another species and be clasped. Thus interspecific pairs are occasionally found in the field. Whether or not these mis-matings result in fertile hybrids depends on the degree of genetic compatibility, and the ability of the intermediate progeny to compete successfully with individuals of the parental species. Modern techniques of sound recording and analysis allow the objective and quantitative investigation of the structure of the mating call. Female acoustical behaviour can also be studied through field observation and call discrimination experiments.

Mating calls and cryptic species

Because of its presumed function as a species-specific attractant, the mating call is a most valuable species characteristic in taxonomy. Closely related sympatric species of frogs (and other groups of animals which use sounds as isolating mechanisms) may thus be expected to have markedly different call structures. Hence, if when studying variability in mating call structure, discontinuity is found within one presumed "species", we may assume that two or more taxonomic entities are actually present and that the situation should be investigated further. This initial behavioural clue has often led to the discovery of parallel slight morphological differences, the significance of which was not previously realized. In other cases, no morphological differences may be apparent, in spite of careful examination. However, this fact need not alter the decision that we are dealing with two good biological species since the distinction depends on their basic genetic differences and their failure to interbreed in nature. Morphological differences, unless associated with ethological isolation, are of secondary taxonomic importance at the species level. Species which have little or no apparent morphological differences are termed *cryptic* or *sibling* species and many have recently been found in sound-producing groups of animals.

The three south eastern Australian species of the *Crinia signifera* complex may serve as an example of the use of mating call in revealing cryptic species. These three species were previously included within *C. signifera,* but studies of mating calls led to the discovery first of *C. parinsignifera* and later *C. sloanei.* As can be seen from the accompanying figure, the calls of these three species are strikingly differentiated, particularly in duration and pulse rate. The frogs are very similar in morphology, but following their recognition on the basis of call structure, slight and consistent morphological differences were found between living adult breeding males, which can usually be identified on the basis of differences in pigmentation and granularity of the ventral surface of the body. The identity of living females, and all preserved specimens, still remains somewhat problematical. Geographic ranges have been determined by road logging of breeding choruses and all three species found to occur in an extensive area of sympatry in northern and north eastern Victoria. No intermediate calls have been heard or recorded.

The two south eastern Australian species of the *Crinia laevis* complex (*C. laevis* and *C. victoriana*) provide an example of almost perfect cryptic species. Again, the presence of quite distinctive mating call structure led to their detection. The calls of the two species are similar in consisting of one or two long introductory notes, followed by a series of short repeated notes. It is within the structure of the repeated notes that a marked qualitative difference is present, as can be seen in the accompanying figure. The geographic ranges of these two taxa are almost mutually exclusive, but one area of contact was found in the Grampians of western Victoria. At this locality the forms maintain their distinctness and thus can be assumed to be good species. An exhaustive examination of adult and larval morphology has failed to reveal consistent differences. Numerous examples of this type could be cited in Australian and North American frogs and North American crickets.

Geographical variability in mating call structure

If the mating call is to be considered as a major species character, then we need to know something about variability between individuals and throughout the geographic range of a species. Calls of a large number of species have now been examined in detail and it appears that individual variation within a population is slight. In general, when populations of one species from different parts of the geographic distribution are compared, some statistically significant differences may be detected; but these differences are much smaller than those present between mating calls of sympatric species.

However there is one situation, known as *reinforcement,* in which marked geographic variation in mating call structure may be found. Consider two geographically separated (allopatric) daughter populations, directly derived from one ancestral population. It is reasonable to assume that the mating calls of these two populations will be similar (because of their common ancestry). Nevertheless, the populations will be expected to show some genetic divergence, as a result of differential adaptation to their respective environments. This divergence may result in genetic incompatibility so that if crosses were made between members of the two populations the progeny would be sterile, inviable, or of reduced fitness relative to the parental forms.

Changing environmental conditions, such as those resulting from a transition of glacial to interglacial climate during the Pleistocene Epoch, could then lead to the expansion of geographic ranges of the two species and result in a broad zone of overlap (sympatry). These contacting populations will lack species-specific signals. Consequently, an inefficient reproductive system will exist in which there is a high frequency of mismatings and the possible production of less fit or sterile hybrids. If the hybrids were as fit as the parental types, then the two forms would not overlap but merge through repeated hybridization and backcrossing (introgression). We would thus not be dealing with two species. But if the hybrids are at a disadvantage (as we have postulated), then natural selection may be expected to operate within the zone of sympatry to reduce the frequency of interspecies matings by favouring those individuals which mate within their own species. Males with calls less like those of the other species, and females which respond to these calls, will be more successful in reproduction and will leave more of their kind than those which cannot discriminate and consequently mate interspecifically. Thus, the mating call-response systems of the two species will begin to diverge, i.e. they will be reinforced against each other. On theoretical grounds it has been predicted that this process can be quite rapid, with most of the change occurring in a few generations. This process of reinforcement is one aspect of a general evolutionary process termed *character displacement,* which can also be applied to divergence resulting from ecological interactions. The study of these phenomena is basic to an understanding of the process of species formation. At most, only four or five cases of reinforcement have been quantitatively examined, and one of these involves two south-eastern Australian species of tree frogs.

Tree frogs of the Hyla ewingi complex

The two closely related but morphologically distinctive species, *Hyla ewingi* and *H. verreauxi,* occur in a wide zone of sympatry in south eastern Australia, along the coast in the south and the Divide in the east. Extensive areas of allopatry of *H. verreauxi* are found in the north, and of *H. ewingi* in the southwest. No natural hybrids have yet been found in the zone of sympatry. Results of artificial hybridization tests between the two species from western sympatry suggest that a high degree of genetic incompatability and hybrid inviability is present. Thus the two basic requirements for the occurrence of reinforcement are present. Previous work has shown that whereas the mating calls of the two species from sympatric populations are quite distinctive, differing mainly in pulse repetition rate, those of frogs from allopatric populations are very similar, so much so that we cannot resolve them with certainty by ear or physical analysis. This pattern of geographic variability has been interpreted as reflecting results of natural selection for efficient premating isolation between the sympatric populations (i.e. reinforcement), while the allopatric populations are presumed to have retained the original basic call structure. A figure showing general south-eastern distributions, and geographical variation in one call component, pulse repetition rate, is presented here. Other noticeable differences have been detected in call duration (eastern sympatry) and carrier frequency (western sympatry). In addition, the distinctness of the pulsing (amplitude modulation) is markedly reduced in the western sympatric populations of *H. verreauxi.* Because the ranges of variation of pulse repetition rate in the sympatric populations do

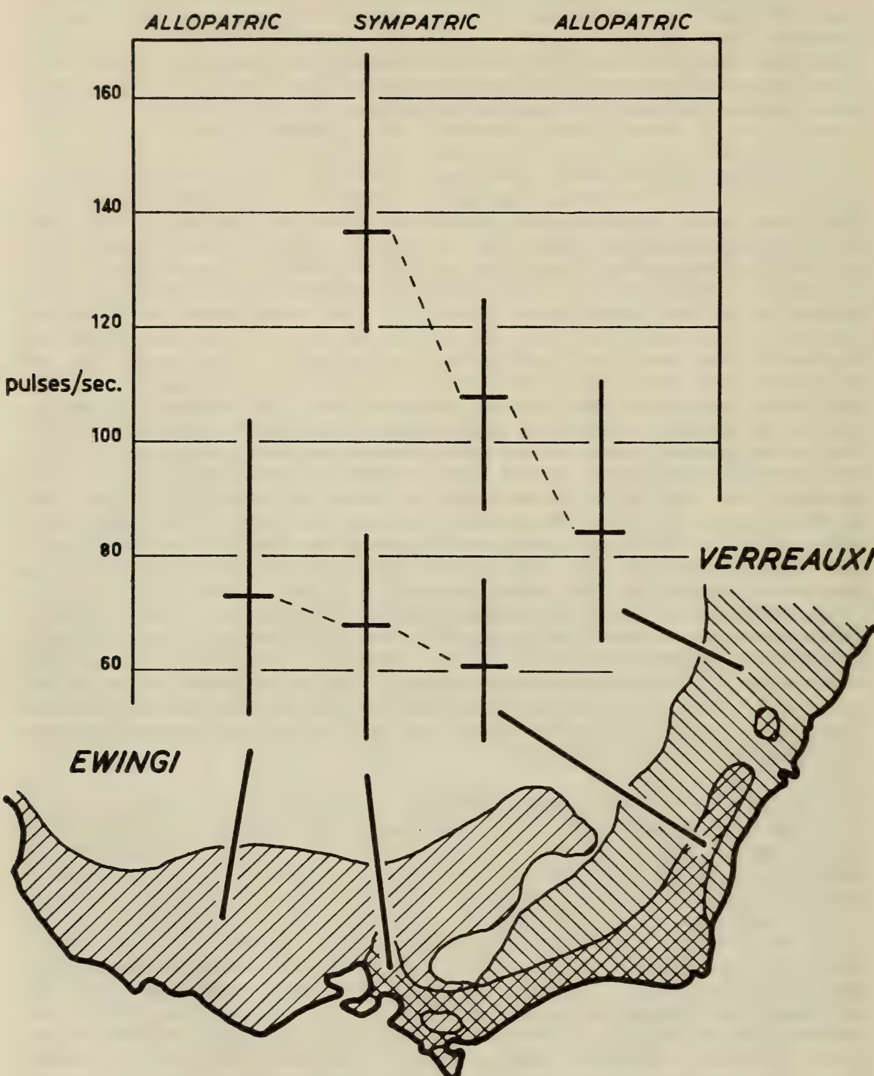

Fig. 1.—Distributions of *Hyla ewingi* and *H. verreauxi* in south eastern Australia and a graphical summary of geographical variation in pulse repetition rate (corrected to 10°C.). The range is indicated by the long vertical line and the mean by the short horizontal line. Each sample includes calls of at least twenty five individuals. (Based on data presented by Littlejohn, 1965, *Evolution* 19: 234-243).

not overlap, whereas those of the other parameters do, we may assume that this most distinctive call component is very important in the call discrimination process. There is also no overlap in ranges of variation of pulse repetition rate of the allopatric and sympatric samples of *H. verreauxi*. We can therefore predict that these allopatric populations are potentially reproductively isolated. Conversely, the pulse repetition rates of western sympatric *H. ewingi* and allopatric *H. verreauxi* do overlap and we might again predict that these populations would not be ethologically isolated if they became sympatric. If this is so, then a rather anomolous taxonomic situation exists in which these remote populations could behave as good biological species, but are linked by a series of intermediate populations. Since the process of speciation is gradual, such examples are to be expected and are of great value in providing information about the evolution of reproductive isolating mechanisms and the formation of species.

Call discrimination tests

The above speculations about the effectiveness of mating call differences can be objectively tested by call discrimination experiments. We are currently investigating these problems in the *H. ewingi* complex and a brief description of the methods and some of the preliminary results may be of interest.

Several parameters of the male mating call (e.g. duration and pulse repetition rate) are markedly temperature dependent. If female specificity depends on these call components then we must assume that the response system has the same temperature coefficient. Consequently in attempting an experimental analysis of this behavioural response it is desirable to control such environmental factors as temperature. This in turn makes the laboratory a more suitable place than the natural situation for experimental investigations of this type. The basic apparatus presently in use consists of a sound and heat-insulated, temperature-controlled box, about eight feet long, thirty inches wide and eighteen inches high. A foam plastic floor, marked out in eight inch squares so that the positions and movements of the frogs can be accurately described, is dampened with water to provide a saturated atmosphere. Two small loudspeakers, each driven by a separate tape recorder, are symmetrically placed within the enclosure at the centres of the appropriate squares, and near the ends. Tapes of test calls are prepared in advance by selecting recordings made at temperatures close to that of the discrimination box (usually 10 or 11°C) and repeatedly transcribed onto another tape so that a long sequence of the same call is available. Observations are made by dim red light and the behaviour of the animals being tested is noted on a third tape recorder (Plate XII).

Reproductively active female frogs, freshly collected from nearby breeding sites, are returned to the laboratory as quickly and quietly as possible. The recorders are loaded with the appropriate prepared tapes, usually one of which carries the call of a male of the same species from the same area (control), while the other is that of a male of another species, or of the same species from another area (experimental). The recorders are then started and the sound levels of the loudspeakers balanced and adjusted to approximate the loudness of natural calls. The female frogs are carefully released and the discrimination trial started. An orientation to a loudspeaker is scored if the frog enters the speaker square (Plate XIII). A normal pattern of orientation to a call involves deliberate and progressive movement towards the sound source, often in a circling path, and finally actual contact with the loudspeaker. At the end of a trial the frogs are gathered up and returned to a central container where they are allowed to settle down for about twenty minutes. To counteract any bias in the system the loudspeaker connections are exchanged so that control and experimental calls are now coming from opposite ends, and the next trial is started. The experiments are repeated until adequate samples have been obtained. It is a rather uncertain and difficult process to obtain reactive females so that some compromise in sample size may be necessary. Many apparently suitable subjects simply sit at the release point for the duration of the trial, while others may attempt to escape from the enclosure by rapid randomly oriented movements which are in striking contrast to the deliberate and overt orientations of reactive frogs.

A reasonable number of *H. ewingi* and *H. verreauxi* females from western sympatric populations have now been tested in the discrimination tank and the results of these experiments give strong support to the predictions made from the quantitative study of geographical variation in mating call structure in this complex.

Electrophysiological studies of the ear can also provide information about the general problem of sound reception and discrimination. Recent work in the United States of America has indicated that the frog's ear may operate as a tuned acoustical filter, allowing only sounds within a certain frequency band to be transmitted by the auditory nerve to the brain for processing. This indicates the possible importance of the carrier frequency differences which we have noted in the geographical survey of mating call structure in the *H. ewingi* complex. Since the natural calls used in the initial discrimination trials may differ in carrier frequency as well as pulse repetition rate, it has become necessary to develop techniques for electronically synthesizing mating calls in which only one factor is varied. We have begun such a programme and the results so far obtained, while most encouraging, are not adequate to permit any generalizations about the significance of the various call components.

This kind of experimental approach to behaviour thus confirms conclusions derived indirectly from a consideration of geographical variability in mating call structure and from comparison of calls of sets of sympatric species. It is hoped that in outlining our research that we may be able to give some indications of the role of behavioural studies in modern taxonomy and evolution, and of future experimental applications.

EXPLANATION OF PLATES

Plate XI, Fig. 1.—Oscillograms of mating calls of (A) *Crinia parinsignifera,* (B) *C. signifera,* and (C) *C. sloanei,* recorded in a sympatric breeding chorus at Mulwala, N.S.W. The time marker below each trace indicates 0.01 second intervals.

Plate XI, Fig. 2.—Audiospectrograms of repeated notes in the mating calls of (A) *Crinia laevis,* and (B) *C. victoriana.* These recordings were obtained from two localities in the Grampians, Vic., close to where the geographic ranges contact.

Plate XII—Mr. J. Loftus-Hills observing the movements of a female tree frog during a call discrimination trial. Note the small white loud speaker enclosure below the cooling pipes inside the discrimination box.
(Photo: Author)

Plate XIII—A female *Hyla verreauxi* which has been attracted to the loud speaker from which recorded mating calls of a male of the same species are being broadcast.
(Photo: Author)

REPTILES AND AMPHIBIANS OF THE BATHURST DISTRICT

By Ian B. McArtney,
Bathurst, N.S.W.

I can make little claim to this work being "all my own". I am very grateful for the assistance given to me by Mr. Harold Cogger of the Australian Museum and to Barry West (who for the present is of no fixed abode). Also to the many others too numerous to mention who have brought specimens to me.

LIZARDS

FAMILY: Geckonidae

THICK TAILED GECKO: *Gymnodactylus millii.* Not a very common species: Rock Forest, Mt. Rankin, Mt. Dedman.

STONE GECKO: *Diplodactylus vittatus.* Whole Bathurst area, usually amongst granite.

LESUEUR'S GECKO: *Oedura lesueurii lesueurii.* From Mt. Dedman only.

FAMILY: Pygopididae

BURTON'S LEGLESS LIZARD: *Lialis burtonis.* Bridal Track. One specimen only. Turondale (numerous).

FRAZER'S LEGLESS LIZARD: *Delma frazeri frazeri.* Turondale. One specimen only.

FAMILY: Scincidae

SKINK: *Ablepharus lineoocellatus anomalus.* A fairly common species throughout the Bathurst district.

WALL LIZARD: *Ablepharus boutonii plagiocephalus.* Mt. Rankin.

Ablepharus greyii. Mt. Rankin; one specimen only.

CUNNINGHAM'S ROCK SKINK: *Egernia cunninghami.* Very common throughout whole Bathurst district, particularly in the vicinity of granite, although quite often found in tree stumps and logs.

THREE TOED SKINK: *Lygosoma (Leiolopisma) decresiense decresiense.* Appears to be restricted to some higher areas around Bathurst, quite common under rotten logs in Vittoria area.

COMMON GRASS SKINK: *Lygosoma (Leiolopisma) guichenoti guichenoti.* Common (as name implies).

Lygosoma (Leiolopisma) pectoralis. Mt. Stewart.

WEASEL SKINK: *Lygosoma (Leiolopisma) mustelinum.* Chifley Dam from one specimen only.

Lygosoma (Leiolopisma) entrecasteauxii. Walang.

METALLIC SKINK: *Lygosoma (Leiolopisma) metallicum.* Mt. Dedman from one specimen only.

COPPER TAIL SKINK: *Lygosoma (Sphenomorphus) taeniolatum taeniolatum.* Common in rocky areas.

STRIPED SKINK: *Lygosoma (Sphenomorphus) lesueurii lesueurii.* Whole Bathurst area.

COMMON WATER SKINK: *Lygosoma (Sphenomorphus) quoyii quoyii.* Most waterways (not in the vicinity of town).

COMMON BLUE TONGUE: *Tiliqua scincoides scincoides.* Whole district.

SOUTHERN BLOTCHED BLUE TONGUE: *Tiliqua nigrolutea.* Appear to be restricted to Southern side of Bathurst. From southwest to east.

SHINGLE BACK: *Trachydosaurus rugosus rugosus.* More common on north side of town. Only occasionally south of Bathurst.

FAMILY: Agamidae

BURROWING DRAGON: *Tympanocryptis lineata.* George Park, Bathurst.
TREE DRAGON or JACKY LIZARD: *Amphibolurus muricatus.* Whole district.
COMMON BEARDED DRAGON: *Amphibolurus barbatus barbatus.* Whole district.
MOUNTAIN DRAGON: *Amphibolurus diemensis.* Mt. Horrible from one specimen.
DRAGON: Previously called *Diporiphora australis* but arrangement of pores makes it an *Amphibolurus.* Possibly an undescribed species (Cogger).
EASTERN WATER DRAGON: *Physignathus lesueurii lesueurii.* Most waterways (not in immediate town area).

FAMILY: Varanidae

LACE MONITOR: *Varanus (Varanus) varius.* A species fast becoming very scarce. Usually found in places not frequented by humans.
GOULD SAND GOANNA: *Varanus (Varanus) gouldii gouldii.* Even rarer than the above. Appears to be restricted to the north side of Bathurst.

SNAKES

FAMILY: Typhlopidae

BLIND SNAKE OR WORM SNAKE: *Typhlops nigrescens.* (Example only)—Common enough but not frequently found, owing to secretive habits. In dealing with typhlops I have only listed the above species. Because of their small size and minor differences between species, identification is often difficult.

FAMILY: Boidae

CARPET PYTHON: *Morelia spilotes variegata.* This would possibly be one of the rarest reptiles in the Bathurst district.

FAMILY: Elapidae

COPPERHEAD: *Denisonia superba.* Usually found on high lands and snow country.
BLACK HEADED OR GOULD SNAKE: *Parasuta gouldii.* Reasonably common but not usually seen unless one searches for them. Found under rocks etc.
SMALL EYED SNAKE: *Cryptophis nigrescens.* Mt. Horrible.
COMMON BROWN SNAKE: *Demansia textilis textilis.* Whole Bathurst area.
YELLOW FACED WHIP SNAKE: *Demansia psammophis.* Forge area. From one specimen only.
MAINLAND TIGER SNAKE: *Notechis scutatus scutatus.* A common species found in all parts of the Bathurst area except the north, e.g. Bridle Track and Turondale. There is a good deal of colour variety in this district.
COMMON RED BELLIED BLACK SNAKE: *Pseudechis porphyriacus.* As the name implies, a very common species, usually found in the vicinity of waterways in the whole of the Bathurst district.
BANDY BANDY: *Vermicella annulata.* Somewhat rare species but found in all parts of the Bathurst district.

TORTOISES

FAMILY: Chelydidae

COMMON LONG NECKED TORTOISE: *Chelodina longicollis.* Found in all waterways in the Bathurst district.
MACQUARIE TORTOISE: *Emydura macquarii.* Turon River. From one specimen only. Lower Macquarie (Ranwick Hole).

AMPHIBIA

FAMILY: Leptodactylidae

PAINTED FROG: *Heleioporus pictus.* Perthville to South.
BULL FROG: *Lymnodynastes dorsalis.* Whole district.
MARBLED FROG: *Lymnodynastes tasmaniensis.* Whole district.
FLETCHER'S FROG: *Lymnodynastes fletcheri.* In common with *tasmaniensis.*
BROWN FROGLET: *Crinia signifera.* Whole Bathurst district. A great variety in colour markings.
BIBRON'S TOADLET: *Pseudophryne bibronii.* Whole Bathurst area.
Uperoleia sp. In the case of this species identification is not positive. Species either *Uperoleia marmorata* or *Uperoleia rugosa.*
GOLDEN SWAMP FROG (BELLS): *Hyla aurea.* Whole Bathurst district.
LESUEUR'S FROG: *Hyla lesueurii.* Bridle Track. Somewhat rare.
Hyla booroolongensis. Very common along the stony margins of all waterways in whole district. Specimens identified by Mr. Harold Cogger.
EWING'S FROG: *Hyla ewingii loveridgei.* Sub species very common in whole district.
PERON'S TREE FROG: *Hyla peronii.* A somewhat rare species in this district.

References

Eric Worrell, "Reptiles of Australia".
J. R. Kinghorn, "The Snakes of Australia".
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TWO NEW SPECIES OF GALAXIID FISHES FROM THE LAKE PEDDER REGION OF SOUTHERN TASMANIA

By Roger Frankenberg

(Plates XIV-XV)

INTRODUCTION

Collections of galaxiid fishes from the Lake Pedder region of southern Tasmania by A. Neboiss and C. McCubbin in 1965, by W. D. Williams and party in 1966, and by the author in 1967, have provided the material for this paper. Two new species are described, with remarks on their relationships and ecology. The occurrence of a third species in the region is noted.

The above collections represent the only records of galaxiids from a comparatively large portion of Tasmania between and including most of the drainage basins of the Gordon and Huon rivers. As galaxiids are the dominant element in the native fish fauna of the rest of Tasmania, it is not surprising that the little known southern part should yield new species.

Aquatic habitats in the Lake Pedder region can be broadly divided on a physical basis as follows: (1) Lake Pedder itself, in the headwaters of the Serpentine R. (Gordon R. drainage), about two miles square and relatively shallow, with wide sandy beaches and little rooted aquatic vegetation; (2) swamps and slow-flowing streams with aquatic and overhanging terrestrial vegetation and a substratum with considerable organic detritus, situated in a flat plain draining into Lake Pedder or the Serpentine R.; (3) streams with steep gradients draining ranges to the north and south of Lake Pedder; and (4) small glacial lakes high in the Frankland Ranges (S. and W. of Lake Pedder), e.g. Lake Surprise, about 400 yards in diameter, with a rocky bottom and, in parts, a thick blanket of algae. At the east end of the Frankland Ranges, the line of the divide between the Serpentine and Huon Rivers lies in the plain and is scarcely distinguishable, suggesting that some continuity of headwaters may occur with periods of heavy rain and consequently allow migration of aquatic organisms from one river to the other.

In the descriptions below, methods of making counts and measurements follow Hubbs and Lagler (1958), except that (1) the caudal peduncle is measured along its dorsal length, and (2) vertebrae counts represent the total number of distinguishable centra minus two in each case, i.e. the ural vertebrae are not counted. The total count is given for dorsal and anal fin rays. Abbreviations used in the text are, "LT"=total length, "LS"=standard length, "f"=frequency. Where counts are given for paired characters, those of the left side are listed first. For the locality records listed, the figure in parentheses following the date indicates the number of specimens. Collections were made using a dip-net and a ⅜" mesh seine. The type-series of each species (and all material collected by the author) were initially fixed in hexamine neutralised formalin and subsequently transferred to 70% ethyl alcohol.

SYSTEMATIC ACCOUNT

Galaxias pedderensis sp. nov.

(Plate XIV)

Holotype: a female 49 mm. standard length, reg. no. D.941, Tasmanian Museum, Hobart. Named from the type-locality.
Type-locality: Lake Pedder, southern Tasmania, near the mouth of the inflowing stream from Lake Maria, and including the stream itself up to 100 yards from the mouth, 1 February, 1967.

Paratypes: 19 specimens: 16 from the same locality and at the same time as the holotype, 3 from a pond about 400 yards south of the type locality, 3 February, 1967.

Diagnosis: distinguished from all other species of *Galaxias* by a combination of the slender caudal peduncle, single pyloric caecum and the low number of vertebrae.

Description: based on the type and 19 paratypes, 32.0-70.0 mm. LS, of which 7 specimens were cleared and stained. Biometric data are presented in Tables 1 and 3.

Body fusiform, head with flat dorsal profile, depressed between the orbits. Jaws sub-equal anteriorly; posterior termination of the maxilla varies between verticals from the anterior one fifth to one half of eye. Premaxilla and dentary each with about 12 to 16 teeth, no lateral canines; 7 to 8 teeth on the mesopterygoid and a double row of about 5 on the lingual plate; both upper and lower pharyngeal teeth present.

A large open pore on each side of each tubular anterior nostril, and 1 immediately antero-medial to each simple posterior nostril; 2 pairs of pores in the interorbital space, respectively about 0.33 and 0.8 of the eye diameter from its anterior margin; 1 pore on the upper margin of each eye slightly posterior to the second interorbital pair, a suborbital (but no postorbital) pore; 2 pores between the maxilla and eye and 2 each side below the jaws; 6 pores along the preoperculum, the first below or slightly anterior to the suborbital pore (slightly posterior in two of the largest specimens).

Gill rakers on lower part of first arch 2 to 3 times longer than wide, of about equal size in individuals, except for the anteriormost 1 or 2.

One short pyloric caecum present, from 1.5 to 3.0 times longer than width at base (4 specimens examined). Least depth of the caudal peduncle varies between 0.32 and 0.37 of its dorsal length.

Pectoral fins rounded, extending from 0.40 to 0.51 of the distance to the origin of the pelvic fins. Pelvic fins with small unpaired 'splint' ray on outer margin and extending from 0.54 to 0.69 of the distance to the origin of the anal fin. A maximum number of 2 branches per ray in both paired fins. Anal fin commences between 0.38 and 0.64 of the dorsal fin base behind the dorsal fin origin. Anterior 4 to 6 dorsal rays and 5 to 6 anal rays unbranched, remainder 2-branched in specimens longer than 43 mm. LS. Last ray divided from base (except in 1 specimen). Caudal fin emarginate, with caudal ridges scarcely extending to the limit of the anal fin. A maximum of 4 branches in a single caudal fin ray.

Branchiostegals: counts of branchiostegal rays for 12 specimens are 7-7(f.3), 8-8(f.5), 9-7(f.1), 9-8(f.1), 9-9(f.2).

Vertebrae: parapophyses not fused with centra on prepelvic trunk vertebrae. Counts of trunk and caudal vertebrae for 17 specimens, covering a total range of 49 to 52, are 29-21(f.1), 30-21(f.2), 30-22(f.1), 31-19(f.2), 31-20 (f.1), 32-18(f.2), 32-19(f.2), 33-16(f.1), 34-16(f.2), 34-17(f.1), 35-16(f.2).

Colour in alcohol: upper body and sides with irregular blotches, dark brown to light grey in colour according to the degree of expansion of the melanophores. Ventral surface light coloured, except that the pigmented coelomic wall may be visible. Fins hyaline, the fin rays (except the posterior pectoral rays) outlined with dark pigment. In the larger specimens dermal pigmentation extends on to the anterior part of the dorsal fin, and to a lesser extent, the anal fin.

Colour in life: upper body and sides light yellow-brown with blackish-brown blotches; lower sides of trunk grey-green; ventral surface whitish. Fins light yellow-brown at bases, becoming colourless distally.

Size: Maximum size observed 80 mm. LT, 70 mm. LS (a female). Largest male 53 mm. LT, 46.5 mm. LS.

Breeding: in 10 specimens, only the 6 largest, from 43 mm. LS (4 females and 2 males), showed any trace of gonad development, and this was at a very immature stage. Females appear to reach a larger size than males, otherwise there is no apparent difference between the sexes.

Habitat: abundant near the edge of Lake Pedder, and in a flowing stream entering the lake. A few specimens were collected from a pond near Lake Pedder (type locality of a second species described below).

Affinities: *G. pedderensis* appears most closely related to *G. johnstoni* Scott. The lower number of vertebrae (Table 3), the single pyloric caecum (*cf.* 2 in *johnstoni*), the narrower caudal peduncle (32.5-37.0, mean = 34.6% of the dorsal length, *cf.* 39.0-47.0, mean = 43.1%), and the longer head (23.1-26.0, mean = 24.7% of LS, *cf.* 21.0-23.0, mean = 22.0%) serve to distinguish *G. pedderensis* from *G. johnstoni.* The specimens used of each species are of comparable size (32.0-51.5, mean 40.8 mm. LS, *cf.* 40.5-60.0, mean 44.9) so that little of the difference in the morphometric characters may be attributed to allometric growth.

Distribution: known only from Lake Pedder and immediate surrounds, southern Tasmania.

Study material and locality records

Lake Pedder, southern Tasmania, near the mouth of the inflowing stream from Lake Maria, and from the stream itself up to 100 yards from the mouth. 1. ii. 1967 (49) R. Frankenberg, B. Cane & G. Wells. Type-series—holotype in Tasmanian Museum, Hobart, paratypes in Department of Zoology Museum, University of Melbourne (M.U.Z.D.).

Pond on the east bank of Lake Pedder, about 400 yards south of the stream entering Lake Pedder from Lake Maria. 1 and 3.ii.1967 (3) R. Frankenberg (M.U.Z.D.).

Lake Pedder. 3.iii.1966 (4) W. D. Williams. (M.U.Z.D.).

Lake Pedder. 30.i.1965 (6) A. Neboiss. (National Museum, Victoria).

Galaxias parvus sp. nov.

(Plate XV)

Holotype: a female 41 mm. standard length, reg. no. D.940, Tasmanian Museum, Hobart. The name *parvus* is from the Latin meaning 'small'.

Type locality: Pond on the east bank of Lake Pedder, about 400 yards south of the stream entering Lake Pedder from Lake Maria, southern Tasmania, 1 and 3 February, 1967.

Paratypes: 19 specimens, 17 of which were collected at the same time and from the same locality as the holotype, and 2 from Lake Pedder near the mouth of an inflowing stream about 400 yards north of the type locality, 1 February, 1967.

Diagnosis: distinguished from all other species of *Galaxias* by a combination of the rounded caudal fin, and the low number of vertebrae and pelvic fin rays.

Description: based for the most part on the holotype and 9 paratypes, 22.5 to 54.0 mm. LS. Osteological features and branchiostegal fin ray counts derive from 7 cleared and stained paratypes, 20 to 34 mm. L.S. Biometric data are presented in Tables 2 and 3.

Body fusiform; head flat between the orbits and with a rounded anterior profile. Jaws equal anteriorly, or lower jaw slightly protrudes; posterior termination of the maxilla varies between verticals from the anterior margin of eye and anterior third of eye.

Premaxilla and dentary each with about 16 teeth of fairly even size, those on the dentary being slightly larger. Lingual teeth well developed, about 5 each side along a rather narrow lingual plate; mesopterygoid also with about 5 teeth; both supra- and infrapharyngeal teeth present.

A large open pore on each side of each tubular anterior nostril and 1 immediately anterior and medial to each simple posterior nostril; a pair of pores in the interorbital space 0.25 to 0.33 of the eye diameter from its anterior margin; a line of 4 pores between the posterior margins of the eyes, the middle 2 sometimes slightly more anterior; a sub-orbital and a postorbital pore; 2 pores between the maxilla and the eye and 2 each side below the jaws; 5 pores along the preoperculum, the first below and distinctly posterior to the suborbital pore; numerous smaller pores on the head.

Gillrakers on the lower part of the first arch vary in length from about 1 to 3 times width at base, but, except for the anterior few, are of similar size in any one specimen.

Pyloric caeca absent (6 specimens examined). Least depth of the caudal peduncle varies between 0.42 and 0.50 of its dorsal length.

Pectoral fins broadly rounded with a short basal peduncle and extending from 0.40 to 0.53 of the distance to the origin of the pelvic fins. Pelvic fins with a small unpaired 'splint' ray on the outer margin and extending from 0.49 to 0.66 of the distance to the origin of the anal fin. Dorsal and anal fins rounded, with 4 to 6 unbranched anterior rays. A small and usually unbranched posteriormost ray in these fins appears distinctly separate from the penultimate ray (except in one specimen) and has been counted separately. The anal fin commences between 0.13 and 0.40 of the dorsal fin base behind the dorsal fin origin. Caudal fin truncate to rounded (slightly emarginate in juveniles); ridges from the caudal fin extend anteriorly, the ventral ridge reaching to or nearly to the base of the anal fin. Where an odd number of principal caudal rays occurs, the lower lobe usually contains one more ray than the upper (one exception). A maximum number of 7 branches in a single fin ray for the caudal fin and 4 for all other fins. *Branchiostegals*: counts of branchiostegal rays for 7 specimens are 7-6(f.1), 7-7(f.3), 8-7(f.3).

Vertebrae: fused parapophyses on all trunk vertebrae. Counts of trunk and caudal vertebrae for 15 specimens, covering a total range of from 44 to 47 are 25-19(f.1), 25-20(f.1), 25-21(f.2), 26-18(f.1), 26-19(f.1), 26-20 (f.1), 26-21(f.1), 27-17(f.1), 27-19(f.3), 27-20(f.3).

Colour in alcohol: body above lateral line light grey-brown to dark brown, with small irregularly spaced denser blotches. Sides below lateral line lighter in colour, ventral surface whitish. Fins hyaline, the rays outlined with black pigment.

Colour in life: back and sides yellow-brown, lower sides grey-green; belly whitish, except for a more or less conspicuous salmon-pink to gold coloration anterior to the pelvic fins—this colour was more evident in the smaller specimens. A greenish iridescence on the operculum. Fins light yellow-brown on the proximal part, hyaline distally.

Size: maximum size observed 60.5 mm. LT., 54.0 mm. LS (female). Largest male 53.5 mm. LT, 38.5 mm. LS.

Breeding: in 10 specimens (5 males and 5 females), immature gonad development was evident in all, the smallest being 22.5 mm. LS. The largest specimens are females, otherwise there appears to be no obvious sexual dimorphism.

Habitat: Swamps, still pools and backwaters; collected mainly by sweeping a dipnet through vegetation on the margins of pools. Juveniles were collected in open shallow water on the edge of Lake Pedder together with adults and juveniles of *G. pedderensis*.

Affinities: in size, general appearance, and in characters such as fused prepelvic parapophyses, 5 to 6-rayed pelvic fins, less than 50 vertebrae, and the rounded caudal fin with a tendency towards fewer than 16 principal fin rays, *G. parvus* departs from the more usual *Galaxias* condition, as represented by *G. pedderensis* and *G. johnstoni,* towards the Australian species, *Brachygalaxias pusillus* Mack. These features apart, however, *G. parvus* shows greater osteological similarity to the above two species of *Galaxias.* On this basis, and from its association with *G. pedderensis, G. parvus* is regarded as being phyletically closest to *G. pedderensis,* the two representing ecospecies which have diverged morphologically in the course of adaptation to differing habitats—*G. parvus* to swamp conditions, and *G. pedderensis* to the more open lake-stream habitat. The features of similarity noted above between *G. parvus* and *Brachygalaxias pusillus* are therefore considered to be due to parallel evolution, and the adaptive nature of the resulting 'morphotype' is supported by personal observations on *B. pusillus,* which typically occurs in swampy conditions, i.e. similar to those of *G. parvus.*

Distribution: Lake Pedder and headwaters of the Huon and Serpentine Rivers, southern Tasmania.

Study material and locality-records

Pond on the east bank of Lake Pedder, about 400 yards S. of the stream entering Lake Pedder from Lake Maria. (Gordon R. drainage). 1 and 3.ii.1967 (23) R. Frankenberg. Type-series—holotype in the Tasmanian Museum, Hobart, paratypes in the Department of Zoology Museum, University of Melbourne (M.U.Z.D.).

Pond near H.E.C. Hut (= type locality?), Lake Pedder, 3.iii.1966 (1) W. D. Williams. (M.U.Z.D.).

Lake Pedder, near mouth of inflowing stream from Lake Maria, 1.ii.1967 (5) B. Cane, R. Frankenberg & G. Wells. (M.U.Z.D.).

Anabranch of Huon R., approx. 2.5 miles SE. of Lake Pedder, 2.ii.1967 (29) R. Frankenberg. (M.U.Z.D.).

Mosquito Creek, SW. of Mt. Bowes (Huon R. drainage), 11.ii.1965 (1) C. McCubbin. (National Museum, Victoria).

Galaxias affinis Regan?

Attention is drawn to the existence of a third species of *Galaxias* from the Lake Pedder region. This is represented by two specimens, 50 and 75 mm. LS, from Lake Surprise. These differ from the other two species in having two pyloric caeca (a vestigial third in one), and markedly higher vertebrae numbers (Table 3). The colour pattern also differs, consisting of dark spots and irregular vertical bars. On the basis of these features, these specimens may represent juveniles of *G. affinis* Regan, but further work is necessary on this ill-defined species before any confidence could be placed in such a designation.

Material examined.

Lake Surprise (Huon R. drainage), Tasmania. 3.iii.1966 (2) W. D. Williams (M.U.Z.D.).

Galaxias johnstoni Scott

Comparative material of *G. johnstoni* (from the Derwent R. system, Tasmania) comprises the type-series (4 specimens from a tributary of the Nive R. (Scott, 1936), and 3 specimens from the Clarence Lagoon, in the headwaters of the Nive R., collected by J. Wilson, 27.iii.1962 (M.U.Z.D.). This material is the total recorded for the species.

SUMMARY

Two new species of galaxiid fishes, *Galaxias pedderensis* and *G. parvus* are described from the Lake Pedder region of southern Tasmania and their affinities discussed. The existence of a third species in the area, questionably referred to *G. affinis* Regan, is noted.

TABLE 1. Biometric data for the type specimen and 9 paratypes of *Galaxias pedderensis*

	Holotype	Holotype & 9 paratypes	
		Range	Mean
Pectoral fin-rays	13, 13	12-15	13.3
Pelvic fin-rays (paired)	7, 7	7-7	7.0
Dorsal fin-rays	12	11-13	11.7
Anal fin-rays	13	13-14	13.2
Principal caudal fin-rays	16	16-16	16.0
Branched caudal fin-rays	14	14-14	14.0
Gill-rakers (lower limb)	11	10-11	10.6
Total length in mm.	56	37.0-58.0	46.9
Standard length in mm.	49	32.0-51.5	40.8
As a percentage of standard length:			
Head length	24.5	23.1-26.0	24.7
Body depth (maximum)	14.3	14.0-15.9	14.7
Body width (maximum)	12.2	11.4-13.0	12.2
Snout tip to pelvic fin-origin	53.1	51.3-54.0	52.8
Snout tip to dorsal fin-origin	68.8	66.7-70.3	68.6
Snout tip to anal fin-origin	72.9	71.0-74.6	72.9
Caudal peduncle depth	7.6	7.2- 8.3	7.6
Caudal peduncle dorsal length	21.3	20.4-23.1	22.0
Pectoral fin length	12.9	11.6-14.3	12.7
Pelvic fin length	11.6	10.7-12.6	11.5
As a percentage of head length:			
Eye width	25.0	24.0-27.5	25.6
Snout length	20.8	20.0-25.3	21.8
Interorbital width	30.0	28.7-32.5	30.1

TABLE 2. Biometric data for the type specimen and 9 paratypes of *Galaxias parvus*

	Holotype	Holotype & 9 paratypes	
		Range	Mean
Pectoral fin-rays	13, 14	12-14	12.8
Pelvic fin-rays (paired)	5, 5	5-6	5.4
Dorsal fin-rays	12	10-12	11.3
Anal fin-rays	13	11-15	13.3
Principal caudal fin-rays	15	14-16	15.2
Branched caudal fin-rays	12	8-14	11.7
Gill-rakers (lower limb)	9	7-9	8.5
Total length in mm.	46.5	25.5-60.5	40.1
Standard length in mm.	41.0	22.5-54.0	35.1
As a percentage of standard length:			
Head length	26.3	23.1-27.5	25.4
Body depth (maximum)	18.0	14.8-19.3	17.5
Body width (maximum)	14.1	11.1-16.2	14.3
Snout tip to pelvic fin-origin	53.7	50.6-55.6	53.5
Snout tip to dorsal fin-origin	70.2	67.9-70.7	69.3
Snout tip to anal fin-origin	75.1	70.7-75.3	72.9
Caudal peduncle depth	8.5	8.3-10.2	9.2
Caudal peduncle dorsal length	19.0	18.9-22.2	20.3
Pectoral fin length	12.2	12.0-16.3	13.5
Pelvic fin length	10.2	9.6-11.5	10.3
As a percentage of head length:			
Eye width	26.9	21.6-31.9	28.0
Snout length	19.4	16.0-20.0	18.0
Interorbital width	27.8	23.3-36.7	30.9

TABLE 3. Fin ray and vertebrae counts in three species of *Galaxias* from the Lake Pedder region and *G. johnstoni* Scott. (D) = Derwent R. drainage, (H) = Huon R. drainage, (G) = Gordon R. drainage, N = number of specimens.

Species	Locality	N	Pectoral 11	12	13	14	15	16	Pelvic 5	6	7	8
G. parvus	Lake Pedder (G)	20	1	8	8	3			10	10		
	Upper Huon R. (H)	15		7	7	1				15		
G. pedderensis	L. Pedder (G)	20		1	11	6	2				19	1
G. johnstoni	Nive R. & Clarence Lag. (D)	6	1	4	1						5	1
G. affinis ?	L. Surprise (H)	2					1	1			2	

Species	N	Dorsal 10	11	12	13	Anal 11	12	13	14	15	Principal Caudal 14	15	16	17
G. parvus	20	3	9	8		2	5	6	5	2	2	8	9	1
	15			12	3			5	7	3			14	1
G. pedderensis	20		8	11	1	1		14	4	1			20	
G. johnstoni	7	1	3	3		1	2	4					7	
G. affinis ?	2				2			1	1				2	

Species	N	Vertebrae 44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
G. parvus	15	3	2	6	4												
	15			6	5	3	1										
G. pedderensis	18						1	7	9	1							
G. johnstoni	3											3					
G. affinis ?	2															1	1

ACKNOWLEDGEMENTS

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EXPLANATION OF PLATES

PLATE XIV

Galaxias pedderensis.—(1) holotype, 49 mm. LS, (2) a paratype 60 mm. LS from a pond near Lake Pedder.

PLATE XV

Galaxias parvus.—(1) holotype, 41 mm. LS, (2) a specimen 40 mm. LS from an anabranch of the Huon R. near Lake Pedder.

A NEW CRAB OF THE GENUS **TRICHOPELTARION** FROM AUSTRALIA

By R. K. Dell

Dominion Museum, Wellington, New Zealand

(Plate xvi, text-figures 1-5).

Abstract

A new species of *Trichopeltarion* is described from southern Australia. This is the first Australian record of the genus.

Introduction

In describing *Trichopeltarion fantasticum* from New Zealand, Richardson and Dell (1964, p. 150) commented that no species of this group was known from Australian waters but suggested that the group would almost certainly be collected there. In fact specimens were already present in collections. Dr. J. C. Yaldwyn had examined the collections of crabs in the Australian Museum to check whether any unidentified members of the Atelecyclidae were represented before the paper was written. Later, when working on the collection of Majidae, he came across an unidentified specimen of *Trichopeltarion* presented by Charles T. Harrisson in 1910 from 40-50 fathoms off Tasmania. This specimen was sent to the writer. Mr. Melbourne Ward had also had specimens of this species from off Tasmania in his collection for many years and had assigned it a manuscript name. Dr. Yaldwyn recognised these while examining the Ward collection and was instrumental in having them also sent to the writer. It had been planned to write a joint description of the new Australian species with Mr. Ward. His untimely death prevented this plan from being carried out. The writer has therefore decided to dedicate this handsome and interesting Australian species to Melbourne Ward as a sign of respect.

Genus *Trichopeltarion* Milne-Edwards, 1880.

Bull. Mus. Comp. Zool., 8, p. 19.

Type species (monotypy) *Trichopeltarion nobile* Milne-Edwards, 1880.

Trichopeltarion wardi n.sp.

(Plate xvi; text-figs. 1-5).

Carapace without the spines slightly longer than broad; anterior margin broadly rounded, posterolateral margins very gently rounded, posterior margin almost straight. Anterior and lateral margins with strong, spiny teeth, posterior margin with fine, close tubercles. Regions reasonably well marked. Carapace with groups of close-spaced, evenly developed pustules, developed most strongly over the median and posterior portions of the carapace. Pattern of pustules best shown in Plate vii. Front with three equally developed, acute spines, flattened dorsoventrally. Pre-orbital spine strong with subsidiary teeth, relatively wide. Supraorbital spine narrower but denticulate. Post-orbital spine subequal with pre-orbital, bearing subsidiary teeth. Behind the post-orbital spines are two strong compound spines on each side, in front of the lateral spines, followed by two simple teeth and then the relatively short, lateral spines. Lateral spines, each less than one sixth the width of the carapace without spines, bearing subsidiary teeth. Abdomen of seven segments, very similar in detail to that of *fantasticum*.

Orbits large, bordered by three spines above, anterior edge bounded by the basal antennal segment. Eyestalk very narrow, comparatively long.

Right cheliped (figs. 2, 3) greatly developed in males, very similar to that of *fantasticum*. Left chela much smaller.

Localities: Off Maria Island, Tasmania, Danish seine working in 40 to 45 fathoms, Capt. K. Moller, Holotype male in the Australian Museum, Sydney

(P. 14789) and one paratype male in the Dominion Museum, Wellington (ex Melbourne Ward collection); 38°12.5'S, 149°05.5'E., off Cape Everard, Victoria, 152 metres, 20.6.1962, C.S.I.R.O. Fisheries (Australian Museum, P. 15188); East of Schouten Island, Tasmania, 40-50 fathoms, 1910, presented Charles T. Harrisson (Australian Museum, P. 4045).

Dimensions:	*Holotype*	*Paratype*
Carapace width including spines	26 mm.	25 mm.
Carapace width without lateral spines	20 mm.	20 mm.
Carapace length	26 mm.	26 mm.

The known range is from Tasmania to Victoria in depths from 40 to 70 fathoms. In view of the distribution of the genus in the Indo-Pacific, from Japan, the East Indies and the Indian Ocean, the absence of any representative from New South Wales and Queensland can only be considered apparent at present. This gap will undoubtedly be filled by additional collecting.

Figs. 1-5 *Trichopeltarion wardi* n.sp.
Fig. 1 Outline of orbital spines of paratype
Fig. 2 Right cheliped of holotype
Fig. 3 Right cheliped of paratype
Fig. 4 Underside of orbital area
Fig. 5 Abdomen.

The Australian species seems closest to the New Zealand *fantasticum* Richardson and Dell, from which, however, it differs in many details. *T. wardi* lacks the long lateral spines of *fantasticum,* does not have the tubercles grouped into complex clumps, has a simpler supraorbital spine, lacks spines behind the lateral spine, and has a different pattern of spines and tubercles. The other species to which it shows some resemblance is *T. alcocki* Doflein, from which it differs in having divided spines along the carapace in contrast to the simple spines of *alcocki.*

Literature Cited

Richardson, L. R., and Dell, R. K., 1964. A New Crab of the Genus *Trichopeltarion* from New Zealand. *Trans. Roy. Soc. N.Z., Zool.,* 4: 145-151.

EXPLANATION OF PLATE

Plate XVI — *Trichopeltarion wardi* n.sp.,
Holotype. Photo: Anthony Healy.

RECORDS OF, AND OBSERVATIONS ON, THE CORAL SHRIMP GENUS **STENOPUS** IN AUSTRALIA, NEW ZEALAND AND THE SOUTH-WEST PACIFIC

By J. C. YALDWYN
Australian Museum, Sydney.

(Figures 1-2).

At the time of publication of a recent paper on the behaviour in captivity of a pair of Banded Coral Shrimps, *Stenopus hispidus* (Olivier), from the Sydney area (Yaldwyn, 1966), many specimens, photographs, observations and sight records of this species in Australasian waters had accumulated in the Australian Museum. Rather than list these as a mere appendix to this recent paper, it was considered advisable to deal with them in more detail in a separate publication. Thus this account extends the known distribution of the closely allied *Stenopus tenuirostris* de Man from the Indian Ocean and Indonesia to the Solomon Islands; it lists numerous recent records of *S. hispidus* from the Sydney area; it confirms the presence of *S. hispidus* in New Zealand and western Australian waters; it discusses colour and colour-pattern in *S. hispidus,* and it quotes a report on presumed "fish-cleaning" by *S. hispidus* in the Sydney area. This last observation is of double interest; it is the first from Australian waters and it extends the records of this behaviour pattern (for discussion of this specialized symbiosis see Limbaugh *et al.,* 1961) almost to the southern recorded limit of this species in warm temperate, rather than tropical, waters.

Order DECAPODA
Suborder NATANTIA
Section STENOPODIDEA
Family Stenopodidae
Stenopus Latreille, 1819

Stenopus Holthuis, 1946, *Temminckia* VII: 5.

Stenopodids with body compressed; carapace and abdomen densely covered with evenly spaced, anteriorly directed, strong spinules, sometimes placed in longitudinal rows; telson elongate, ending in two strong spines. 3rd maxilliped with ischium spined externally and with a distinct exopod. 4th and 5th pereiopods with short biunguiculate dactyls. Endopod of uropod with two dorsal ridges, median stronger than inner ridge.

The type species is *Palaemon hispidus* Olivier, known from the Indopacific and tropical western Atlantic. Three other species are known in the genus: *S. spinosus* Risso from the Mediterranean and Red Sea; *S. scutellatus* Rankin from the tropical western Atlantic, and *S. tenuirostris* de Man from the Indian Ocean and Indonesian waters.

Stenopus tenuirostris de Man, 1888

Stenopus tenuirostris de Man, 1888, *Arch. Nat.* 53 (1): 567, pl. 22a fig. 5.
Stenopus tenuirostris, Holthuis, 1946, *Temminckia* VII: 21, pl. III figs. c-e.

Stenopids with 3 to 9 teeth on ventral margin of rostrum, and with rostrum reaching as far as, or beyond, the distal margin of the antennular peduncle. 3rd abdominal segment with a distinct shield-shaped area medially near posterior margin. Spinules on 4th to 6th abdominal segments not in distinct transverse rows, those on 6th segment in more or less distinct longitudinal rows. Scaphocerite not toothed along entire lateral margin, but with a distinct untoothed portion distally adjacent to distal spine. Pereiopods 1, 2, 4 and 5 with rows of small spinules along most segments.

MATERIAL EXAMINED.

Tunabuli Harbour, Santa Isabel (or Ysabel) Id., Solomon Islands, N.S. Heffernan, 1924, 1 ♂ carapace length 6 mm, length large hand 10 mm, 8 ventral rostral teeth; 1 ovig. ♀ carapace length 7 mm, length large hand 9.5 mm, 9 ventral rostral teeth (Australian Museum P. 7638).

DISTRIBUTION.

Previously known from the Seychelles in the Indian Ocean and from the Indo-Malayan Archipelago (for detailed localities see Holthuis, 1946). Now recorded from the southern Solomon Islands, east of New Guinea.

Stenopus hispidus (Olivier, 1811)

Palaemon hispidus Olivier, 1811, *Encycl. meth. Hist. nat.* 8: 666.
Stenopus hispidus, McNeill & Ward, 1930, *Rec. Aust. Mus.* XVII (9): 360.
Stenopus hispidus, Holthuis, 1946, *Temminckia* VII: 12, pl. 1 figs. a-g.

Stenopids with ventral margin of rostrum either untoothed or with a single subapical ventral tooth, and with rostrum reaching to about middle of 2nd segment of the antennular peduncle. 3rd abdominal segment with no shield-shaped area near posterior margin. Spinules on 4th to 6th abdominal segments not in transverse rows, those on 6th segment in more or less distinct longitudinal rows. Scaphocerite not toothed along entire lateral margin, but with a distinct untoothed portion distally adjacent to distal spine. Pereiopods 1, 2, 4 and 5 with segments naked or with a few scattered spinules.

MATERIAL EXAMINED.

In the list below, the first measurement given for each specimen is the carapace length, and the second, if given, is the length of the large hand, i.e. the propodus with finger of the 3rd pereiopod.

Australian Museum Collections, Sydney. (Some of these records have already been given in McNeill & Ward, 1930. Numbers quoted are Australian Museum Register numbers).

Indian Ocean: On reef near R.A.A.F. camp, West Id., Cocos-Keeling Is., Dr. J. Harrison, 24-5-1952, 1 ♀ 10mm, 17mm (P. 15413).

Hawaii: Reef, Waikiki, Honolulu, Melbourne Ward, 1925, 1 ♂ 10mm, 19mm (P. 8503); 1 ♂ 10mm, 18mm; 1 ovig. ♀ 10.5mm, 15mm (both P. 15404).

New Hebrides: Vila Harbour, Messrs. Cummins & Stevens, 1910, 1 ovig. ♀ 11.5mm, 15.5mm; 1 ovig. ♀ 12mm, 21mm (P. 2460-61). Vila Harbour, A. R. McCulloch, whole mount on slide, carapace length approx. 5mm, hand 8.5mm (P.15177).

Northern Territory: Off North East Id., nr. Groote Eylandt, western Gulf of Carpentaria, 26 fms, M.V. *Kestrel,* 4-9-1963 (C.S.I.R.O. Prawn Survey Sta. K11), 1 damaged ovig. ♀ approx. 17mm, 29mm (P. 15405).

Queensland: Hope Id., S. of Cooktown, A. R. McCulloch, 1913, 1 ovig. ♀ 11mm, 16mm (P. 3775). Low Isles, off Port Douglas, Dr. W. E. J. Paradice, 1924, 1 ♂ 9 mm, 19 mm; 1 ♀ 8 mm, 14 mm (P. 8042). Green Id., off Cairns, Old Coll., 1 ♂ 10.5mm, 19mm (P. 275). Green Id., A. R. McCulloch, 1913, 1 ♂ 11mm, 20mm; 1 ovig. ♀ 11.5mm (P. 3844). Dunk Id., off Tully, E. J. Banfield, 1909, 1 ♂ 13mm (P. 2291). Trawled about 7 miles N.W. of Hayman Id., Cumberland Group, 20 fms, M.V. *Challenge,* Pres. K. de Witte, 1958, 1 ♂ 8mm, 16mm; 1 ♀ 16mm, 28mm (P. 12995). One Tree Id., Capricorn Group, among coral rubble in about 3 feet of water at low tide, lagoon, J. C. Yaldwyn & Museum Party, 19-11-1966, 1 ♀ 16mm, 27mm (P. 15406); shallow reef pool at low tide, J.C.Y. & Museum Party, Nov., 1966, 1 ovig. ♀ 16mm, 29mm (P. 15603); lagoon, under dead coral 6-10 feet, B. Goldman & Museum Party, 12-10-1967, 1 ♂ 14mm, 29mm (P. 15604).

New South Wales: In pools with encrusting colonial corals, intertidal rock platform, Minnie Waters, nr. Grafton, G. Biddle, 1963, 1 ♂ 13mm, 28.5mm (P. 15003). Garden Id., Port Jackson, Sydney, Lieut. N. Glover, 1924, 1 ovig. ♀ 13.5mm, 21mm (P. 7203), original colour sketch by A. R. McCulloch in Australian Museum, detailed colour description published by McNeill & Ward

(1930: 361). Below low-tide level, coast nr. Botany Bay, Sydney. R. Ware, Jan. 1952, 1 ovig. ♀ 15mm (P. 12122). In rock crevice at about 18 feet, Congwong Bay, La Perouse, C. J. Lawler, April, 1963, 1 ♂ approx. 5mm, 8mm; 1 ♀ 12mm, 21.5mm (P. 14584-85), measurements as when caught, for subsequent history see Yaldwyn (1966).

Lord Howe Island, Tasman Sea: Lord Howe Id., Mr. Thompson, 1900-1908, 1♀ 18mm (G. 2634); 1 ovig. ♀ 16mm (G. 4068); 1 ovig. ♀ 10mm, 18mm (P. 618). Johnson's Reef, Lord Howe Id., Julie Booth, April 1962, 1 ovig. ♀ 19mm, 27mm (P. 13775), for colour notes on this specimen see below. Lord Howe Id., Julie Booth, Dec. 1962, 1 ♂ 17mm, 38mm (P. 14586).

Auckland War Memorial Museum Collections, New Zealand.

New Zealand: Taken by skindiving at 120 feet off northern tip of Poor Knights Is., North Auckland, K. Tarlton, 1-6-1965, 1 damaged ♀, approx. 11mm.

This is the first record in the scientific literature of *Stenopus hispidus* from New Zealand. The specimen, and a colour photograph of another showing the characteristic colour pattern of the species, were sent to me for comment by Dr. A. W. B. Powell, Assistant Director of the Auckland War Memorial Museum. A black and white photograph of *S. hispidus* appeared in the *Dive Handbook to N.Z. Skindiving* (Tarlton, 1965: 11). The text reference on page 8 states that the specimen illustrated came from a depth of 15 feet in Deep Water Cove, Bay of Islands, North Auckland, that the photograph was taken by Kelvin Tarlton (probably in 1964 or 1965), and that quite a number of specimens had been seen by skindivers north of Auckland. The Auckland Museum colour photograph appears to be of the Deep Water Cove specimen. The above records would indicate that the Banded Coral Shrimp is a genuine member of the northern New Zealand warm-water fauna and not just a tropical stray (compare discussions on the recent records of other Australian and Indopacific Crustacea from northern New Zealand, e.g. Dell, 1964; Yaldwyn, 1961).

Dominion Museum, Wellington, New Zealand.

Solomon Islands: Tide pool, Simigan Beach, Banika Id., Russell Is., R. K. Dell, 20-10-1965, Royal Society B.S.I.P., 1 ♀ 8mm, 15mm (Z. Cr. 1688). "Moated" area, outer coast Banika Id., Russell Is., R. K. Dell, 22-10-1965, Royal Society B.S.I.P., 1 unsexed 5.5mm, 7mm.

New Zealand: Taken by skindiving at 10 fms off Poor Knights Is., North Auckland, B. B. Anderson, 23-4-1967, 1 ovig. ♀ 16mm, 26mm (Z. Cr. 1779).

REPORTED SIGHTINGS AND PHOTOGRAPHS.

Western Australia and Indian Ocean: Dr. R. W. George, of the Western Australian Museum, kindly provided me with a list of specimens of *S. hispidus* taken in Western Australian waters and now in the collections of that Museum (pers. comm., 16-11-1966). These are as follows: 50 miles N.E. of Adele Id., north of Broome, 50 fms (1 specimen); reef at Adele Id. (3 specimens); trawled in Exmouth Gulf (3 specimens); North West Cape (3 specimens), and Blow Holes, 40 miles N. of Carnarvon (about 8 specimens). There are also 2 specimens from Christmas Id., in the Indian Ocean, south of Java and north-west of Western Australia.

Queensland: The British Museum Great Barrier Reef Expedition, 1928-1929, took *Stenopus hispidus* during the general survey of Low Isles, off Port Douglas, and this material is recorded in F. A. McNeill's recently completed report on the Decapoda and Stomatopoda of the Expedition's collections (*Gt. Barrier Reef Exped. Sci. Repts.*, in press). *S. hispidus* has also been photographed several times at Heron Island, Capricorn Group, southern Barrier Reef, and a colour photograph taken there by Keith Gillett has been published (Gillett & McNeill, 1959, 1962, 1967, pl. 104), while others taken by H. G. Cogger in December, 1960, are in the Australian Museum. The latter show the shrimp in shallow water, with antennae extended laterally, moving over a surface of living corals.

New South Wales, north of Sydney: Colour photographs in the Australian Museum taken by G. Biddle at Minnie Waters, near Grafton, in the summer of 1962-1963, show typically coloured *S. hispidus* from the large, coral-encrusted pools of the intertidal rock platform. R. Johnstone reported (pers. comm., 8-5-1967) a virtual "colony" of at least a dozen *S. hispidus* at a depth of about 12 to 20 feet on a reef off the northern beach of Broughton Island, off Port Stephens, May, 1966. No signs of "fish-cleaning" or pair association were noted during a short visit.

New South Wales, Sydney Area: Specimens of Banded Coral Shrimps have been reliably reported by skindivers during 1963-1966 from the following localities: Terrigal, near Gosford (reported by C. J. Lawler from a photograph); Whale Beach, Avalon (reported by Christine Prigge from dark zone of partially subtidal cave, January, 1966); Fairlight, near Manly, Sydney Harbour (photographed on roof of subtidal cave by D. E. Wilson, May, 1964); Fort Denison, Port Jackson, Sydney Harbour ("Along the deeper northern shore, in the few areas with natural rock formations, several cleaner shrimps, *Stenopus hispidus,* were found in clefts or holes in the rocks. There were two pairs and one solitary specimen," see Lawler, 1965); Clovelly pool, near Coogee Beach, Sydney (site of the R. Johnstone "cleaning" observations given below; large specimen seen about 15 feet down by C. J. Lawler, 27-12-1963, associated with a little group of "hinge-beak" prawns (*Rhynchocinetes rugulosus*); Bare Island and Congwong Bay, La Perouse, Botany Bay (original, unequally sized pair described in Yaldwyn, 1966; another pair, matched in size, under observation by C. J. Lawler for about 18 months in 1964-1965; many other specimens seen in this area during 1964-1966 by Lawler and members of the Underwater Research Group of N.S.W.); Glaisher Point, near C.S.I.R.O. Fisheries Laboratory, Cronulla, Port Hacking (C. J. Lawler), and Shiprock, Burraneer Bay, Port Hacking (an equally sized pair seen in large crevice at night in association with a large brown spotted cod, no "cleaning" observed, another smaller specimen remained in a small cave for six weeks and grew noticeably during this period—observations by C. J. Lawler in *U.R.G. Bulletin,* published by the Underwater Research Group of N.S.W., for February, 1967. A colour photograph by Lawler shows a small *S. hispidus* upside down on roof of a crevice at a depth of about 50 feet).

New South Wales, south of Sydney: Colour photographs by F. McCamley show typically coloured *S. hispidus* taken from a rock pool exposed during low tide at Shellharbour, south of Port Kembla, Illawarra District, 22-4-1967. This is the southernmost record of the Banded Coral Shrimp in Australian waters.

Coral Sea: Under overhang among coral, shallow water, North East Cay, Herald Group, Coral Sea, east of Cairns, Qld. Underwater sighting of single specimen by the author, 6-11-1964.

Lord Howe Island, Tasman Sea: Several colour photographs of *Stenopus hispidus* taken by Miss Julie Booth in 1962, are in the Australian Museum to supplement the specimens from this area listed above. These demonstrate the characteristic colour pattern of the Banded Coral Shrimp and record the bright greenish-blue colouring of the ripe egg mass within the cephalothorax of the mature female.

DISTRIBUTION (Figs. 1 and 2).

Previously known from the tropical western Atlantic (Bermuda in the north to Curacao in the south) and the whole Indopacific area, extending from the Red Sea and the east African coast south to Durban in the west, north to Sagami Bay in southern Japan, east to Hawaii and the Tuamotu Group, and south to eastern Australia (at the latitude of Sydney, N.S.W.), Lord Howe Island (about 32°S.) and New Caledonia. Now recorded from northern New Zealand (at approx. 35.5°S.), eastern Australia south to Shellharbour, N.S.W. (approx. 34.5°S.) and Western Australia south to between North West Cape and Carnarvon (approx. 24°S.).

Fig. 1.—Map showing the recorded world distribution of the Banded Coral Shrimp, *Stenopus hispidus*, including reported sightings accepted in this paper. Each circle may represent more than one record or more than one nearby locality. (N.B. The two records from the Solomon Islands were received too late for inclusion on this map.)

Fig. 2.—Map showing the recorded distribution of *Stenopus hispidus* in Australia and the south west Pacific. Solid circles represent material examined or records previously published; open circles represent reported sightings accepted in this paper. Each circle may represent more than one record or more than one nearby locality.

REPORTED "FISH-CLEANING" IN THE SYDNEY AREA.

As stated previously (Yaldwyn, 1966), no observations have as yet been published on "fish-cleaning" by *Stenopus hispidus* in Australian waters. The habit is, however, well established for the Banded Coral Shrimp in the western Atlantic sector of its distribution and has been described in some detail (Limbaugh *et al.,* 1961). There, fish are attracted to such obvious features as the white antennules and antennae projecting from a coral crevice or small cave and waving in the sunlight. The fish then remain still while the shrimp picks with its smaller claws (1st and 2nd chelae) at parasites, injured tissue and other growths on their bodies and fins. The shrimp does not leave its crevice to clean, but merely reaches out towards the fish, which appear to congregate around known *Stenopus* "cleaning stations."

Underwater observations by Mr. R. Johnstone of Sydney (pers. comm., 10-5-1965, 14-2-1966) at the Clovelly pool, near Coogee Beach, Sydney, indicate that "fish-cleaning" is similarly carried out by the Banded Coral Shrimp about fifty miles north of its southernmost recorded limit in eastern Australian waters. Johnstone describes the site of these observations, and the recess in which the *S. hispidus* was established, as follows:

> The Clovelly inlet runs east to west, and is guarded at the entrance by a [man-made] rocky reef, which is uncovered at dead low tide. The recess [occupied by *S. hispidus*] is approx. 40 yards inside the reef on the southern side of the inlet, and is at the base of a gradual drop off which consists of kelp [*Ecklonia*]—covered rocks. It faces out onto a sand patch, which actually forms the floor in the recess. At the time of the observed cleaning, and on subsequent sightings, this floor had distinct fin marks on it. Kelp extends down both sides and to the top of the recess; in front, about five feet

> out and slightly to the east, is a kelp-covered rock. The sand floor here is 18 feet from the surface at low tide, and the actual recess measures 9 inches wide, 4 inches high and 6 inches deep. It has a distinctly concave roof to which the shrimp would cling and wave its antennae in a very inviting manner, indeed until one actually looked into the recess the antennae were all that could be seen.

Johnstone's actual observations in early May, 1965, on presumed "fish-cleaning" were as follows:

> Extending from the recess [described above] were some very long antennae, which were waving about. Knowing something about marine animals, I took a close inspection. To my surprise I discovered in the small recess a specimen of the Banded Coral Shrimp and knowing that other specimens had been found in the Sydney area by Clarrie Lawler, I realized this was not a rarity. On examining the recess further I saw marks and swirls in the sand on the floor, so I backed off and waited patiently. After a long wait, a fish, which I recognized as a small Jackass Fish, *Nemadactylus macropterus,* prevalent at the time, presented itself at the recess and swam in. After some delay, it emerged and swam off and the shrimp came to the entrance and continued to wave its antennae. The swirls then were the marks of fishes being cleaned.

Subsequently Johnstone observed the shrimp in the same recess for a further three weekends, but he did not witness any further presumed cleaning behaviour. The shrimp maintained its station on the roof of the recess and there always appeared to be a larger variety of fish in this area than elsewhere in the pool. These were mostly Jackass Fish, but included "Red and Magpie Morwong, large Sweep and Mado", and it clearly appeared to Johnstone that the shrimp was the attraction. On the fourth weekend, when he returned to the recess, it was covered by sand after heavy seas during the preceding week and the shrimp could not be found.

COLOUR AND COLOUR PATTERN.

Since the well-known, coloured illustrations of Adams & White (1848-1849) and Herrick (1893), the striking and distinctive colours and colour pattern of *Stenopus hispidus* have been described and figured many times. In Australian waters, McNeill's figure (1926: 326; 1958: 257) and McNeill & Ward's description (1930: 361) were the first records, but these were soon followed by Roughley's pioneer colour photograph (pl. 35) in 1936. This "Lumière autochrome" was apparently the first colour-photograph of *S. hispidus* to be published. All references to the colour in life of this shrimp were summarized and discussed by Holthuis in 1946, and he drew attention to differences in the descriptions of various authors and wondered if these were due to variability within the species or to incorrect observations. Since that date, many more illustrations have been published, and the fine colour photograph in Gillett & McNeill (1959, 1962, & 1967), followed by the black & white photographs in Bennett (1966: pl. 95a) and Yaldwyn (1966), clearly indicate the colour pattern in eastern Australian specimens.

In a continuing attempt to answer the questions raised by Holthuis, at least for the Australian area, a further colour description from recent material will be given here. This is presented under the same headings used by Holthuis in his discussion.

Colour Notes, Autsralian Museum Specimen P. 13775 (Johnson's Reef, Lord Howe Id., Julie Booth, April, 1962, ovigerous ♀, carapace length 19mm). Observations made a short while after death and preliminary fixation in weak formalin/sea water.

Anterior red patch on carapace. This red area does not reach posterodorsally as far as cervical groove, but it includes the proximal half of the rostrum, the ocular peduncles and the proximal part of the peduncles of antennules and antennae. The central portion of this red patch is much darker than the outer edges.

Red bands on abdomen. One band covers 3rd abdominal segment and extends a little onto 2nd and 4th segments; a second band covers 6th segment and base of tail fan.

Red bands on 3rd (enlarged) pereiopod. One band over middle of propodus and proximal part of dactyl; one band over proximal ¼ of propodus; one band over median portion of carpus, and a fourth band over median portion of merus.

Blue on ventral surface. The bases of the 3rd maxillipeds and 1st to 4th pereiopods are coloured dark blue.

This colour pattern compares well with that given in Yaldwyn (1966: 378), especially with regard to the position of the red bands on the abdomen and enlarged pereiopods, and with the amount of blue present ventrally. The red area anteriorly on the carapace of the Congwong Bay female (as described in the 1966 account) extended over the base of the rostrum (incorrectly stated as the whole "rostrum" in 1966) and eye-stalks, but did not extend on to the antennular or antennal peduncles. Thus some variation in pattern can be established even in the eastern Australian-Tasman Sea area. However, considering the extensive range of this species in the Indopacific and western Atlantic, the apparent stability of the main features of this colour pattern is remarkable.

The proliferation of illustrations of this brightly banded shrimp since Holthuis's review in 1946, makes it important to attempt some bibliographical listing of biologically useful figures before the task becomes too extensive. Thus a provisional iconography of *S. hispidus,* updating that given in the 1946 synonymy, is presented here, with a special attempt being made to include figures appearing in general works and illustrated popular natural history volumes. This listing is probably by no means complete for the period 1946-1967, but may serve as a basis for a definitive catalogue at some later date. As will be seen from the use by Waterman (1960-1961) and A.I.M.L.C. (1965) of diagrams indicating the colour pattern of this shrimp on the covers of their publications, *Stenopus hispidus* is becoming a widely recognized symbol of marine tropical pattern and diversity.

Provisional Iconography of Stenopus hispidus (1946-1967)

The list given below is arranged in date sequence and, if possible, comments are added on the style and significance of the figures quoted.

Kubo (1941: figs. 14-15)—line drawings to show details of hand, scaphocerite, telson and mouthparts from Micronesian specimen. (Not included in Holthuis, 1946).

Edmondson (1946: fig. 147)—lateral-view black & white photograph of dead specimen from Hawaii.

Zariquiey (1946: fig. 56)—dorsal-view drawing, without indication of colour pattern.

Buchsbaum (1948: pl. 268-6, 1951: pl. 72)—dorsal-view, black & white photograph of living animal from Bermuda, West Indies.

Barnard (1950: fig. 106)—lateral-view drawing of carapace to show details of spinulation.

Zahl (1954: 418)—colour photograph of West Indian specimen.

Holthuis (1955: fig. 101a)—lateral-view drawing after that published by Bate (1888) in his *Challenger Expedition Report.*

Utinomi (1956)—publication not seen; coloured figure *fide* Limbaugh *et al.,* (1961).

Balss (1957: fig. 1158)—lateral-view drawing after Bate (1888).

McNeill (1958: 257)—dorsal-view drawing of Australian specimen, a republication of the figure in McNeill (1926).

Gillett & McNeill (1959, 1962 & 1967: pl. 104)—dorsal-view colour photograph of specimen from Heron Island, Queensland.

Buchsbaum & Milne (1960: pl. 90)—colour photograph of dead specimen from West Indies.

Grobe (1960: figs. 1-2)—fig. 1, black & white photograph of living animal, but with both enlarged pereiopods missing; fig. 2, sketch based on fig. 1 purporting to show position of *S. hispidus* during "fish-cleaning".

Okada *et al.* (1960: pl. 50 fig. 5)—dorsal-view colour figure of Japanese specimen.

Waterman (1960: dust jacket; 1961: dust jacket & p. 68)—dorsal-view figure, redrawn after Herrick (1893) with colour pattern indicated by shading, published to show spread of antennules and antennae in chapter therein on "Mechanoreception" by Cohen & Dijkgraft; same figure used as dust jacket motif for both volumes.

Hanson (1961: fig. 8A, 1964: fig. 2/4A)—black & white photograph of living animal. Compare this dorsal-view photograph for colour pattern and stance with that in Gillett & McNeill (1959, 1962, 1967).

Limbaugh *et al.* (1961: fig. 8)—lateral-view drawing, modified by Chace from that published in Bate (1888), with colour pattern indicated by shading.

Butterfield (1964: 29 photo 6)—colour photograph of living animal against natural background taken in the Florida-West Indian area.

Church (1964: 93)—full-page, underwater, colour photograph of living animal in crevice showing typical display of white antennae. Text implies that photograph was taken by author at Wake Island in the north west Pacific. *Note*: this photograph and that of Schroeder (1964) are apparently the first natural underwater photographs of *S. hispidus,* as distinct from aquarium photographs, to be published.

Schroeder (1964: 151)—underwater colour photograph of specimen approaching open mouth of "green moray eel" and apparently about to begin "fish-cleaning". This is a night photograph taken on Alligator Reef near Key West, Florida, and shows typical red banding on enlarged pereiopods, display of white antennae and blue-green egg mass below abdomen.

Yaldwyn (1964: two figs. & cover plate)—two black & white photographs to demonstrate "association" in an unequally-sized pair from Congwong Bay, nr. Sydney, N.S.W. (see also Bennett, 1966 and Yaldwyn, 1966), as well as a republication of Chace's figure from Limbaugh *et al.* (1961), to show colour pattern.

A.I.M.L.C. (1965: cover figure)—stylized, two-colour figure in black and red showing colour pattern, used as cover motif; redrawn, but inspired by, Chace's lateral-view figure in Limbaugh *et al.* (1961).

Eibl-Eibesfeldt (1965: fig. 20)—underwater colour photograph of Peacock-eye Dragonfish (*Nemapterois biocellatus*) resting upside down on cave roof "being cleaned" by *S. hispidus;* text on pp. 63-64 states that photograph was taken by author at a depth of 80 feet, off Rasdu Atoll, north Maldives, Indian Ocean, 1957. *Note*: this is apparently the first published photograph to indicate (though not actually show) "fish-cleaning" by *S. hispidus.*

Schmitt (1965: fig. 67)—lateral-view drawing, a republication of Chace's figure from Limbaugh *et al.* (1961).

Tarlton (1965: 11)—black & white photograph of dead specimen from northern New Zealand waters.

Tinker (1965: pl. 3)—black & white photograph of dead specimen from Hawaiian waters.

Bennett (1966: pl. 95a)—black & white aquarium photograph, taken by F. G. Myers, of female from the Congwong Bay pair described and figured in Yaldwyn (1964, 1966).

Schroeder (1966: 73)—underwater black & white photograph of living West Indian specimen on face mask of skindiver.

Straughan (1966: 10)—black & white photograph showing a specimen upside down on the roof of a crevice formed under a small coral head in the West Indies.

Thomson (1966: pl. 15)—colour photograph of living specimen on natural background, taken by E. Grant on the Great Barrier Reef, Queensland.

Weisz (1966: pl. XIIIB)—colour photograph of dead specimen, showing very dark "red" bands,

Yaldwyn (1966: pls. XXV-XXVII)—black & white aquarium photographs of the Congwong Bay pair, taken by F. G. Myers, to illustrate "resting positions", ophiuroid eating, courting "dance" and "saddle riding" as described in text.

A.A.A.S. (1967: cover plate)—black & white underwater photograph of specimen with antennae in full display, used as an example of a reef animal showing "oral grooming behaviour".

Finally there is the colour photograph of two *S. hispidus* in the Noumea Aquarium, New Caledonia, duplicated and distributed by Dr. R. L. A. Catala as *Aquarium de Nouméa* series III, no. 12, and listed in the printed sheet of captions supplied with this series (publication date not known, but still available in 1967).

The best colour photographs are those by Zahl (1954) and Gillett & McNeill (1959, 1962, 1967), though as yet no detailed closeup colour photograph has been published at a size large enough to serve as a clear record of the full colour pattern of one individual specimen. It is interesting to note the reuse of Herrick's (1893) dorsal view figure, and especially the number of illustrations that have been based on Bate's early lateral-view plate (1888) or on Chace's modification of this drawing.

It should be pointed out here that the figure given in Macnae & Kalk (1958: fig. 18h) as that of *Stenopus hispidus* is certainly not that species, but is probably the hippolytid *Saron marmoratus* (cf. Barnard, 1950: fig. 128a).

COMMON NAME.

During the examination of the references cited above, it was seen that the common names used for *Stenopus hispidus* varied from place to place and from time to time within each area. The following names were noted, though other variants may have been seen and overlooked.

Banded Shrimp: an obvious descriptive name used in Roughley (1936), Gillett & McNeill (1959, 1962, 1967) and Bennett (1966).

Banded Coral Shrimp: a name widely used by amateur naturalists and skindivers in the eastern Australian area at the present time. Possibly the name was adopted, after Roughley and other Australian authors, for *S. hispidus* along the Barrier Reef, and then spread south in this form into New South Wales. Also used by Schroeder (1964, 1966) and Straughan (1966) in general accounts of West Indian coral reef fauna.

Bandanna Prawn: used by Herrick (1893). He states that it was coined by American biologists collecting *S. hispidus* with him at the Bahama Islands, West Indies. The form *Bandanna Shrimp* is used in Hanson (1964), and the spellings "bandana prawn" in Edmondson (1946) and "Bandana shrimp" in Weisz (1966).

Barber-shop Shrimp: used by Buchsbaun & Milne (1960).

Barber-pole Shrimp: an obvious descriptive name heard locally in eastern Australia. Presumably developed from that used in the widely known Buchsbaum & Milne (1960).

Cleaner Shrimp: commonly used in general accounts of the "fish-cleaning" habits of *S. hispidus*. In reality this is a more general term applied in the form 'cleaners" or "cleaner shrimps" to all the shrimps that have been observed to clean fish and which are discussed in Limbaugh *et al.* (1961). Thus it has been applied as well to *Stenopus scutellatus, Periclimenes yucatanicus, P. pedersoni, Hippolysmata grabhami* and *H. californica.*

Porcelain Shrimp: used by McNeill (1958). Presumably based on the use of the term "porcelain white" in the colour descriptions given in McNeill & Ward (1930) and McNeill (1958).

Spiny Shrimp: a descriptive name used by Barnard (1950) in his catalogue of South African Decapod Crustacea. The form *Spiny Prawn* is used by Tinker (1965) who also gives the Hawaiian name of *'O-pae-hund.*

SUMMARY AND CONCLUSIONS

The observations published above, based on both museum specimens and field records, often supported by underwater photographs, fill in and extend the recorded ranges of both *Stenopus tenuirostris* and *S. hispidus,* as well as indicating the subtidal abundance of the latter in the Sydney area, near the southernmost part of its range. The greater part of the field records were made under water by skindivers, and this clearly underlines the importance of this relatively new dimension in marine biology. Sufficient evidence is thus presented here to show that *S. hispidus* can no longer be regarded as an "occasional wanderer" as far south as the Sydney area, appearing only when "a convenient warm summertime current has carried the larvae close into the rock-bound coast" (McNeill, 1958), but must now be recognised as a colourful and distinctive member of the underwater scene of coastal New South Wales (south to at least Shellharbour).

The new records and observations given in this paper can be summarized as follows:

1. The known range of *Stenopus tenuirostris* de Man is now extended to the southern Solomon Islands.
2. *Stenopus hispidus* (Olivier) is now recorded from Western Australia, the Northern Territory and northern New Zealand.
3. The known range of *S. hispidus* in eastern Australian waters is now extended south to Shellharbour, N.S.W. (approx. 34.5°S.).
4. An observation on what is presumed to be "fish-cleaning" by *S. hispidus* in the Sydney area is presented in some detail.
5. A discussion of colour and colour-pattern in *S. hispidus* precedes an annotated, and provisional, list of illustrations of this species published between 1946 and 1967.
6. A list of some common names applied to *S. hispidus* in various parts of its range is given, and an attempt is made to trace the derivation of these names.

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FRUIT-SUCKING MOTHS (LEPIDOPTERA: NOCTUIDAE)

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(Figure 1)

Summary

A number of species of Noctuidae grouped together under the common title of fruit-sucking moths is discussed. Reference is made to distribution, economic importance, host preference of adults and larvae, and some methods of control in the orchard.

An illustration of a fruit-sucking moth larva is given.

Fruit-sucking moth larvae develop on wild growing or ornamental hosts where they are mostly of little importance, but the adult moths may visit orchard trees to suck juice from ripening fruits. Myburgh (1963) aptly called them "Vandals in the orchard." They are not important as orchard pests in New South Wales, but can be troublesome in Queensland.

Distribution

The fruit-sucking moths are widely distributed in the temperate and tropical areas of the world and many species have been recorded as orchard pests. In South Africa the most important are *Serrodes inara* Cram., *Calpe provocans* Walk., *C. emarginata* Fabr. (Myburgh, 1963) and *Achaea lienardi* Bd. (Taylor, 1965). Ebeling (1951) listed *Othreis fullonia* (Cl.), *O. materna* L., *O. ancilla* Cram., *Eumaenas salaminia* (Cram.) and *Achaea janata* L. as citrus pests in India. In central America, Mexico and Jamaica several species of *Gonodonta,* including *Gonodonta pyrgo* Cram. damage fruit (Anon., 1963).

In Australia there are a number of species of varying economic importance including *O. fullonia, O. materna* and *E. salaminia* all of which occur in New South Wales. *A. janata* is common in Australia, but has not been recorded attacking fruit. The larvae feed on the castor oil bush *Ricinus communis* L. and other plants of the family *Euphorbiaceae.*

O. fullonia has the widest geographical range of all the fruit-sucking moths, having been recorded from Africa, India, China, the Philippines, Malaya, Australia, New Guinea, Indonesia, Tahiti, Marianna and Caroline Islands, Loyalty Island, Society Island, Tonga, French Hebrides, Fiji and Western Samoa (Comstock, 1963).

The Adults

The adults are large, stout bodied moths, and measure approximately 4 in. across the wings. At rest the wings are folded tent-like over the body in typical Noctuid fashion. In this position the cryptic colouring of the upper wings makes the moth very hard to detect when resting on tree trunks or old fence posts. When disturbed the moth quickly raises its forewings to show the brilliant orange underwings, probably as a defensive display against predators.

Fruit Damage

The moth damages fruit by piercing the rind with its proboscis to feed on the juice. The long proboscis or haustellum is formed by the fusion of the greatly elongated galea into a tube which is finely serrated, pointed, approximately 1 in. long, and strong enough to penetrate tough fruit rind. The haustellum is tightly coiled between the labial palps when not in use and is well shielded from above by the epicranium.

The feeding hole is obvious and in oranges may be mistaken for the damage of the larva of the orange fruit borer *Isotenes miserana* (Walk.) (Lepidoptera: Tortricidae). The injury predisposes fruit to infection by moulds and rots, and in tropical areas where the moths are numerous fruit loss may be considerable. Citrus fruits, particularly oranges and grapefruit, appear to be favoured hosts, but other fruits such as bananas, plums, tomatoes, mangoes, pineapples, persimmons, grapes, peaches, apricots, custard apples, papayas and guavas may be attacked.

Importance in Australia

In Queensland these moths sometimes cause considerable fruit losses and a number of species is usually associated with any outbreak (Anon., 1951).

Fruit-sucking moths are normally unimportant in orchard areas in New South Wales, but were recorded attacking citrus in the Bourke district in 1958 (E. C. Levitt—personal communication). Damaged fruit was received from Wanaaring on the Paroo River in June and damage was reported from properties on the Darling River 14 miles north of Bourke soon afterwards until August. The fruits affected were mostly navel oranges, and it was estimated that 25 per cent of one crop was attacked. The injury to the fruit and description of the moth suggest that *O. fullonia* was involved.

Species of fruit-sucking moths have been known to migrate a hundred miles or more from their breeding ground to suitable orchard areas in South Africa (Myburgh, 1963). Tryon (1898) noted McLachlan's 1877 record of a specimen of *O. materna* captured 300 miles to sea from Mauritius.

It seems reasonable to conjecture that the moths attacking fruit around Bourke in 1958 may have migrated from Queensland south along the Culgoa and Paroo Rivers.

The Larvae

The larvae of the fruit-sucking moths common to Australia are distinctive dark brown to black caterpillars (a green phase of *O. fullonia* from Samoa was described by Comstock (1963)). They have conspicuous eyespots on each side of the second and third abdominal segments. The eyespots may be strikingly coloured in blue ,yellow and red, or black and white in the case of *O. fullonia*. The eleventh segment is humped, and the larva is approximately 50 mm. long at maturity. The young caterpillars drop from the food plant to the ground at any sign of danger. More mature larvae adopt an aggressive attitude by swaying from side to side while holding on to the food plant by their hind legs.

In Australia the larvae feed on leaves of various species of native creepers of the family Menispermaceae. In 1961 caterpillars of *O. fullonia* were seen at Narara feeding on *Stephania japonica* Miers, a native vine with heart-shaped leaves about 3 in. in diameter. This and a similar vine *Sarcopetalum harveyanum* Miers (a possible host) grow on the fringes of cleared areas, or in rain forest or moist gullies. *S. japonica* also grows on coastal sand dunes. Dowling and Haines (1963) referring to *Othreis* sp., commented that "frequently their curious caterpillars are found feeding on large heart-shaped leaves of a vine belonging to the family Menispermaceae growing abundantly in a nearly gully" at Bandon Grove, near Dungog, New South Wales.

Other recorded hosts of the larvae in Australia are: *Legnephora moorei* Miers, found in rain forest areas of New South Wales and Queensland, *Stephania aculeata* F. M. Bail, a small species occurring in open forest country of the Far North Coast of New South Wales and in Queensland, and *Tinospora smilacina* Benth., found on the ranges from New South Wales to the Kimberley district of Western Australia.

Other Menispermaceae that are possible hosts of the larvae are *Carronia multisepalea* F. Muell and *Fawcettia tinisporoides* F. Muell., from the Richmond

River district of New South Wales and *Pliogyne cunninghamii* Miers which grows north of Brisbane.

In Samoa and other Paciific Islands, the nornamental coral tree *Erythrina variegata* L. var. *orientalis* (L) Merr. is a host of *O. fullonia* larvae. In India the vine *Tinospora cordifolia* Miers, and the cocoa plant *Theobroma cacao* L. are also hosts of the larvae (Comstock, 1963). In South Africa the larva of *Serrodes inara,* a serious pest of canning peaches, feeds on the wild plum *Pappea capensis* Eckl. and Zeyh. and *Calpe provocans* and *C. emarginata* feed on a native creeper *Antizoma capensis* (L.f.) Diels (Myburgh, 1963). Larvae of *Achaea lienardi* at times defoliate the black wattle *Acacia mollissima* Willd. in South Africa.

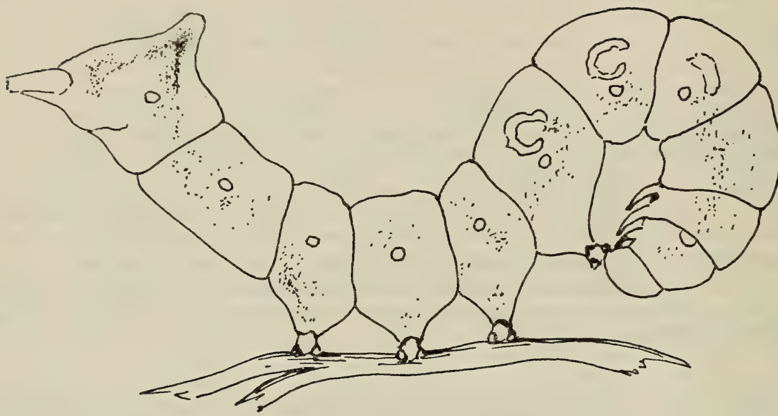

Figure 1.—Mature larva of *Othreis fullonia,* slightly less than 2½ times natural size.

Control of moths as orchard pests

Little effort has been made to control the moths in Australia, chiefly because outbreaks are intermittent and several years may elapse between outbreaks. The moths' habit of leaving the orchard during the day to rest in the surrounding bush, returning again at night to the same, or possibly another orchard makes control difficult. The moths usually attack fruit ready for harvest when care has to be taken with insecticide usage. The larval hosts of the majority of species grow outside the orchard areas in places where conventional control measures are impracticable.

Swatting the moths individually at night has been tried but is inadequate if the moths are present in any number. Where moths are present each year the most practical method of avoiding loss in probably to harvest the fruit as soon as possible, as suggested by Ebeling (1951).

Some success has been achieved in Queensland by using ripe or overripe fruit, particularly bananas, as a lure. The fruit is tied together in bunches of five or six or placed in open weave bags and hung in the orchard trees. The lures are inspected for moths each night and any moths found are destroyed. The fruit is changed every third day and destroyed to conform with fruit fly regulations. An improvement of this method is to place a fruit lure in the open mouth of an inverted hessian bag. After feeding the moth flies upward into the bag where it rests and can be readily killed when the bag is inspected in the morning.

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OBSERVATIONS ON THE AUSTRALIAN LAND-LEECH, CHTONOBDELLA LIMBATA (GRUBE, 1886) (HIRUDINEA: HAEMADIPSIDAE)

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Abstract

This is a semi-sedentary animal restricted to seepage moistened areas with forest fringe in canopy forest lacking a lower stratum, not an animal of the forest floor proper, and accordingly patchy in distribution. Non-reactive to noise, vibration, disturbance of leaves and twigs, light or shadow, and attaches only when physical contact has been made. There is no evidence of jumping, hunting, or aggressive attack, nor of any long-range sensory perception. The velar organs appear to be moisture sensitive. It is a limited traveller. The stinging sensation and delayed irritation from the bite are due to nephric excretion, not histamine or hirudin. The engorged leech is secretive for 4 to 7 days, then progressively active. Burrowed into soil which is slowly dried, the leech enters an inert anhydrobiotic state, recovering to full activity, even after five months, immediately when dampened.

This is the common large sanguivorous land-leech of coastal eastern Australia from Victoria to Southern Queensland, from sea-level to at least 3,500 feet. Although an occasional experience for those who enter wet bush, there is no account yet of its habits and behaviour. Haemadipsids are notorious nuisance animals of tropical and subtropical forests in India, Ceylon, Malaysia, the East Indies, etc.; but the Australian land-leeches do not seem to reach the same nuisance levels as those elsewhere.

The findings on *Chtonobdella limbata* in this report run contrary to many statements made about haemadipsids in the past, and conflict with some of the opinions held on *C. limbata* itself. This leech is semi-sedentary, a poor traveller, leisurely in movement, and with a restricted range. No evidence was found of hunting or pursuit activity, such as is exhibited by many aquatic sanguivores, and this correlates with the low functional value of the sense organs and the absence of any evidence of long-range sensory perception. It gains attachment on its host only when accidental physical contact has been established, and its first actions then are the same as when the leech is placed on any other foreign surface.

Feeding is divided into a first phase when the jaws enter the skin while the anterior sucker is held in position by the rigid body, not by powerful adhesion. This phase ends when nephric excretion is released from the anterior nephridiopores. This causes irritation in the incision. It is found here that the irritant is neither 'histamine' nor 'hirudin'. Feeding then passes into the second phase with the body relaxed to receive the meal and held in place by the adhesion of both suckers.

C. limbata is patchy in distribution in simple canopy forest lacking lower strata of vegetation. They are found here in areas receiving seepage from adjacent areas but drained in such manner that they are not covered with standing water from any long period of time. The infested areas are floored with forest litter, shaded by the canopy, and protected from the drying effects of wind by forest fringe. These then are areas having relatively prolonged periods of stable ground moisture levels, more so than the general forest floor which is not the habitat of leeches. They are animals of the ground. None were found on foliage. They are not aquatic. They do not enter water. They cannot swim, but they can survive under water.

In dry weather, they are burrowed in soil, and with progressive reduction in available water, they assume an inert dehydration-resistant form. This can survive a total lack of environmental water for months, but becomes immediately active when supplied with water. Since this is a precisely defined form of cryptobiosis, I propose that it be termed *anhydrobiosis* being a response to an environmental stress arising from the absence of water.

The g. *Chtonobdella* is haemadipsid, characterised by having 5 annuli in the complete somite and only the pair of ventrolateral jaws, so that the bite shows only two incisions. It is known at this time (Soos, 1967) by *C. tristriata* (Goddard, 1910) in New Guinea; *C. parva* Moore, 1944 in the New Hebrides; *C. fallax* Blanchard, 1917 in Madagascar; and in coastal eastern Australia (Richardson, in press) by two species, *C. limbata* (Grube, 1866) and *C. australiensis* (Lambert, 1899).

C. limbata is commonly 25.0 to 30.0 mm long in contraction and 50.0 to 60.0 in extension, a few exceptional individuals reach a maximum extension of 85.0 mm. The body is somewhat circular in section; club-shaped, widest posteriorly, tapering to the small anterior sucker which carries 5 pairs of obvious black eyes arranged as an arch paralleling the margin of the sucker, and with the first three pairs on the velum which overhangs the aperture of the sucker; the interspace between the 4th and 5th eyes on each side greater than between the 3rd and 4th; dorsum and sides, generally dark green with a narrow cream to golden yellow median dorsal longitudinal stripe which does not quite reach the ends of the body; a yellow lateral stripe along each side includes the nephropores to be seen as minute regularly spaced dark spots; the venter, generally rusty red mottled erratically with black patches and even streaks. *C. australiensis* is of the size of *limbata* and also has a mottled venter, but lacks the median stripe excepting on the last fifth of the body in some and in this region there are also paired oblique lines of gold patches with often bright red lines anterior to these patches. The mottled venter distinguishes both from the leeches of the g. *Philaemon* which are often found with them. These have an immaculate usually greyish venter; 4 annuli in the complete somite; 4 annuli between the genital pores (about 7 in *Chtonobdella* in Australia); and are much smaller leeches.

Habitat

I select for description one example which clearly illustrates the preferred habitat of *C. limbata* rather than to attempt the descriptions of other examples which are only confirmatory in my experience. The presence of a man-made track is not an essential feature.

Bruxner Park near Coffs Harbour, N.S.W., a reserve of rain forest, provides a typical habitat in the forest covered side-gully near the main picnic ground. Rain had fallen on several days previous to the study described (Oct., 1966). The litter on the forest floor proper was wet to the touch but there were no puddles of standing water.

The fully-timbered gully had a high canopy but no lower level strata, and the floor covered with leaves and other debris. There was no grass. A well-developed fringe closed the edge of the forest along the road and extended for some forty feet along the edge of the track as it entered the forest. The track was an unmade foot-track, one to three feet wide, wet and muddy outside of the canopy and progressively drier as it entered the forest where it was covered with leaves and debris presenting an appearance similar to that of the general forest floor.

Drainage of the area as a whole passed into a small semi-temporary pool outside of the forest fringe. There were no leeches in this pool nor in the grasses around the pool. There were no land-leeches on the muddy wet portion of the track as it entered the edge of the fringe. *C. limbata* was found on the next portion of the track which was drier but covered with litter moist to the touch. They were present in a distance of 30 feet but not above this where the surface was drier again. In an area of some 120 sq. ft., 20 leeches ranging in length from 20.0 mm to 75.0 mm when extended, were collected on two searches, the third yielded none. All were found on the ground, none on erect plants or foliage. Nearly all were on open litter, a few close to the fringe plants, but none more than a foot from the open track.

This area containing leeches was quite precisely defined. It was a short length of track just within the canopy, margined by fringe shrubs etc., covered with leaves and other small debris, of such slope that it drained so that there was no water standing on it and water would not stand on it for any great length of time after rain had ceased. It was not a water runway. It received seepage from adjacent areas of forest floor. This and the protection given by the fringe shrubs reducing the drying action of moving air and of sunlight, gave a greater ground moisture stability than for the forest floor, the adjacent fringe, or the areas outside of the fringe.

Having found that leeches could be readily seen when stationary or moving even at distances up to ten feet, I searched two areas of 300 sq. ft. each of adjacent forest floor but did not find one leech on the open floor nor beneath such stones, fallen branches, logs etc. which might have served as shelter. The debris in one foot square areas taken at random was closely searched on ten occasions in each area, but these yielded no leeches, nor did any attach to me although given ample opportunity for various parts of each area were searched on hands and knees. Forest fringe on either side of the mouth of the track was also carefully searched but no land-leeches were found.

The section of track below the road was then examined. The pattern of forest fringe entering the mouth of the track and extending a short distance beneath the canopy, the wet muddy initial portion of the track giving way to a moist debris-covered surface, was repeated, and beyond this the surface was drier. The results were the same. Land-leeches were found only on the length of debris covered track margined by fringe vegetation. Only four leeches were found. This lower track is much more frequently travelled than the portion above the road which may be correlated with the small number of leeches. It is possible that the numbers are kept down through leeches being transported away from the area attached to intruders, or crushed under the boot, for they do not behave in such way to escape the foot.

An hour was spent in searching 1,000 sq. ft. of forest floor on each side of the track, including the examination of one rather steep seepage area. Particular attention was paid to small trees and other foliage. Again, foot square areas of debris were closely searched and places of concealment examined; but not one leech was found, nor did one attach to me.

The main stream is upper transitional in nature, consisting of long pools separated by runs and low drops; the bottom, small boulders, graded gravels to some sand; the banks high, steep and mostly beneath the canopy so that they carry only a broken fringe shrubbery. No leeches were found in the stream, nor on the banks, not even in the spray zones near the short drops.

These observations have been repeated elsewhere. The land-leech is an inhabitant of areas covered with forest floor litter, beneath the canopy, guarded by fringe against the drying effects of moving air and sun, kept moist by seepage, and of such slope and drainage that they do not stand covered by water nor drain rapidly dry. It is reasonable that such conditions can be created under other circumstances but I do not have wide experience of this as yet.

Behaviour

As generally seen, some few leeches are moving but the greater number are stationary, erect on the posterior sucker, a stance they maintain for twenty minutes and longer. There are short intervals when they give the impression that they are restless as a whole, but these intervals are transitory and could not be related to any particular circumstance in their surroundings.

There is no response by change of attitude to noise such as from scratching a piece of wood, rubbing wood together, snapping twigs in the hand or on the ground, or the disturbance of leaves and twigs slowly or rapidly, or other attempts to simulate indications of an animal moving across the ground. Moving leeches do not alter direction towards such disturbances. The shoe-covered foot placed down within a few inches of a leech produces no response. Stationary or moving leeches show no response to shadow or to alternating light and shadow in imitation of a moving animal. The pack-sack left on the ground for an hour attracted no attention.

The hand, bare arm, and bare foot brought gradually closer to an erect or moving leech brought no reaction even when within an inch of the leech. There was no response to puffs of breath blown over the leech.

An erect leech does not attach to a twig or leaf brought into contact with the anterior sucker, but a moving leech may sometimes change direction away from the object when this is done repeatly. If a leech is erect on a leaf on the ground and the leaf is lifted clear of the ground, the leech does not move to the hand even when this is close to the leech. The leech may move over to the edge of the leaf, where it seems unable to retain its hold, for instead of moving over onto the lower surface, it drops, and is so rapidly erect on the ground, that it gives the strongest impression the leech has performed a precisely controlled jump.

The non-reactive behaviour changes immediately when some leeches are brushed by the finger, foot, shoe or clothing; but not all show the following response. The leech attaches with the anterior sucker, transfers the posterior sucker to the new surface, and then moves rapidly and erratically until it gains a sheltering area such as between the fingers or toes, beneath the laces of a shoe, or inside the top of a low sock. The rapid erratic movement is the same as when a leech is placed on a foreign surface, such as the smooth surface of a plastic tray.

Locomotion

This is by the usual looping which is very precisely performed. The extended animal attaches the anterior sucker, the posterior sucker is brought up to the hind edge of the anterior sucker so that the body seen from the side is thrown briefly into a high open loop. The anterior sucker releases its hold, and the animal raises the body. Moving over the ground, the animal halts repeatedly, may extend the body nearly level with the ground and then 'explores' the surface in a semi-circle or less, touching with the margin of the velum at briefly spaced intervals before moving on, which it most generally does in a straight line. With these halts, the progression is not even of the order of a foot a minute. Gentle attempts to encourage faster progression are most commonly unsuccessful.

When the lid is removed from the jar, the recently captured land-leech emerges rapidly onto the lip of the jar and may then drop onto the bench, where it moves rapidly and erratically. If released onto a smooth-surfaced plastic tray, it will be seen that at each point of contact by the suckers there is left behind distinct round moist patches matching the size of the suckers. With the hand-lens, it can be seen that this moisture is related to the active excretion from the anterior pair of nephropores situated briefly behind the margin of the anterior sucker, and from the auricles close to the dorsal surface of the posterior sucker where the posterior nephropores are concealed.

When kept on the move for five to fifteen minutes, depending in part on humidity and temperature, the leech becomes progressively inconvenienced in movement. It can be seen that the marks from the suckers are becoming less moist, dry quicker and are finally irregular in outline. The leech becomes reluctant to move, and quite suddenly looses the capacity to do so. It falls helplessly on the side and does not recover a normal stance. Nephric excretion has ceased. One leech left on the dry surface did not recover its ability to resume the ordinary stance even after two hours, the longest I have kept one in this state.

Escaped onto the dry polished floor, I have not had one land-leech manage to move more than eight feet before becoming incapacitated. Aquatic sanguivores will often travel further than this when they escape.

Feeding

So far I have only studied in detail the first phase in feeding. By scratching with a needle just sufficiently to bring continued minute bleeding at a point suitable for observation, this can be watched under the low-power binocular.

A leech held from mid-January to late October, unfed in a jar with soil and plants, was put on the back of my hand. It was prevented in moving between the base of my fingers, and then moved over the back of my hand 'exploring' the surface within its extended reach before moving position. Each time it halted, it continuously and persistently touched the skin with the lower surface of the anterior margin of the velum at intervals of 3.0 mm to 10.0 mm, at a rather uniform rate, there being about two or three seconds to each action.

A scratch made on the first phalanx of the index finger brought the least trace of continuing bleeding. The velum contacted the skin twice within a millimetre of the blood but did not hesitate near it. It was not until the velum later actually touched the blood that the sucker was slid along the surface to cover the scratch. The body of the animal then became rigid. There was no activity of the pharyngeal musculature such as would indicate an immediate uptake of blood.

The sucker was expanded fully to a sub-circular shape and flattened over the incision. Muscular action indicating the operation of the jaws could not be seen. Raising the velum with a blunt needle, the jaws could be seen sinking into the skin, but the sawing action which has been continuously referred to for the european medicinal leech since Moquin-Tandon (1846) was not obvious under these conditions of reasonable visibility, a suitable magnification, and good illumination, nor was the skin raised as a papilla. It is possible there is a sawing action at the very start, but at the time when I was watching the jaws, they were sinking smoothly into the skin and at least the basal half of each jaw was visible. The fact that the jaws continued to sink into the skin after the velum had been raised by the needle, indicates that the process is not dependent at this time on adhesion by the sucker. It is the rigid body which provides the platform for the operation of the mandibular muscles. It is the rigid body which presses the sucker down and holds it in position.

A stinging sensation was felt briefly following the release of a clear watery excretion from the anterior pair of nephropores and the spread of this around the rim of the sucker. At this point, I raised the body of the leech from the surface of my hand, to find two rows of transparent clear minute long gelatinous threads, mucus-like in appearance, extending from all the nephropores along each side of the body excepting the anterior pair, and onto the skin. These threads were elastic and recall the early name given to the nephridia as being 'glandes muqueuses—mucous glands' by writers such as Blainville, Filippi, Moquin-Tandon etc. about a century ago.

Raising the body led to the detachment of the anterior sucker, and the leech did not return to the bite. The bleeding was not significantly increased. There was no red reaction or flare. Coagulation was normal. In this first phase of the bite, terminating with the release of liquid excretion from the first nephridia, neither histamine nor hirudin had been released.

The wound healed rapidly and normally, was barely discernible at the end of 48 hours, and was forgotten. This bite was made on 2nd October. On 9th October, I found myself scratching the site of the bite which was stinging sharply, more so than at the time of the bite. The skin was so fragile that it broke readily and a small quantity of bloody serum was exuded. As trypanosomatids have been reported in the crop of these leeches (Richardson and Hunt, in press), the exudate was examined but was negative for trypanosomatids.

On 12th October, there was further itching and an inflamed area of some 4.0 mm diameter centred on the site of the bite. This I avoided interfering with. There was repeated itching throughout the day, but no further recurrence.

This experience which shows that the stinging sensation at the time of the bite and the subsequent irritability are due to nephric excretion and not histamine nor hirudin, gives point to a field note where I recorded that there was a slight stinging sensation on the skin of the hands after handling many land-leeches. My hands were then obviously covered with 'slime'.

The Engorged Leech

The fully-fed leech is grossly swollen throughout the greater length of the body saving only the cephalic region consisting of the velum, anterior sucker and somites v to vii. The body is obtusely rounded posteriorly, but the posterior sucker is of normal size, form and is fully functional. Movement is embarrassed, slow, clumsy, more of a crawling action in which the body is briefly extended, the anterior sucker attached and the body drawn forward. Since both suckers are functional, it would appear that the leech drops of its own accord from the host rather than this being due to mechanical difficulties in attachment in the engorged condition.

Removed to a jar floored with damp soil, leaves, etc., the engorged leech burrows into the soil and remains in the burrow for four days to a week before emerging and becoming active again. It will then move onto the side of the jar above the level of the soil and hang in somewhat of a horizontal position with the body sagging between the suckers. At first it leaves the soil once in the day, moves little, then after some days it resumes the usual twice daily activity, and is fully active within the month, although still greatly swollen. At the end of about forty days, it can be seen that the meal has been absorbed from the first few anterior caeca and from the postcaeca of xix. Further change is slow.

Anhydrobiosis

I suggest this term to describe the manner of survival of the land-leech in the absence of environmental water, when the leech becomes inactive, but the condition is such that recovery is immediate when water again becomes available. Water-lack is not necessarily seasonal in Australia, so such terms as aestivation etc. are not applicable, especially as there is no correlation with temperature. Cryptobiosis is used by some writers for the cessation of general activities under environmental stress even to the point where no vital activity is demonstrable. Anhydrobiosis is accordingly a category of cryptobiosis based on environmental stress due solely to the lack of water.

In mid-January, a freshly collected well-fed *C. limbata* was placed in a half-gallon jar floored with damp soil, leaves, some moss, and a spray of rooted fern, and closed with a perforated lid. No further water was supplied.

The leech established a short burrow in the soil, about one inch below the surface and horizontal for the last portion. There was a well-established daily activity cycle, the leech emerging in the late morning and late afternoon and moving around on the side of the jar for an hour or more. At these times, the illumination was in the order of 15 f.c., but artificial illumination at this intensity at night did not set the leech into activity. I have not seen any activity on the part of these leeches at night.

This very regular activity ceased about the end of May, and from then on the leech was not seen. The plants lived into July.

The jar was opened on the 30th October. All plants were dead and dried. The soil was powder dry. The leech was in the soil, but the burrow was collapsed. The leech was contracted to a length of 25.0 mm, cylindrical and about 6.0 mm in diameter, and briefly tapering to a point at each end. Neither sucker could be distinguished. The body was fully firm, solid to the touch, rigid; the skin so dry the dust fell from it. There was no response to touch, handling, sunlight or other simple stimuli over a period of some 20 minutes.

The soil was replaced in the jar with the leech just below the surface, and lightly sprinkled with water. In under 10 minutes, the leech had emerged from the soil, was fully active and moving around in the jar. It transferred readily onto the hand. The twice-daily activity periods were resumed. Later further water was added until the soil was muddy and water-logged. The leech then spent its time attached to the side of the jar well above the level of the soil.

Other land-leeches held in small containers with only damp moss or grass, have not survived progressive deydration. Held in a jar with water and no soil, the leech does not enter the water. They are unable to swim. Dropped into water, they sink helplessly. They are most reluctant to enter, but can survive in water for over a week if forcibly kept below the surface.

Discussion

The accounts of land-leeches can be divided between those of the earlier travellers, Tennant, Hooker, Haeckel, Schmarda, Semper and others in the last century concerned with land-leeches in Ceylon, India, Malaysia, the East Indies, etc., and the few later attempts to carefully determine the habits and behaviour of these animals. Blanchard (1917) in his monograph of the family, drawing from the earlier travellers, writes:

"Il existe dans la zone intertropicale asiatique et océanienne des Sangsues de petite taille, vivant à terre, sur les arbres, dans la brousse et dans les hautes herbes. Quand l'Homme ou quelque Animal à sang chaud passe à leur portée, elles se jettent avidement sur lui, par dizaines et souvent même en bien plus grand nombre, lui faisant subir de multiples saignées, par où le sang continue à s'échapper longtemps. - - - - - - - Tous ce qui ont voyagé à Ceylan, - - - - - - ont été assailis par ces terribles animaux - - - - -". The earlier travellers pictured them as aggressive attackers, falling or jumping onto the intruder into their area (e.g. Hooker: "they got into my hair, hung on my eye-lids, crawled up my back", etc.). Generally there is reference to large numbers only as on the legs (Semper: "they formed on both sides of the ankles bunches as large as the fist" etc.).

Such experiences have not been reported in Australia. Earlier accounts give hardly passing mention to land-leeches in this country. I have not seen them referred to in more recent writings to any greater extent, not even in travels written by the more colourful authors. I have not yet had the opportunity of studying them in a multistrata canopy forest, with the floor wet throughout the greater part of the year; but the general dryness of the floor of the Australian simple canopy forest, makes this commonly unsuitable for leeches over considerable periods in all seasons.

Since Moore (1927), studies on land-leeches elsewhere show many similarities to *C. limbata* as found in the present study. In 1886, Whitman reported that *Haemadipsa japonica* did not ascend into trees and shrubs and could not jump. Moore was satisfied that the latter was a physical impossibility for land-leeches. Worth (1951) recognises that jumping could not be successful since the sense-organs of the leech cannot range a target. The more recent reports in general agree that they are for the greater part animals of the ground as is evidenced by the major incidence of infestation being on the lower legs. Matthews (1954) does not recall seeing land-leeches more than three or four feet above the ground, and Smythies (1959) quotes Harrison as writing of land-leeches dropping from shrubs. Such instances as are given do not describe the condition of the ground.

Moore (1932) writes: "Land-leeches are found by no means everywhere in the jungle, forest or grassland, but chiefly in local aggregations or colonies. Such areas of concentration may be only a few feet or yards in diameter, or they may cover many acres, especially in forest grazing land. Elsewhere one may proceed often for several miles along a seemingly favourable jungle trail and scarcely meet a leech." Stammers (1950) writes of areas in Ceylon yielding 50 and more leeches to the square yard. In contrast to Moore's description, Smythies (1959) quotes Dr. Huenhe as stating that in a six month journey into the interior of Borneo, he was never more than a yard from a leech.

Moore describes the circumstances which apply to *C. limbata* (also *Philaemon* spp.) in the simple unstratified canopy forest where they are restricted to limited, exceptional, well-characterised areas and accordingly very patchy in distribution. So far I have had no indication of infested areas covering many acres and casual observations based mainly or solely on leeches found on the observer are not to be relied on as evidence in this regard.

The features of an area suitable for land-leeches are seepage providing relatively prolonged moderate moisture levels on the ground and drainage adequate to prevent free-standing water and water-logging of the soil other than temporarily. Related to this are such other factors as delay the drying of the ground, protection against the sun and against the drying effects from free-moving air. Many combinations can conceivably provide these requirements depending on the topography of a region, such as deep narrow gullies, marsh fringe etc.; but to date the evidence of reliable interested observers as given to me and my own experience are in agreement that the most general combination is an association of canopy forest and forest fringe. I can suggest also that in many situations small muddy water-logged areas and small temporary pools, supplying or receiving seepage will be related to infested areas as a source of seepage or as evidence of seepage suitable for the circumstances necessary for the land-leech.

These leeches are reluctant to enter water (the contrary is known only for the asiatic *H. sylvestris*). Their locomotion is dependent on moisture and their hesitant slow progression on the ground suggests attempts to select suitably moist surfaces to cross. *C. limbata* is an animal of the ground. From the behaviour in a jar with water-logged soil, when the leech remains for days on the side of the jar well above the wet soil, which is quite unlike the usual activity, they may be expected to ascend onto shrubs etc. at times when there is temporarily free-standing or running water on the area of choice. I have not yet been able to see this in the field.

The absence of reaction to a variety of stimuli, the general behaviour in the field, the slow rate of progression etc., all indicate that *C. limbata* is not an aggressive hunter or attacker which agrees with their morphology and with their demonstrable lack of long-range sensory perceptor mechanisms. So far I have been unable to find the situation described as "leeches moving in to the attack'. It would seem that this is no more than the sudden realisation that the observer is standing in a leech-infested area.

The sense organs of the land-leech are of the same kind as in aquatic leeches (Moore, 1927). The aquatics respond to light intensity, chemical stimuli, vibration, and are thermosensitive (Mann, 1962).

The American aquatic sanguivore, *Macrobdella decora,* will be disturbed over an area of 30 feet radius and more, by the vibration of a pole firmly planted in the bottom of a pond, as also by the movement of an intruder. Moore (1923) refers to this, and Whitman (1886) describes in some detail the response which is well-known to those who study this and other aquatic sanguivores. *C. limbata* showed no reaction to noise, vibration, or even the disturbance of litter in the immediate vicinity of the leech. Whitman (1886) found *H. japonica* sensitive to any movement of the jar. This is so with most freshly captured leeches, including aquatics; but later with *C. limbata* there is only an occasional response, and then only during activity periods. With several in a jar, one might respond and others not. The lack of response when a leech is raised on a leaf, does not indicate a sensibility to vibration.

The American aquatic scavenger, *Haemopis marmorata,* aggregates from over a large area in ponds onto the body of a dead fish, so exhibiting a high degree of chemical sensitivity. *C. limbata* did not respond to the hand brought within less than an inch of the leech. It did not detect fresh blood from a scratch on the skin even when the velum contacted the skin within a few millimetres of the blood. Stammers (1950) reports that *H. zeylanica* passed the anterior sucker through a film of fresh blood, "yet failed to pause and examine it". He found that this leech does not detect, even from a distance of only a quarter of an inch, pieces of skin removed from cats and rats; but when by chance contact is made, they bite into such skin and remain attached for long intervals (max. 120 minutes). It is clear that long-range chemical sensibility is absent which suggests that the velar sensory patches are probably sensitive to moisture.

Temperature responses are demonstrated in aquatic hirudinids (Mann, 1962). Stammers reports (1950) strong positive reactions to moist warm air blown over *H. zeylanica* which turn towards the source of the air and may even move towards it. Such a reaction was seen by Whitman and is referred to by others. In contrast, Stammers found that *H. zeylanica* would pass even within a quarter of an inch of a glass tube warmed by water without reaction to it. If by chance the leech contacted the tube, it would attach to it and exhibit a feeding attitude which it did not adopt on a tube containing cool water. Attention has been turned to temperature sensitivity in seeking a mechanism through which the leech is attracted to the warm-blooded host. I have not been able to demonstrate a response to the warm moist breath blown over *C. limbata* in the field or at the bench. In the field, *C. limbata* is exposed to the vagaries of moving warm moist air and of variations in the temperature of this air as a normal part of the environment. When I have brought my bare arm or hand near to a leech in the field, air temperatures have been high, and the temperature differential quite small; but equally there has been no response at the bench when the temperature differential has been more in the order of 15°C. Since these leeches feed also from amphibia and reptiles, a positive reaction to warm moist air is scarcely acceptable as a factor in food-finding activity, especially in an animal otherwise exhibiting no evidence of long-range temperature sensitivity. It would seem to be an orientation reaction related to maintenance within the suitable environment.

Aquatic leeches exhibit movement towards optimum light intensities, etc. Various workers refer to response to light and shadow. Stammers (1950) describes that the shadow from a card passing over the cephalic end of *H. zeylanica* led to immediate activity, and that experimentally these leeches react to a reduction of illumination so long as it is more than a change of 50% in intensity. I could not get a response to shadow or light from *C. limbata* in the field. In its environment, *C. limbata* lives on ground richly speckled with small patches of deep shadow and speckles of bright light which move restlessly as the light filters through the moving canopy. At the bench, jars containing this leech were remote from the window, and when sunlight, filtering through shrubbery outside of the window, came suddenly onto the jar during the activity period, the leeches exhibited increased activity. Yet there was no reaction to even very bright light shone suddenly on the jar in the dark at night.

Collectively, all indications are that there are no long-range sensibilities in the land-leech such as would serve it as a hunting animal. Sensibilities are of the low order to be expected from unmodified aquatic sensory receptors in the terrestrial environment. This conclusion agrees with the lack of any evidence for aggressive hunting activity. Accepting this, we must now see these leeches as animals lacking the acute sensibilities of aquatic leeches, and for the greater part detached perceptually from their environment and dependent on chance contact for their food. I will admit, that as my appreciation of this status in their relationship with their environment developed, their gentle tapping 'explorations' with the velum seemed similar to a blind and deaf man guiding himself with his cane.

There is need for caution in studying these animals. They have a high capacity to 'condition' and do this rapidly. Stammers (1950) noticed that *zeylanica* after five or six trials showed 'conditioning or fatigue' to subsequent reductions in illumination. On several occasions when I have had *limbata* on my hand and prevented it from making a few attempts to bite, it has stayed on my hand for even up to 45 minutes without attempting to bite again. It is accordingly an animal for which unifactorial experimentation at the bench may lead to error in the understanding of the behaviour of the animal as an entity in its complete environment. The non-responsiveness to light and shadow, etc. on the forest floor where many stimuli are a constant and varying feature in the environment might be ascribed to conditioning and not recognised as truly indicative of the behaviour of the normal animal within its environment.

Lindemann (1939), studying *Hirudo medicinalis,* concluded that there was a first stage in the feeding process when the incision was made and a histamine-like substance supplied into the incision to cause liberal bleeding, followed by a second stage when blood was taken into the crop and hirudin was mixed only with this blood. This contrasts to the long-held opinion that hirudin was supplied into the incision at the start of the bite, and was solely responsible for the subsequent bleeding by preventing coagulation within the incision. Stammers (1950) showed that the coagulation time of blood issuing from a bite was initially 13 minutes, diminishing after 10 minutes to a coagulation time of 3 minutes, but bleeding continued for 30 minutes. He concluded that both hirudin, and a histamine-like substance, were supplied into the incision, and that the physiological activity of the latter, continuing long after the hirudin was exhausted, was responsible for the prolonged bleeding.

Worth (1951) also recognised an initial short biting phase, but with a sensation of stinging, followed by the feeding stage, such as I have described for *C. limbata.* However, it did not come to attention before that in the initial stage of the bite, the body is rigid and presses the anterior sucker onto the skin, while the jaws are penetrating into it. The sucker is not adherent of its own function at this time. The release of nephric excretion from the anterior nephropores enables adhesion and is accompanied by the slight stinging sensation.

This could not be the histamine-like substance of Lindemann. It did not lead to prolonged bleeding. Hirudin had not been released in this first phase of the bite for the coagulability of the blood had not been reduced. Unlike a typical histamine reaction, there was no reddening of the skin and no flare at the site of the incision following the bite. Histamine is readily destroyed when normal circulation is present. The long-delayed and more intense subsequent irritation (which exhibited a red reaction, flare and slight oedema) is obviously due to some substance other than histamine, which could not have persisted this length of time at the site of the bite. On the evidence of the generalised stinging of the surface of my hands after handling many fresh land-leeches, this substance appears to be a normal constituent of nephric excretion.

The firm adhesion of the anterior sucker and the relaxation of the body to permit a ready flow of blood into the crop contrast strongly with the initial biting phase.

The behaviour of the engorged leech differs from the conclusion reached by Moore (1927) on the evidence from Robertson (1909) that neither she, nor Dr. A. Willey, had ever found a fed land-leech in the bush. Moore took this as establishing that the engorged leech was secretive and remained in hiding until the meal was completely digested. It is clear this is not the case in *C. limbata*. Many of the field-collected land-leeches I have dissected have held blood in the crop; but I have not yet seen haemoglobin crystals in the crop of any of these leeches like the quantities of crystals which are present in the crop two months and longer after a leech has engorged itself. This has suggested to me that these leeches more commonly make only small meals such as from young frogs or other small animals.

The exhibition of the anhydrobiotic state was to be anticipated from the many accounts of the absence of land-leeches in dry periods; but by comparison with aquatic leeches, I had not anticipated such a high level of resistance to dehydration, the only indication having been given by Moore (1927) in his account of *H. sylvestris* where he records briefly that several collectors had noted that they had found these in a 'semi-torpid' condition under stones and buried in mud, and one described them as in a "contracted condition — quite still, as though dead". Aquatic leeches do not have the ability to withstand the total absence of environmenal water such as shown by *C. limbata*.

One feature of the circumstances found in this study presents an unusual situation applicable to the land-leech. Aquatic leeches are for the greater measure retained within their body of water. If one is attached to an intruder who leaves the water, the leech usually detaches quickly and under suitable circumstances can often be seen making its way back to the water.

C. limbata is a poor traveller with a restricted range in unsuitable conditions. Feeding and attached to an intruder for twenty minutes or longer (Worth records 35 minutes for *H. zeylanica*), the leech would be carried relatively far from the area of choice, and, in all probability, to quite unsuitable areas. Detached, it will seek concealment in the new area. It might enter the anhydrobiotic state and be reactivated in time; but the opportunity for return to the original small suitable area seems generally improbable.

Such a factor may operate to limit the density of the population in the small suitable area. The example given of the smaller number of leeches on a patch on a well-travelled track contrasting with the higher numbers on a less-travelled track favours the existence of such a factor.

At this time, it can be seen that the area infested with land-leeches is well-characterised, recognisable, and can be avoided; or if unavoidable, the feet and legs should be examined for leeches immediately after crossing such an area. On travelled tracks, the simplest improved drainage of seepage areas should reduce or even eliminate land-leech populations.

Acknowledgments

I express my sincere appreciation of the assistance I have been given in obtaining literature and in many other ways by Dr. J. C. Yaldwyn, of the Australian Museum, Dr. R. E. Barwick, of the Australian National University, and Dr. W. H. Dawbin, University of Sydney. Miss E. Pope of the Australian Museum has been most helpful with specimens of *C. limbata* and in other ways; Mr. P. Strong of Grafton and Mr. H. Battam of Cronulla have provided me with considerable collections of live land-leeches; and I have been given valuable assistance in the field by members of the Clarence Valley Field Naturalists' Club. The Science and Industry Endowment Fund has assisted me with microscopic and other equipment.

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BOOK REVIEW (and a TYPE DESIGNATION)

"The Fishes of New Guinea", by Ian S. R. Munro (Sydney: Government Printer) (December) 1967, pp. i-xxxviii + 1 - 651, coloured plates 1-6, b. & w. plates 1-78 and text figs. 1-23. Price $14.50 + postage. Published by Department of Agriculture, Stock and Fisheries, Port Moresby, New Guinea, and printed in New South Wales. Available from Department of Territories, Sydney.

We welcome the long overdue appearance of this work which is compiled with the thoroughness which we have come to expect from the author of "The marine and freshwater fishes of Ceylon." In this volume, everything is made as easy as practicable for even a non-ichthyologist to identify a fish. As a result, further discoveries amongst the rich New Guinea fish-fauna may be expected and it will be easier to make them known. In fact, a number of species recorded in recent years (i.e. since about 1958) could not be included: delays of about a decade in the printing of Munro's book—delays for which that author was not responsible—caused these omissions to be inevitable. Fortunately for the average fisherman or naturalist, these additions are mostly deepsea fishes or pelagic larvae, rarely seen by the landsman, or else they are interesting but obscure new species, mostly described in foreign literature.

The science of New Guinea fishes is further clarified by the illustrations, many from the pen and brush of Munro himself. Few may realize the immense amount of patient work involved in producing a book of this kind; the assembling of historical sources and analysis of scattered literature in several languages, the detailed examination of specimens, the listing and preparations of keys, proof-reading, indexing and making cross-references to thousands of numbers, the selection and arrangement of over 1,130 drawings and photographs and planning them to fit the plates—this is a colossal undertaking, all the more creditable since for much of the time the author was engaged in quite different work in a remote part of northern Australia. His book deals with the marine and fresh-water fishes of the Territories of Papua and New Guinea, the western part of New Guinea now known as West Irian, and offlying island groups. For locality maps, synonymies and bibliography, the reader is referred to an earlier Check-list by Munro. Misprints and errors are rare and the book is beautifully printed and set out. One new generic name, *Symphorichthys* was proposed therein, without special nomination of a type-species, though *Symphorus spilurus* Gunther, 1872, was obviously intended, and with the author's agreement is hereby designated the type-species. Perhaps Mr. Munro could be requested to finish his Handbook of Australian Fishes now, for it must be confessed that, thanks to him, countries like Ceylon and New Guinea now have better books about their fishes than Australia and New Zealand.

—G. P. Whitley.

EDITORIAL NOTES

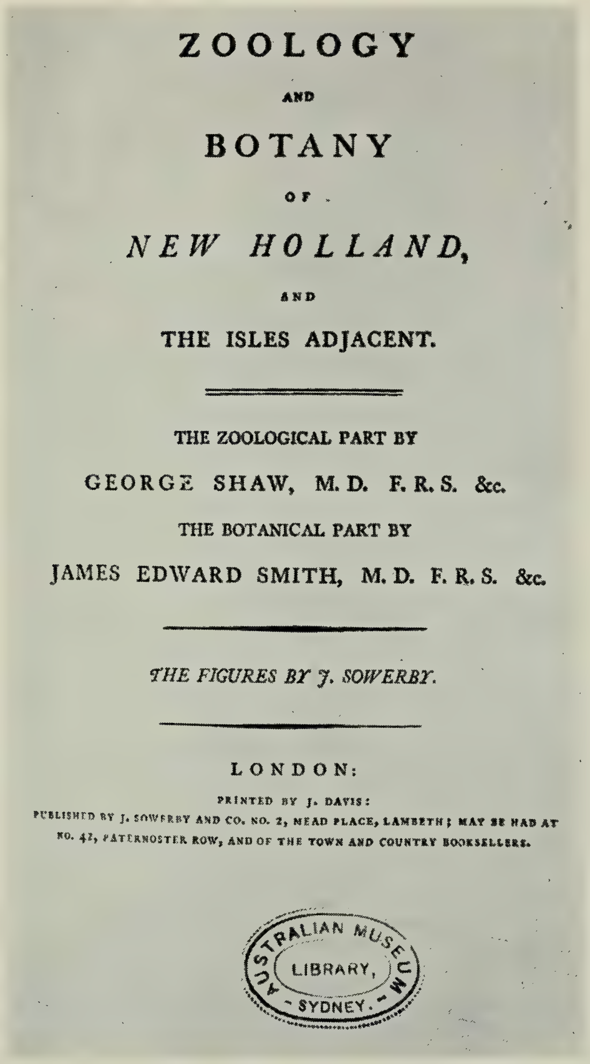
A slight departure from the usual running heads of the pages of the *Australian Zoologist* may be noticed in the present number: instead of a brief title and the author's name with the pagination, a reference to volume and date appears. This is to conform with the requirements of the General Post Office when registering this publication for transmission by post as a periodical. Some such change was envisioned in any case for the forthcoming volume xv of the *Australian Zoologist,* so this issue merely hastens an improvement which has been in mind for some time.

Mr. K. A. Hindwood has personally met the cost of the blocks illustrating his paper on three early natural history books; his continued generosity is appreciated.

Lieutenant Joseph L. H. Wassell, A.A.M.C.
(*circa* 1944).

J. L. H. Wassell with paws of a large crocodile, Silver Plains, North Queensland, 1960.

J. L. H. Wassell discovering the breeding place of *Aedes culiciformis* in freshwater crab-holes, Yarraden Station, 40 miles south of Coen, Queensland, 25 May 1953.



ZOOLOGY

AND

BOTANY

OF

NEW HOLLAND,

AND

THE ISLES ADJACENT.

THE ZOOLOGICAL PART BY

GEORGE SHAW, M.D. F.R.S. &c.

THE BOTANICAL PART BY

JAMES EDWARD SMITH, M.D. F.R.S. &c.

THE FIGURES BY J. SOWERBY.

LONDON:

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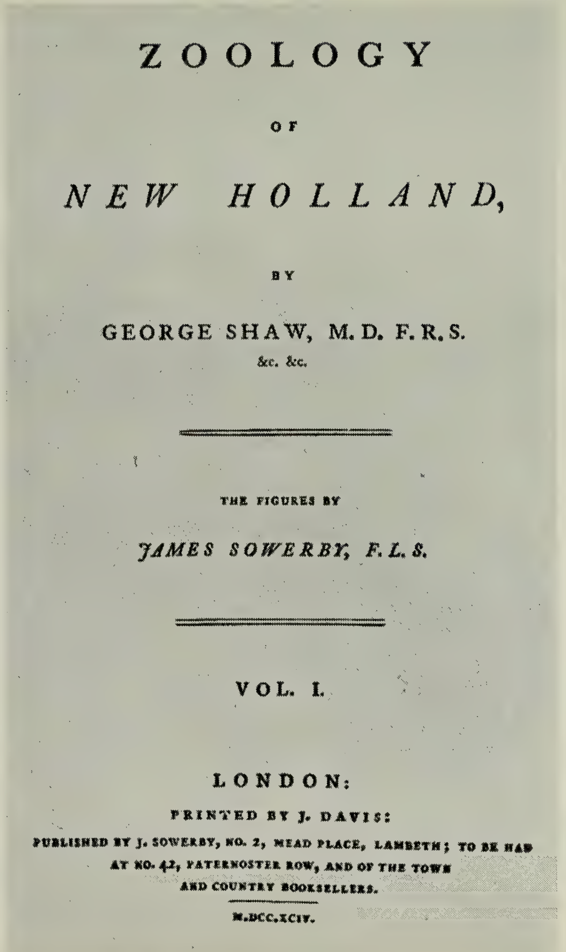
Title-page of Shaw and Smith's *Zoology and Botany of New Holland,* the first book to deal exclusively with Australian natural history. From the copy in the Australian Museum, Sydney.



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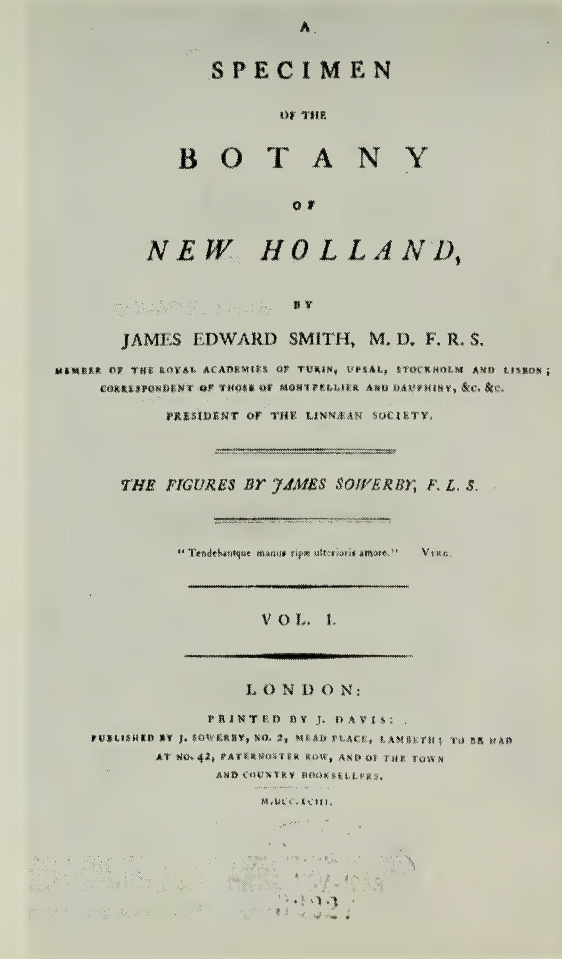

A

SPECIMEN

OF THE

BOTANY

OF

NEW HOLLAND,

BY

JAMES EDWARD SMITH, M. D. F. R. S.
MEMBER OF THE ROYAL ACADEMIES OF TURIN, UPSAL, STOCKHOLM AND LISBON;
CORRESPONDENT OF THOSE OF MONTPELLIER AND DAUPHINY, &c. &c.
PRESIDENT OF THE LINNÆAN SOCIETY.

THE FIGURES BY JAMES SOWERBY, F. L. S.

"Tendebantque manus ripæ ulterioris amore." VIRG.

VOL. I.

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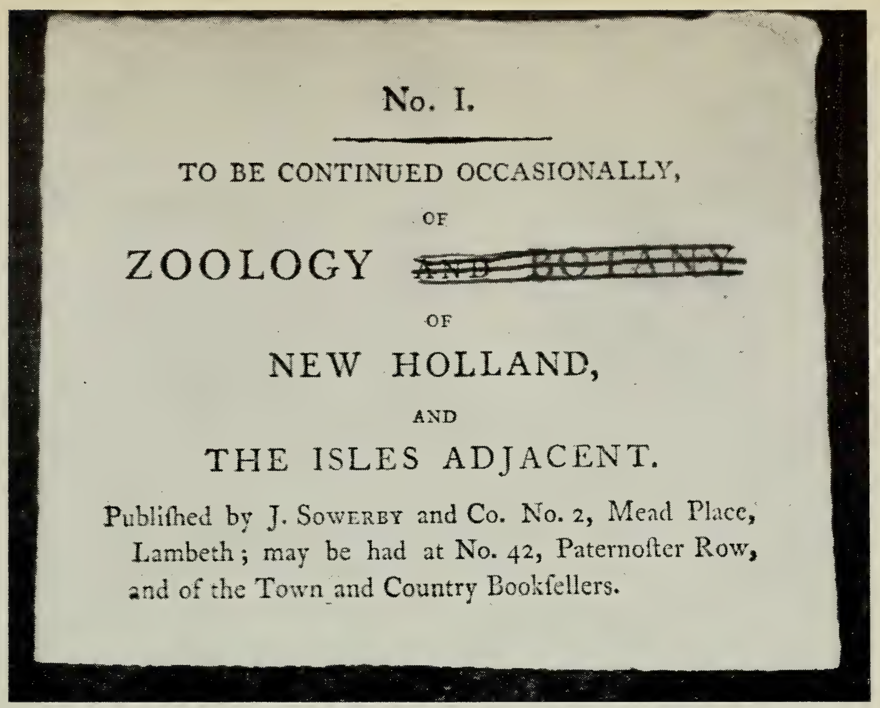
Title-pages of the separate works, Shaw's *Zoology* and Smith's *Botany* of New Holland, the former from the Author's library and the latter from the Australian Museum copy.



No. I.

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OF

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OF

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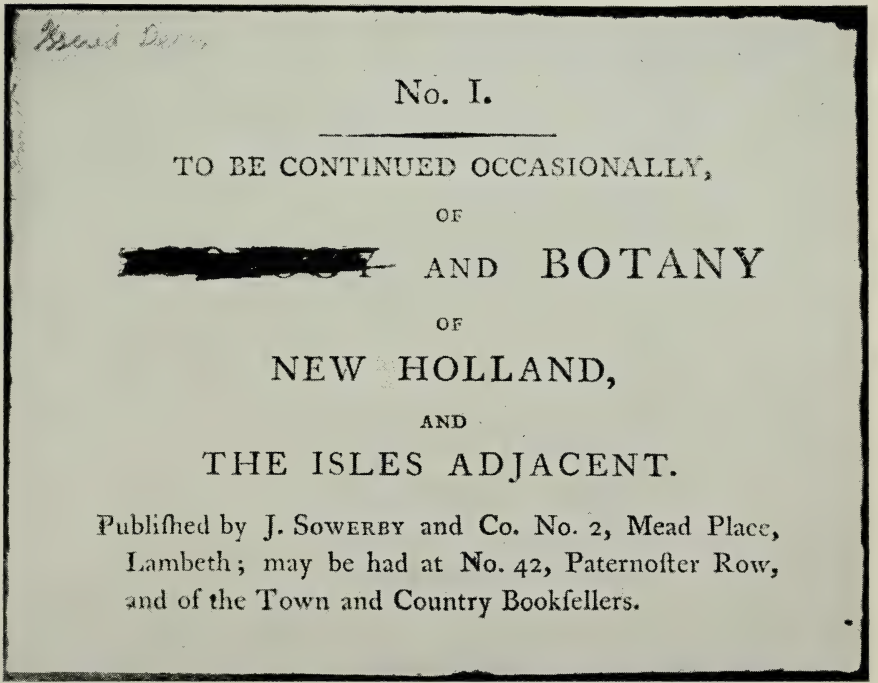

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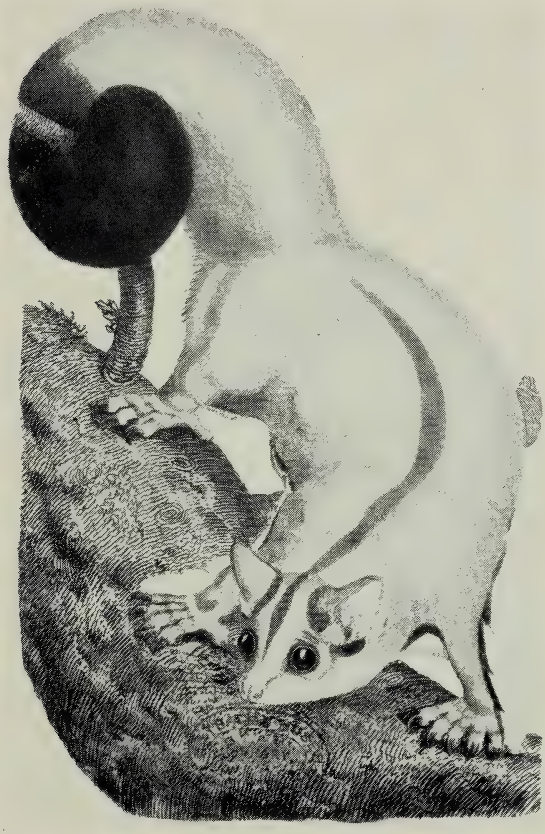


The Squirrel Opossum, *Didelphis sciurea* [now *Petaurus norfolcensis*], from plate 11 of Shaw's *Zoology of New Holland*, 1794 (copy in the Australian Museum, Sydney).

—Photo: C. V. Turner

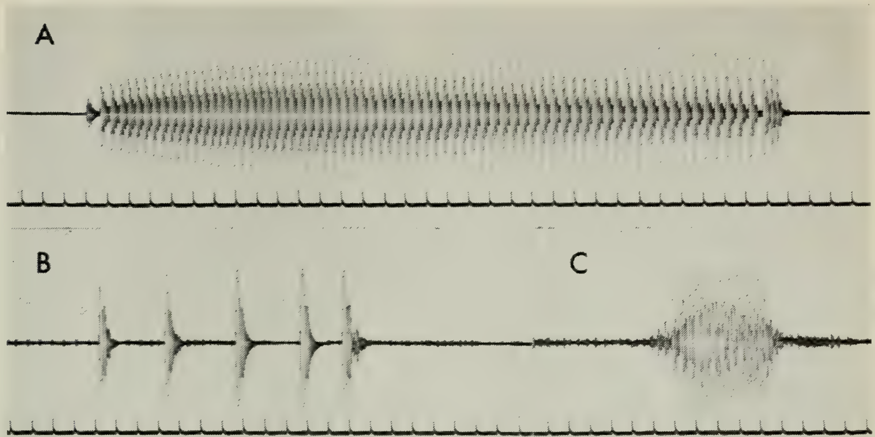


Figure 1

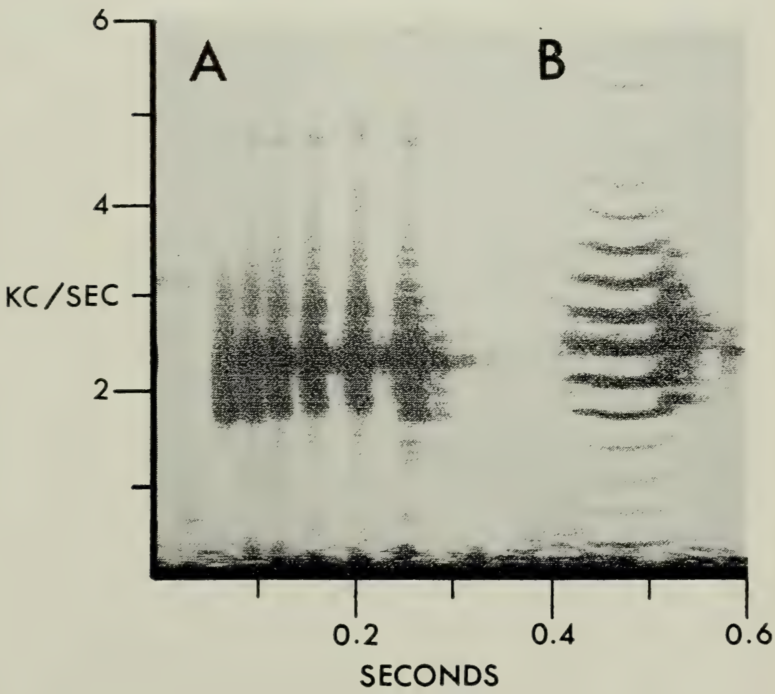


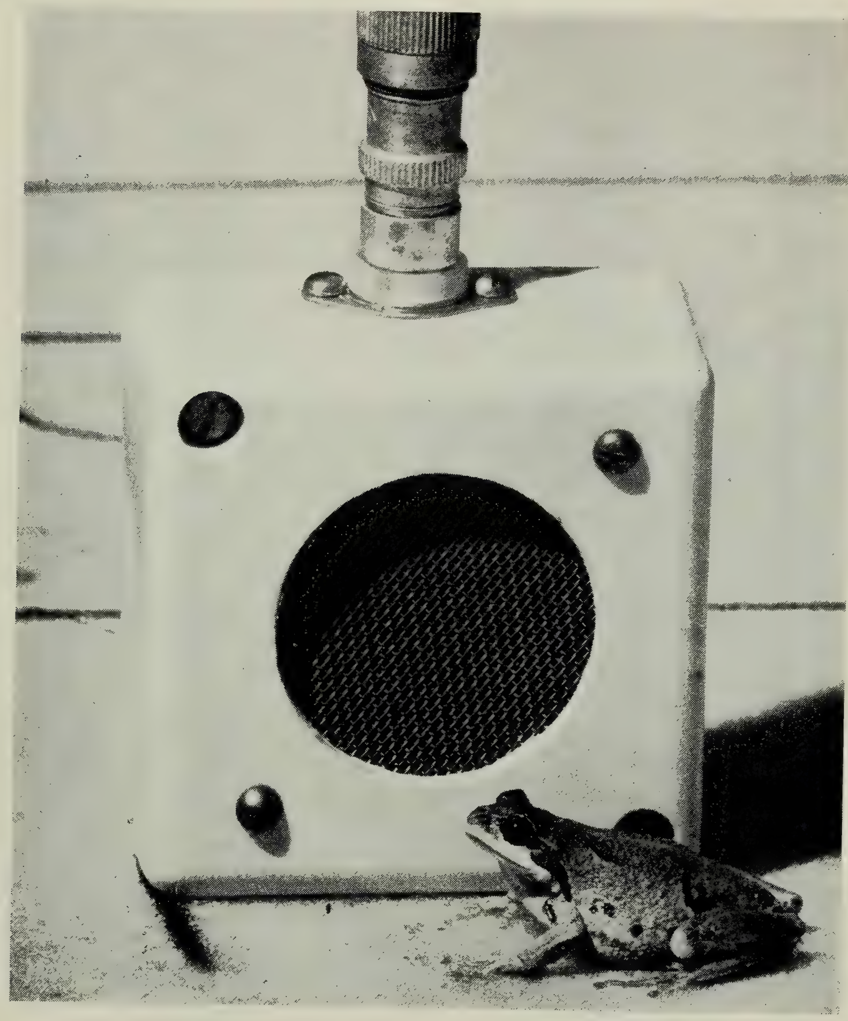
Figure 2

Frog calls

(For explanation, see page 264)

Frog calls

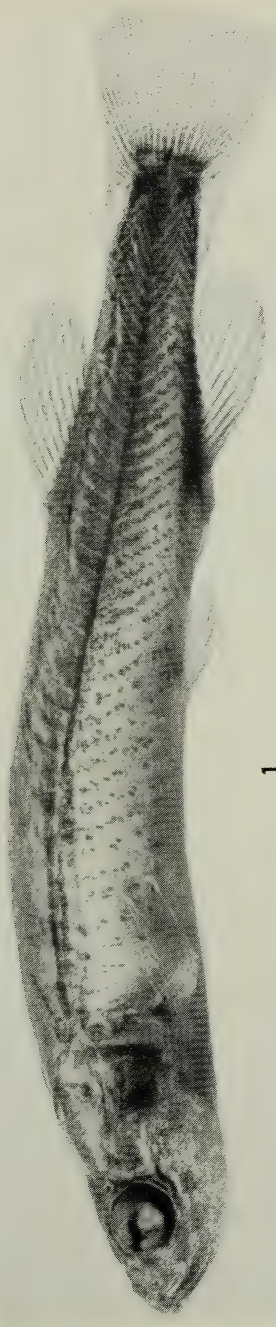
(See page 264)



Frog calls

(See page 264)

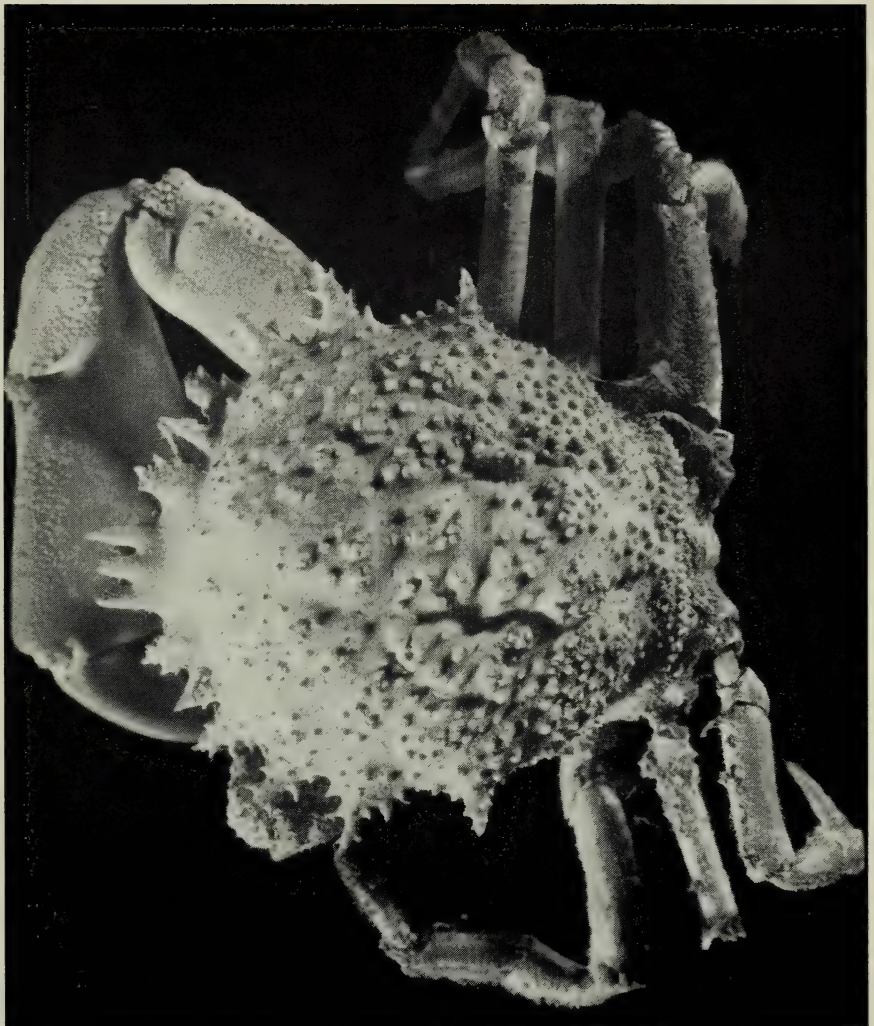
Galaxias pedderensis Frankenberg



1

2

Galaxias parvus Frankenberg



Trichopeltarion wardi Dell. Holotype.

—Photo: A. Healy

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PUBLICATIONS

The Australian Zoologist, published at irregular intervals since 1914.
Proceedings, published since 1933-34.

AUSTRALIAN ZOOLOGICAL HANDBOOKS AND SPECIAL REPRINTS.

"Bibliography of Australian Entomology, 1775-1930", by A. Musgrave, 1932.

"A Check List of the Birds of Paradise and Bower Birds", by T. Iredale, 1948.

"Revision of the New South Wales Turridae", by C. F. Laseron, 1954.

"The Published Writing of Tom Iredale, with an Index of his new Scientific Names", by D. F. McMichael & G. P. Whitley, 1956.

"A Reclassification of the Order Odonata", by F. C. Fraser, 1957.

"Dragonflies of Australia", by F. C. Fraser, 1960.

A Catalogue of the Psocoptera of the World, by C. N. Smithers, 1967.

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