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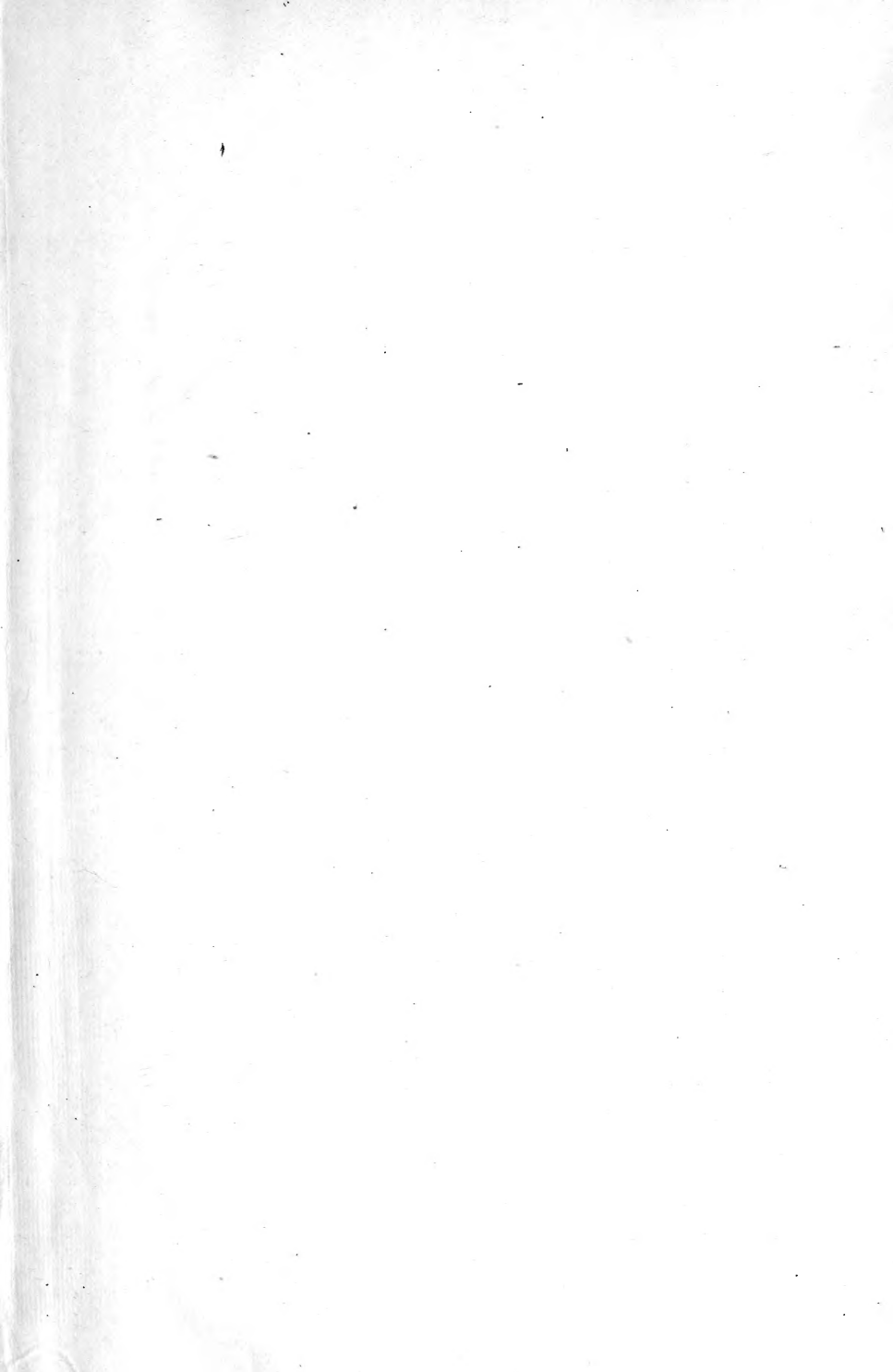
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TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XXIII.

For 1898-99.

[WITH TEN PLATES.]

EDITED BY PROFESSOR R. TATE.



Adelaide :

W. C. RIGBY, 74, KING WILLIAM STREET.

DECEMBER, 1899.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 34, Milk Street, Cheapside, London."

ROYAL SOCIETY OF SOUTH AUSTRALIA

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ADDENDA AND CORRIGENDA.

- PAGE 45: Under *Chalcopterus gracilicornis* insert N. W. Australia.
- PAGE 48: Under *C. mundus* insert N. Queensland.
- PAGE 55: Under *Emenadia difficilis* insert S. Australia.
- PAGE 209: 21 lines from top, 3 and 5 lines from bottom, for unguinal read unguinal.



FEB 2 1900

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TRANSACTIONS

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XXIII., Part I.

[WITH THREE PLATES.]

Plates VI.-VII. of Vol. XXII. are issued herewith.

Vol. XXII.

EDITED BY PROFESSOR R. TATE.

ISSUED AUGUST, 1899.

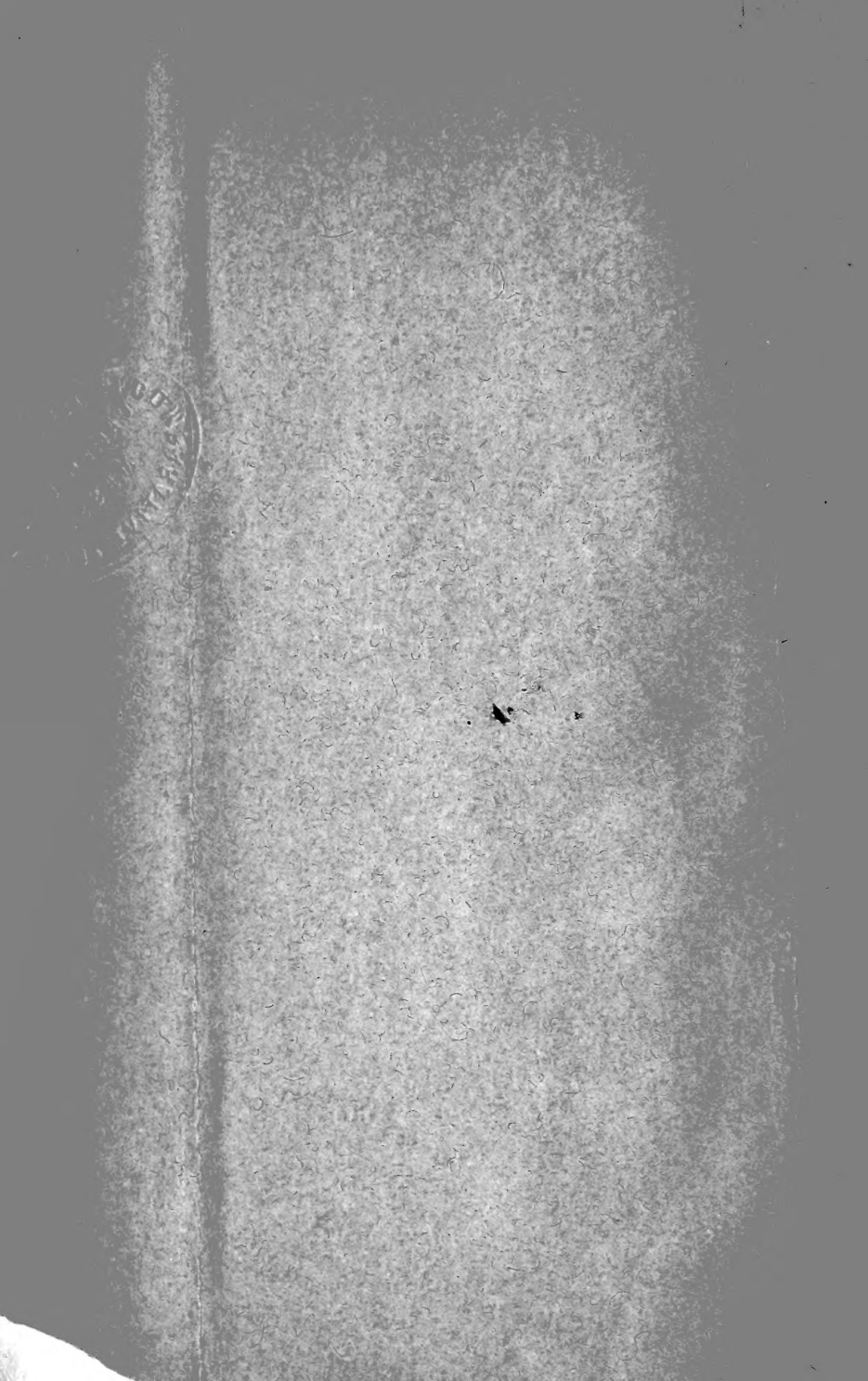


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A LIST OF THE LIBELLULIDÆ (DRAGON FLIES)
OF AUSTRALASIA.

By J. G. O. TEPPER, F.L.S., F.S.Sc., &c.

WITH ANNOTATIONS ON SOUTH AUSTRALIAN
SPECIES.

By MONS. RENE MARTIN.

[Read May 2, 1899.]

The Libellulidæ form a part of the Odonata or Pseudo-Neuroptera. They are classed now with the Orthoptera, but were formerly included among the Neuroptera, which they resemble in appearance of the mature forms, but their metamorphosis is quite different. The Thripsidæ, Psocidæ, Embidæ, Termitidæ, Perlidæ, and Ephemeridæ embrace the remaining families.

Very little appears to have been published hitherto in Australia on the species of Odonata occurring endemically in this region, excepting several papers by Mr. W. W. Froggatt in Proc. Linn. Soc., N.S.W. (vol. X., 1895-6), on the "Termites" or "White Ants." The chief reasons for this paucity are that not only are the specimens rather difficult to capture, collect, and preserve, but that the literature relating to the suborder is so widely scattered in mostly foreign publications as to be almost inaccessible for any local student. The means are therefore lacking to learn which forms are known to occur in the district or province, or to classify them when collected. To meet this want to some extent this list of the most important and conspicuous family has been drawn up, as a preliminary step towards a better knowledge.

Naturally the work is somewhat imperfect, it being quite impossible for one not in possession either of all the necessary literature or extensive collections to discriminate whether a species appearing in various genera, under different authors, or from dissimilar localities (or *vice versa*), be one and the same or not, or whether different species have been included under similar names. This can ultimately only be determined by European workers to whom both literature and collections are accessible.

The present list is chiefly based on the essays of Fr. Brauer, published in the "Verhandlungen der Botan. und Zool. Gesell-

schaft, Wien," between 1862 and 1868, and the "Zoological Record" from 1868 to 1897. A few species were gleaned from Burmeister's "Handbuch," 1838, and one from the British Museum Catalogue. The dates attached refer to the earliest notice observed in the works above cited.

The arrangement of the genera follows mainly that of Brauer's "Verzeichniss" (Abh. Bot. u. Zool. Ges. 1868).

Respecting the numerical extent of the Libellulidæ, it may be remarked that in 1871 Selys recorded (as known) some 1,357 species, but may have been considerably added to since. The Australian species, of which 139 in 65 genera are listed below, appear to be those least known; and it is hoped that this paper may lead to a better study of the family ere rendered impracticable through more or less total extinction, with which all endemic life in Australia is threatened, either directly or indirectly.

The Dragon-flies attract the attention of many persons, partly on account of the large size of some, the brilliant colours of some of the smaller, and the ceaseless graceful flight of most, and partly through the groundless fear of injury, which produced the vernacular name of "Horse-stingers" for them; yet they are rarely taken by collectors. They deserve, however, serious study on account of the important rôle they act in Nature as tireless consumers of flies, mosquitoes, and other large and small insects wherever water more or less abounds.

The larvæ and nymphs are wholly aquatic, living in fresh to brackish stagnant pools, ponds, or morasses. Whenever practicable to connect them with the mature form they should be collected also, at least the cast skin of the nymph, which the imago leaves attached to some object on emerging. They are very much stouter in body than the latter, move about in the water by walking on the bottom, climbing plants, &c., and contribute largely to the reduction of other and more noxious insect life.

During 1898 specimens of the South Australian Libellulidæ were sent by permission of the Board of Governors to Mons. René Martin (Le Blanc, Indre, France), a noted specialist, who kindly identified them, and furnished the notes which are indicated under each species-name by inclusion within inverted commas (" "). These I have supplemented by remarks, &c., and the localities whence the specimens in the Museum collection were obtained. The species hitherto recognised in South Australia, and of which specimens are in the Museum collection, are denoted by an asterisk.

SUBORDER ODONATA (PSEUDO-NEUROPTERA).

FAMILY I.—LIBELLULIDÆ.

SUBFAMILY I. — LIBELLUNINÆ.

- Pantala flavescens*, *Fabricius*. New South Wales, Fiji, New Caledonia, Tahiti (Brauer, 1864-8; R. Martin, 1896). The species is widely distributed in the Old World, being met with from Europe to Kamschatka, and reported from Natal.
- **Tramea carolina*, *L.* Northern Territory of S.A., New Caledonia, India, America (Brauer, 1864-8).
- Tramea Loewi*, *Brauer* (1866). Queensland, Ceram.
- Tramea brevistyla*, *Brauer* (1865). New South Wales.
- Tramea transmarina*, *Brauer* (1866). Fiji.
- Tramea samoensis*, *Brauer* (1866). Samoa.
- Rhyothemis* (*Celithemis*) *apicalis*, *Kirby*. New Hebrides (Zool. Rec., 1889).
- Rhyothemis* (*Celithemis*) *chalcoptilon*, *Brauer*. Samoa (1868).
- Rhyothemis* (*Celithemis*) *pygmæa*, *Brauer* (1866-8). New Guinea.
- Rhyothemis* *Chloë*, *Kirby*. Queensland (Z.R., 1894).
- Rhyothemis* *crapula*, *Brauer*. Fiji.
- Rhyothemis* *graphiptera*, *Rambur*. Queensland (Br., 1868).
- Rhyothemis* *dispar*, *Brauer* (1867). Fiji.
- Rhyothemis* *princeps*, *Kirby*. Queensland (Z.R., 1894).
- Rhyothemis* *resplendens*, *Selys*. Queensland, New Guinea (Z.R., 1878).
- Rhyothemis* *Turneri*, *Kirby*. Queensland (Z.R., 1894).
- Zyxomma multinervis*, *Carpenter*. New Guinea (Z.R., 1897).
- Zyxomma* (*Tholymis*) *tillarga*, *Fabr.* Tahiti, Samoa, India, Chili, Madagascar, Mauritius (Br., 1868).
- Perithemis* (*Microthemis*) *Duivenbodei*, *Brauer* (1866). New Guinea.
- Calothemis* (*Orchithemis*) *Meyeri*, *Selys*. New Guinea (Z.R., 1878).
- Neurothemis elegans*, *Guérin*. New Guinea (Brauer, 1866).
- Neurothemis fluctuans*, *Burmeister*, 1838; Brauer, 1866. Pele Islands.
- Neurothemis innominata*, *Brauer* (1867). New Guinea, Ceram. (To this species belongs *N. diplax*, Br., as a heteromorphous form.)
- Neurothemis oligoneura*, *Brauer* (1867). North Australia.
- Neurothemis oculata*, *Fabricius*. North Australia (Brauer, 1867).
- Urothemis nigrilabris*, *Selys*. New Guinea (Z.R., 1878).
- **Nesoxenia Libellula*) *braminea*, *Fabr.* Australia (S.A.), India, &c. (Brauer, 1868). Colour bright-blue when alive; expanse of wings, 3-3½ in. (75 mm.). "Un mâle d'Adelaide.

- L'espèce habite les Indes orientales et l'Australie. Elle paraît être commune dans New South Wales." Specimens obtained at Magill and Mount Lofty.
- Nesoxenia (Libellula) cingulata*, Kirby. Alu Islands (Z.R., 1889).
- Prothorthemis Wahnesi*, Foerster. New Guinea (Z.R., 1897).
- Trithemis festiva (infernalis)*, Brauer. New Guinea, India, &c. (Brauer, 1868).
- Orthemis pectoralis*, Brauer (1868). Fiji, Ceram.
- Nesoceria Woodfordi*, Kirby. Solomon Islands (Z.R., 1889).
- Crocothemis (Hydronympha) servilia*, Drury. Queensland, China, India (Brauer, 1868).
- Hydronympha (Orthetrum) nigrifrons*, Kirby. Queensland (Z.R., 1894).
- Brachydiplax denticauda*, Brauer (1868). New Guinea.
- Brachymesia australis*, Kirby. Queensland (Z.R., 1889, 1894).
- Diplacina smaragdina*, Selys. New Guinea (Z.R., 1878).
- Libella (Hydronympha) caledonica*, Brauer. Queensland (1868).
- Lepthemis sabina*, Drury. North-Eastern Australia, Fiji, Java, Celebes, India, China, Japan, Philippine Islands; and some varieties in Arabia, Syria, and Asia Minor.
- Erythemis oblita*, Rambur. South and Central Australia (Brauer, 1868).
- Erythemis haematodis*, Burm., (? *oblita*, var.). Australia (Brauer, 1868).
- **Erythemis (Trithemis) rubra*, Kirby. Australia (S.A.), New Guinea (Z.R., 1889). Colour of male when alive bright to dull-red, of female ochre-yellow. Expanse of wings, $1\frac{3}{4}$ ins. to $2\frac{1}{4}$ ins. (40 to 56 mm.). Specimens from Adelaide and Magill. "Un mâle. Elle habite toute l'Australie et probablement la New Guinea et les îles voisines."
- **Erythemis* sp. Adelaide, South Australia. Wings brownish, body stouter than that of the last, colour yellowish.
- Diplax bipunctata*, Brauer. Queensland, New Caledonia, Samoa (1868).
- Diplax (Trithemis) trivialis*, Rambur. Queensland, N. Guinea, Fiji, Java (Brauer, 1866).
- Nannodiplax rubra*, Brauer. Queensland (Brauer, 1868).
- Nannodiplax Finschi*, Karsch. New Guinea (Z.R., 1889).
- Nannophya australis*, Brauer. New South Wales (1865).
- Nannophya (?) pygmaea*, Rambur. Queensland, Amboyna, Malacca, &c. (Brauer, 1868).
- Nannophya (?) exigua*, Hagen. Queensland, Celebes (Brauer, 1868).
- Nannodythemis australis*, Karsch. Australia (Z.R., 1889).
- Nannothemis (= Nannophya) australis*, Brauer. New South Wales (1868).

SUBFAMILY 2.—CORDULINÆ.

- Epopthalmia* (*Cordulia*) *elegans*, *Hagen*. Australia, China, &c. (Brauer, 1864).
- p ophthalmia* (*Cordulia*) *australis*, *Hagen*. Australia, Celebes (Brauer, 1868).
- Cordulia novæzealandiæ*, *Brauer*; (*Smithii*, *White*). New Zealand (Brauer, 1864).
- Hemicordulia affinis*, *Selys*. North-Western Australia (Z.R., 1871).
- Hemicordulia assimilis*, *Selys*. Solomon Islands, Celebes (Z.R., 1871).
- **Hemicordulia australasiæ*, *Rambur*. Queensland (Brauer, 1868).
- Hemicordulia fidelis*, *Selys*. Loyalty Islands (Z.R., 1886).
- **Hemicordulia intermedia*, *Selys*. South Australia, Queensland (Z.R., 1871).
- Hemicordulia Jacksoniensis*, *Rambur*. Australia (Brauer, 1868).
- Hemicordulia novæhollandiæ* *Selys*. Australia (?).
- Hemicordulia oceanica*, *Selys*. Tahiti (Brauer, 1868).
- **Hemicordulia tau*, *Selys*. Australia (S.A., incl.) (Brauer, 1868).
 “Le genre *Hemicordulia*, remarquable en ce que les mâles ont le bord anal des ailes inférieures arrondi, comprend une douzaine d'espèces. Parmi elles, deux habitent Madagascar et Maurice, une autre voisine les îles Seychelles. Dans l'Inde, on a observé une autre espèce, de même qu'une autre se trouve assez communément à Java. Contes les autres habitent les îles australes ou le grand continent Australien. Ainsi, l'*oceanica*, *Selys*, a été prise à Taïti, *assimilis*, *Selys*, à Celebes et dans les îles Solomon, *fidelis*, M'Lachlan, les îles Loyauté, les quatre derniers espèces ont été trouvées en Australie.”
- “Les *H. australiæ*, *Rambur*, et *H. novæhollandiæ*, *Selys*, ne portent pas sur le front une tache en forme de I (Greek *tau*), tandis que *H. intermedia* et *H. tau*, *Selys*, à la tache noire du front en forme de I plus ou moins épais. Enfin *H. intermedia* se distingue de notre espèce ‘*tau*’ par une bande jaune en demi-aureau au second segment de l'abdomen. La taille de toutes espèces est à peu près la même.”
- Epithea* (*Cordulia*) *Grayi*, *Selys*. New Zealand, (?) Australia (Z.R., 1871).
- Epithea* (*Cordulia*) *Braueri*, *Selys*. New Zealand (Z.R., 1871).
- **Synthemis eustalacta*, *Burmeister*. South Australia, Victoria, &c. (Brauer, 1868). A specimen from Wilmington appears to represent another species. “Le groupe *Synthemis*, reconnaissable par ce que les espaces basilaire et median sont réticulés avec quatre ailes, est absolument Australien et n'a jamais été observé qu'en Australie, ou îles Fiji et de la N. Caledonie.”

“*S. eustalacta* a été observé sur plusieurs points du continent et parait assez rare partout.”

- Synthemis miranda*, *Selys*. New Caledonia (Z.R., 1871).
Synthemis macrostigma, (*Hagen*) *Selys*. Fiji (Z.R., 1871).
Synthemis Leachi, *Selys*. Australia (Brauer, 1868; Z.R., 1871).
Synthemis guttata, *Selys*. Australia (Brauer, 1868; Z.R., 1871).
Synthemis brevistyla, *Selys*. Queensland (Z.R., 1871).
Synthemis regina, *Selys*. Queensland (Z.R., 1874).
Synthemis virgula, *Selys*. Victoria (Z.R., 1874).
Cordulephya pygmaea, *Selys*. Victoria (Z.R., 1871).

FAMILY II.—ÆSCHNIDÆ.

SUBFAMILY 1. — GOMPHINÆ.

- **Austrogomphus Guérini*, *Rambur*. S. Australia, &c., Tasmania (Brauer, 1868).
 **Austrogomphus collaris*, *Selys*. Australia (Brauer, 1868).
Austrogomphus (? *Hemigomphus*) *ochraceus*, *Selys*. Victoria (Z.R., 1869).
Austrogomphus (? *Hemigomphus*) *amphiclitus*, *Selys*. Queensland (Z.R., 1873). “Les quatre espèces qui composent le genre *Austrogomphus* sont propre a l’Australie. Le *A. Guérini* habite aussi la Tasmanie.”
Hemigomphus lateralis, *Selys*. North Australia (Z.R., 1873).
Ictinus australis, *Selys*. Queensland (Z.R., 1871).
Petalura (*Diastatomma*) *gigantea*, *Leach*. Australia (Brauer, 1864).
Uropetala Carovei, *White*. New Zealand (Burmeister, 1838; Brauer, 1864).

SUBFAMILY 2.—ÆSCHNINÆ.

- Anax guttatus*, *Burmeister*. N. Guinea, India, Java, Seychelles, &c. (R. Martin, Mem. Soc. Zool. de France, IX., p. 105).
 **Hemianax* (*Æschna*; *Anax*) *papuensis*, *Burm.* (*congener*, *Ramb.*). Northern Territory, S.A. (nec Adelaide), N.S. Wales, Queensland (Brauer, 1864). There is also one specimen each from Blinman, S.A., and Fremantle, W.A. Colour, grey, with black and yellow markings; expanse, 4 ins. (95-102 mm.). Another still larger species, of which a defective specimen is in the collection, is possibly *Petalura gigantea*.
Acanthagyna subinterrupta, *Rambur*. New Guinea (Brauer, 1866). (*Acanthagyna*, *Kirby*, is intended to replace *Gynacantha*, *Selys*, nec *Rambur*.)
Æschna brevistyla, *Rambur*. New Zealand (Brauer, 1864).
Æschna tahitensis, *Brauer*. Tahiti (1865).

**Austroeschna parvistigma*, *Selys*. South Australia, Victoria, N.S. Wales (Z.R., 1883). This is the largest of the commoner of the S.A. species, resembling *H. papuensis* in general aspect, and is occasionally seen in great number at the sea coast (Ardrossan, 1880) and the vicinity of larger expanses of water. "Cette espèce semble assez commune dans les différents contrées du continent Australien, notamment en Victoria et New South Wales."

**Austroeschna* (?) sp. S. Australia; locality unknown. Colour of all the wings clear brown; size rather larger than preceding.

FAMILY III.—AGRIONIDÆ.

SUBFAMILY 1.—CALOPTERYGINÆ.

Hemiphlebia mirabilis, *Selys*. Queensland (Z.R., 1869).

Rhinocypha tincta, *Rambur*. New Guinea, Philippine Islands (Brauer, 1866).

Diphlebia sp. Australia. "La subfamily Calopteryginæ n'est représentée en Australie que par le genre *Diphlebia* qui comprend une espèce, et par quelque rares espèces de plusieurs autres genres. Certaines groupes de cette son famille sont pourtant fortement représentés à Celebes et même à la New Guinea."

SUBFAMILY 2.—AGRIONINÆ.

Amphipteryx lestoides, *Selys*. Queensland (Brit. M.C., p. 654).
Archibasis (*Stenobasis*) *occipitalis*, *Selys*. New Guinea (Z.R., 1877).

**Lestes analis*, *Rambur*. "Egalement in South Australia et Victoria."

**Lestes annulosa*, *Selys*. South Australia, Victoria (Brauer, 1864). "Jolie espèce observé en Victoria et S.A., sur les marecages."

Lestes albicauda, *McLachlan*. New Guinea (Z.R., 1895).

Lestes Colenonis, *White*. New Zealand (Brauer, 1864).

Lestus Leda, *Selys*. Queensland (Brauer, 1868).

There are two or three undetermined species besides the above in South Australia, of which specimens are in the collection from the Lakes and Kangaroo Island.

Synlestes Weyeri, *Selys*. Queensland (Z.R., 1869).

Argiolestes obscura, *Selys*. New Guinea (Z.R., 1878).

Argiolestes ornata, *Selys*. New Guinea (Z.R., 1878).

Argiolestes pallidistyla, *Selys*. New Guinea (Z.R., 1878).

Argiolestes postnodalis, *Selys*. New Guinea (Z.R., 1878).

Argia australis, *Guérin*. New South Wales (Brauer, 1864).

Onychargia flavovittata, *Selys*. New Guinea (Z.R., 1878).

Onychargia rubropunctata, *Selys*. New Guinea (Z.R., 1878).

- Ischnura (Agrion) aurora*, *Brauer*. Tahiti, Samoa (1865).
Ischnura distigma, *Brauer*. Queensland (1868).
Ischnura spinicauda, *Brauer*. Polynesia (1865).
Ischnura tahitensis, *Selys*. Tahiti (Z.R., 1878).
Pericnemis annulata, *Brauer*. Samoa (1868).
Idiocnemis bidentata, *Selys*. New Guinea (Z.R., 1878).
Idiocnemis inornata, *Selys*. New Guinea (Z.R., 1878).
Agrion æruginosum, *Brauer*. Queensland (1868).
Agrion cingillum, *Brauer*. Queensland (1868).
Agrion cingulatum, *Burmeister*. Australia (Handb., 823, 1838).
Agrion heterostictum, *Burmeister*. Australia (Handb., 820, 1838).
Telebasis eximia, *Selys*. New Guinea (Z.R., 1878).
Telebasis Laglazei, *Selys*. New Guinea (Z.R., 1878).
Telebasis recurva, *Selys*. New Guinea (Z.R., 1877).
Telebasis sobrina, *Selys*. New Zealand (Z.R., 1873).
Telebasis (Teinobasis) zealandica, *McLachlan*. New Zealand (Z.R., 1873).
Agriocnemis exsudans, *Selys*. New Caledonia, Labuan, Java (Z.R., 1877).
Agriocnemis australis, *Selys*. Queensland (Z.R., 1877).
Argiocnemis nigricans, *Selys*. New Guinea (Z.R., 1877).
Argiocnemis rubescens, *Selys*. Queensland (Z.R., 1877).
Platysticta auriculata, *Selys*. New Guinea (Z.R., 1878).
Platysticta bicornuta, *Selys*. New Guinea (Z.R., 1878).
Alloneura erythroprocta, *Selys*. New Guinea (Z.R., 1886).
Alloneura Wallacei, *Selys*. New Guinea (Z.R., 1886).
Caconeura eburnea, *Foerster*. Key Islands, New Guinea (Z.R., 1895).
Caconeura finisterræ, *Foerster*. New Guinea (Z.R., 1895).
Isosticta (Alloneura) spinipes, *Selys*. New Caledonia (Z.R., 1885).
Xanthagrion antipodum, *Selys*. New Zealand (Z.R., 1878).
Xanthagrion zealandicum, *Selys*. New Zealand (?).
Xanthagrion sp. New Zealand.
 **Xanthagrion erythroneurum*, *Selys*. South Australia, Victoria (Z.R., 1878). This, the smallest of the S.A. species, is remarkable for the bright red and green tints of the males, and has been obtained at Adelaide, Goolwa, and Strathalbyn. "Cette espèce qui habite, Melbourne, Adelaide et un grand nombre de points sur le continent Australien, est très commune en Victoria, dans les marais et sur les étangs en Octobre-Novembre. Les mâles semblent être plus nombreux que les femelles; ce qui est un cas fréquent chez beaucoup d'espèces d'Odonates."
 "C'est la seule espèce du genre qui soit purement Australienne, le trois autres espèces habitent New Zealand."

NOTES ON AUSTRALIAN LEPIDOPTERA.

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ARCTIADÆ.

The present paper is preliminary to a revision of the Australian species belonging to this family. I take the opportunity of making the following corrections in nomenclature :—

<i>Tigrioides splendens</i> , Luc.	= <i>Æonistis</i> * <i>entella</i> , Cr.
<i>Brunia repleta</i> , Luc.	= <i>Tigrioides repleta</i> , Luc.
<i>Brunia intersecta</i> , Luc.	= <i>Xylorycta porphyrinella</i> , Walk. (<i>Tineina</i> , <i>Xyloryctidæ</i>)
<i>Sorocostia interspersa</i> , Luc.	= <i>Mosoda interspersa</i> , Luc.
<i>Chiriphe angulifascia</i> , Luc.	= <i>Goniosema angulifascia</i> , Luc.
<i>Comarchis equidistans</i> , Luc.	= <i>Chiriphe equidistans</i> , Luc.
<i>Comarchis obliquata</i> , Luc.	= <i>Scaeodora obliquata</i> , Luc.
<i>Comarchis lunata</i> , Luc.	= <i>Scaeodora lunata</i> , Luc.
<i>Anestia inquinata</i> , Luc.	= <i>Anestia ombrophanes</i> , Meyr., var.
<i>Spilosoma brisbanensis</i> , Luc.	= <i>Spilosoma fuscinula</i> , Dbld., var.
<i>Spilosoma quinquefascia</i> , Luc.	= <i>Spilosoma fuscinula</i> , Dbld.
<i>Calligenia pilcheri</i> , Luc.	= <i>Enaemia dives</i> , Walk. (<i>Tineina</i> , <i>Hyponomeutidæ</i>)
<i>Nudaria albida</i> , Walk.	= <i>Phaneropseustis albida</i> , Walk.
<i>Nudaria obducta</i> , Luc.	= <i>Phaneropseustis obducta</i> , Luc.
<i>Nudaria mollis</i> , Luc.	= <i>Psilopepla mollis</i> , Luc.
<i>Nudaria macilenta</i> , Luc.	= <i>Thallarcha macilenta</i> , Luc.
<i>Spilosoma frenchi</i> , Luc.	= <i>Spilosoma erythrastis</i> , Meyr.
<i>Thallarcha phædropa</i> , Meyr.	= <i>Thallarcha phalarota</i> , Meyr. (female)

I have not yet been able to examine many of the species described by Dr. Lucas, but the following are, I believe, correctly referred :—

<i>Scoliacma iridescens</i> , Luc.	<i>Sorocostia mesozona</i> , Meyr.
<i>Scoliacma cervina</i> , Luc.	<i>Sorocostia argentea</i> , Luc.
<i>Tigrioides transcripta</i> , Luc.	<i>Mosoda venusta</i> , Luc.
<i>Thrypticodes xyloglypta</i> , Meyr.	<i>Pelobrochis rava</i> , Luc.
<i>Sarrothripa punctata</i> , Luc.	<i>Diphtheraspis modicus</i> , Luc.

* This is, however, not a true *Æonistis*, according to the definition in Meyrick's Handbook.

TIGRIOIDES XANTHOPLEURA, *n. sp.*

Male, 30-32 mm. Head ochreous-yellow, sometimes with a slatey-grey bar on vertex and collar. Antennæ pale-fuscous. Thorax slatey-grey. Abdomen ochreous. Legs slatey-grey; posterior tibiæ and tarsi pale-ochreous. Forewings elongate, posteriorly dilated, costa moderately arched, apex obtuse, hindmargin rounded, slightly oblique; pale slatey-grey; a pale-ochreous line along whole of costa, broadest at base, narrowing towards apex. Hindwings and cilia pale-ochreous-yellow.

Brisbane; several specimens in August.

TIGRIOIDES ACOSMA, *n. sp.*

Male, 30 mm. Forewings with vein 2 from near angle, 3 and 4 stalked, 5 absent, 8 and 9 out of 7, 11 anastomosing with 12. Hindwings with 4 and 5 absent, 6 and 7 stalked, 8 from middle of cell.

Head and thorax orange-ochreous. Antennæ fuscous, towards base pale ochreous. Abdomen grey; lower surface and tuft orange-ochreous. Legs pale ochreous; anterior and middle tibiæ and tarsi tinged with fuscous. Forewings elongate, somewhat dilated, costa moderately arched, apex rounded, hindmargin somewhat obliquely rounded; pale ochreous, somewhat fuscous-tinged, without markings, cilia pale ochreous. Hindwings and cilia pale ochreous.

Differs from most of the genus in vein 2 of forewings arising from near angle of cell; but there is considerable variation in the genus in the place of origin of this vein. The point mentioned will prove useful in distinguishing this from *T. nana*, Walker, another unicolorous species, in which vein 2 is from middle of cell.

Johnstone River, North Queensland; one specimen in the collection of Mr. R. H. Relton.

ÆDŒA, *n. g.*

Tongue present. Antennæ in male filiform, shortly ciliated (two-thirds), with scattered longer cilia. Palpi minute. Forewings with vein 2 from two-thirds, 3 and 4 stalked, 5 absent, 3 and 9 by a common stalked out of 7, 11 separate. Hindwings with 3 and 4 stalked, 5 absent, 6 and 7 stalked, 8 from middle of cell.

Distinguished from *Tigrioides*, Butler, by the absence of anastomosis between veins 11 and 12 of forewings.

ÆDŒA MONOCHROA, *n. sp.*

Male and female, 17-18 mm. Head, antennæ, and thorax yellow-ochreous. Abdomen ochreous-whitish; tuft yellow-ochreous. Legs pale fuscous; posterior tibiæ and tarsi pale ochreous. Fore-

wings elongate, somewhat dilated, costa moderately arched, apex rounded, hindmargin somewhat obliquely rounded; uniform yellow-ochreous; cilia pale ochreous. Hindwings and cilia pale ochreous.

This species might be easily mistaken for small specimens of *Tigrioides nana*, Walker, if attention were not paid to neuration.

Brisbane; two specimens in January and April.

CALLIGENIA SAGINAEA, n. sp.

Male, 20 mm. Head pale-yellowish. Antennæ whitish. Thorax pale-yellowish, with two grey spots anteriorly, and two more on bases of patagia. Abdomen whitish. Legs ochreous-whitish; apical two-thirds of anterior and middle tibiæ fuscous. Forewings posteriorly dilated, costa moderately arched, apex rounded, hindmargin very obliquely rounded; pale-yellowish, with reticulated grey markings; base of costa grey; a median grey line from base to one-third, joined by two lines from costa at one-fourth and before middle, and two from inner-margin at one-fourth and middle; an inwardly oblique line from costa near apex to middle of inner-margin, connected with costa at two-thirds; a fine irregularly-dentate line arising with preceding to inner-margin before anal angle; a dot in disc at two-thirds; cilia yellowish. Hindwings and cilia whitish.

The type is somewhat worn.

Cairns, Queensland; one specimen taken by Mr. C. J. Wild in July. (Queensland Museum).

TERMESSA DIPLOGRAPHA, n. sp.

Female, 22 mm. Head whitish; vertex and collar yellowish. Palpi ochreous. Antennæ fuscous. Thorax ochreous-yellow, anterior-margin blackish. Abdomen (broken). Legs ochreous; anterior tibiæ and tarsi obscurely annulated with fuscous. Forewings elongate-triangular, costa gently arched, apex obtuse, hindmargin rather oblique, scarcely rounded; light ochreous-yellow, with dark-fuscous markings; a broad line from costa at one-fifth, angulated beneath costa to inner-margin at one-fourth; a second line from costa at two-fifths to beyond middle of inner-margin, slightly wavy in disc; a third line from costa at two-thirds to anal angle, somewhat dilated on costa; a fine line parallel to third from just beyond anal angle, angulated outwards in disc at three-fourths, and ceasing abruptly; disc between third and fourth lines partly suffused with fuscous; a large triangular spot on hindmargin immediately beneath apex; cilia ochreous-yellow, on hindmarginal spot and at anal angle fuscous. Hindwings light-ochreous-yellow; a broad fuscous band from costa near hindmargin, dilated in middle, narrowing to a point at anal angle; cilia pale-ochreous-yellow, with a small fuscous spot below apex.

Smaller than the other species of the genus. Distinguished from *T. gratiosa*, Walk., by the yellower forewings, with both fasciæ completely resolved into two separate lines.

Brisbane; one specimen.

EURODES, *n. g.*

Tongue well-developed. Palpi small, protected, terminal joint short, obtuse. Antennæ in male (unknown). Forewings with vein 2 from two-fifths, 3 from near angle, 4 and 5 stalked, 6 and 7 stalked, 11 connected by a bar with 12. Hindwings with 3 and 4 stalked, 5 absent, 6 and 7 stalked, 8 from near angle of cell.

Among Australian genera this appears to stand isolated. The separate condition of veins 8, 9, and 10 of forewing is noteworthy.

EURODES MICROMMATA, *n. sp.*

Female, 17 mm. Head and thorax fuscous-grey. Abdomen whitish-ochreous, legs pale ochreous. Forewings oblong, strongly dilated, costa strongly arched in basal half, thence nearly straight; apex obtuse, hindmargin straight, rounded beneath, not oblique; fuscous-grey, mixed with pale ochreous; apical two-fifths of costa ochreous; three blackish lines; first wavy from costa at one-third to inner margin at two-fifths; second from costa at three-fifths to middle of hindmargin, and continued along margin to anal angle; third from costa at four-fifths, joining second line; a minute orange spot in disc at two-thirds; cilia grey, mixed with blackish. Hindwings and cilia whitish-ochreous.

Port Darwin, North Australia; one specimen. (Coll. Lyell).

PHANEROPSEUSTIS, *Meyr.* (MSS.).

Head with projecting scales above. Tongue well developed. Antennæ of male filiform, shortly ciliated (one-half to one). Palpi short, appressed, loosely scaled; terminal joint short, obtuse. Forewings with two from three-fifths, three from four-fifths, seven and eight stalked, eight and nine stalked, ten absent, twelve giving off three short branches to costa. Hindwings six and seven long-stalked, eight from four-fifths.

Characterised especially by the curious branching of vein twelve of forewings.

PHANEROPSEUSTIS ALBIDA, *Walk.*

Nudaria albida, Walker, Brit. Mus. Cat., Suppl., 273; Lucas; Proc. Linn. Soc., N.S.W., 1893.

Male and female, 16-19 mm. Head, palpi, antennæ, thorax, and abdomen white. Legs white; anterior tibiæ and tarsi fuscous-tinged. Forewings oblong, posteriorly dilated, costa strongly arched, apex rounded, hindmargin obliquely rounded;

white, thinly-scaled; markings pale-fuscous; a blackish dot in disc before middle, and a second beyond middle; two fine interrupted lines from costa at one-fifth and before middle, ending in rather conspicuous dots on inner-margin, which are sometimes confluent; a third line from costa at two-thirds to before anal angle, sometimes obsolete; a fourth line from costa before apex to hindmargin above anal angle, also sometimes obsolete; a series of dots along hindmargin; cilia white. Hindwings and cilia white.

Brisbane; in September.

PHANEROPSEUSTIS OBDUCTA, *Luc.*

Nudaria obducta, Lucas, Proc. Linn. Soc., N.S.W., 1893.

Male, 18 mm. Head pale-fuscous; face and palpi whitish. Antennæ whitish. Thorax pale-fuscous, irrorated with whitish scales. Abdomen white. Legs white; anterior pair fuscous-tinged. Forewings oblong, not dilated, costa strongly arched at base, thence slightly, apex rounded, hindmargin obliquely rounded; whitish; irrorated with fuscous scales; all margins narrowly edged with fuscous; interrupted fuscous streaks along veins in disc, and terminations of veins on hindmargin; a dot in disc at two-thirds; an ill-defined whitish fascia at one-third; a whitish area along hindmargin, bounded anteriorly by a well-defined dentate line from costa at two-thirds obliquely outwards, then bent parallel to hindmargin, ending in inner-margin at three-fourths; indications of a fine line posterior and parallel to this; cilia pale-fuscous, apices whitish. Hindwings and cilia whitish.

Brisbane.

PSILOPEPLA, *n. g.*

Tongue present. Antennæ, basal joint clothed with long hairs, forming an anterior tuft; in male filiform, with short, fine cilia-tions (two-thirds). Palpi minute. Forewings clothed with fine hair-like scales; vein two from near middle, three from five-sixths, five absent, eight and nine out of seven, ten running into nine, eleven anastomosing with twelve. Hindwings six and seven long-stalked, eight from two-fifths.

A peculiar genus, but probably allied to *Phaneropseustis*, Meyr.

PSILOPEPLA MOLLIS, *Luc.*

Nudaria mollis, Lucas, Proc. Linn. Soc., N.S.W., 1893.

Male, 14 mm. Head whitish, suffused above with pale-fuscous. Antennæ whitish. Thorax whitish, suffused with pale-fuscous. Abdomen whitish. Legs whitish; anterior tibiæ pale-fuscous. Forewings strongly dilated posteriorly, costa moderately arched, apex rounded, hindmargin oblique, scarcely rounded; whitish,

thinly scaled; costal edge pale-fuscous at base, a pale fuscous dot in disc near base, and another on inner-margin near base, the whole connected by a pale-ochreous suffusion; a pale-fuscous dot on costa at one-third, connected by a pale ochreous suffusion, with a pale-fuscous line to inner-margin at one-fourth; a circular fuscous spot above middle of disc; a pale-fuscous dot on costa at two-thirds, connected by a pale-ochreous suffusion with a pale-fuscous line, which describes a strongly sigmoid curve before ending in anal angle; a very pale fuscous line towards hindmargin, darker above anal angle; cilia whitish, above anal angle fuscous. Hindwings and cilia whitish.

A delicate and prettily-marked species.

Brisbane.

SCAPHIDRIOTIS, *Meyr.* (MSS.).

Tongue well developed. Antennæ in male finely and evenly ciliated (one and a-half), with a dense tuft of scales on upper surface immediately beyond basal joint. Palpi moderate, second joint clothed with very long loose hairs, terminal joint short, obtuse. Thorax with a posterior crest. Forewings with inner-margin strongly folded over beneath; vein two from two-thirds, five absent, eight and nine out of seven. Hindwings with a dense patch of scales on upper surface; vein five absent, six and seven long-stalked, eight from one-fourth.

SCAPHIDRIOTIS XYLOGRAMMA, *Meyr.* (MSS.).

Male, 16-17 mm. Head and palpi fuscous. Antennæ whitish, brownish tinged; tuft whitish, but portion from which tuft arises fuscous. Thorax fuscous; crest whitish; apex of patagia dark-fuscous. Abdomen fuscous; tuft whitish. Legs whitish; anterior pair infuscated. Forewings very elongate-triangular, costa slightly arched, apex rounded, hindmargin obliquely rounded; whitish, thickly irrorated with brownish-fuscous scales, which form more or less distinct markings; a line from one-fourth of costa to one-third of inner-margin, sometimes obsolete; a sharply-dentate line from costa at three-fifths to before anal angle; a dark spot below middle of disc touching this line; series of dark spots along apical-third of costa and hindmargin; cilia whitish, on spots bases brownish-fuscous. Hindwings whitish-brown; with a densely scaled brownish-fuscous patch above middle; cilia whitish.

Brisbane; four specimens.

PSAPHARACIS, *n. g.*

Tongue well developed. Antennæ in male (unknown). Palpi moderate, slender, ascending; terminal joint moderate, tolerably acute. Forewings with costa very strongly arched, hindmargin

excavated; vein two from five-sixths, eight and nine out of seven. Hindwings with three and four stalked, five absent, six and seven stalked, eight from one-third.

PSAPHARACIS TOXOPHORA, n. sp.

Female, 19 mm. Head pale-fuscous. Palpi dark-fuscous. Antennæ brown-whitish. Thorax brown-whitish. Abdomen grey. Legs ochreous-whitish; anterior pair fuscous. Forewings trapezoidal, strongly dilated beyond middle, costa at first straight, very strongly arched beyond middle and crested on convexity, apex acute, hindmargin excavated beneath apex, hence obliquely rounded; brown whitish, paler towards hindmargin; an ill-defined whitish streak along costa to two-thirds; dark-fuscous dots on costa at one-fifth, beyond two-fifths, three-fifths, and four others in apical third; from second costal dot an indistinct, very slender, much angulated, transverse line to inner-margin at two-fifths; from third dot a very slender line parallel to costa, abruptly bent beneath costa at five-sixths, and continued much angulated to before anal angle, where it forms a conspicuous dark-fuscous spot; a transversely oval whitish spot above middle of disc at three-fifths; cilia brown-whitish, mixed with dark-fuscous. Hindwings and cilia grey.

Brisbane; one specimen taken by Mr. F. P. Dodd.

SOROCOSTIA CERRAUNIAS, n. sp.

Male, 15 mm. Head whitish. Palpi (2), white irrorated with grey. Antennæ grey. Thorax whitish-grey. Abdomen grey. Legs fuscous; posterior pair whitish. Forewings elongate, posteriorly dilated, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; whitish-grey, sparsely scattered with blackish scales; first and second tufts blackish anteriorly; a narrow blackish line, outwardly curved, from costa at one-fourth to inner-margin at one-fourth; a second similar line, somewhat angulated, inwardly oblique, from costa at three-fourths to inner-margin at three-fourths; cilia grey. Hindwings and cilia whitish.

In Meyrick's table falls with *S. paroxynta*, Meyr., from which it is distinguished by the shorter palpi, blackish tufts on forewings, and other points. Examples of this and the two following species were submitted to Mr. Meyrick, who pronounced them new.

Sydney; two specimens in February.

SOROCOSTIA DESMOTES, n. sp.

Male and female, 12-15 mm. Head, thorax, and antennæ pale-brownish, or whitish, irrorated with brownish scales. Palpi (2), fuscous-brown. Abdomen whitish-grey. Legs fuscous,

irrorated with whitish. Forewings elongate-triangular, costa slightly arched, apex round-pointed, hindmargin scarcely rounded, rather strongly oblique; whitish, irrorated with pale-brownish and dark-fuscous scales; three suffused fuscous spots on costa at base, one-third, and middle; from the second of these proceeds an angulated, suffused line to inner-margin at one-third; a slightly sigmoid line of dark-fuscous dots from costa at three-fourths to before anal angle; cilia brownish, with a whitish basal line. Hindwings and cilia whitish-grey.

In Meyrick's table falls with *S. parallacta*, Meyr., from which it is distinguished by the much shorter palpi, brownish coloration, and dark-fuscous spots on costa.

Brisbane; in September, and again in January and February, rather common, but seldom taken in good condition.

SOROCOSTIA MICROPHILA, *n. sp.*

Female, 11-13 mm. Head and thorax white, irrorated with blackish scales. Antennæ white, annulated with blackish. Palpi one and a half, dark-fuscous. Abdomen grey. Legs dark-fuscous, irrorated with white. Forewings elongate, posteriorly dilated, costa slightly arched, apex round-pointed, hindmargin very obliquely rounded; white, faintly ochreous-tinged, irrorated with blackish scales; tufts posteriorly white, anteriorly mixed with fuscous; anterior line very inwardly oblique, from costa at one-fourth to inner-margin at one-fifth; posterior line obsolete on costa, though otherwise conspicuous, from beneath costa at two-thirds, strongly angulated outwards, then inwardly oblique to inner-margin beyond middle; a blackish dot in disc before apex; and a series of black dots along hindmargin; cilia grey, irrorated with blackish, tips whitish. Hindwings and cilia grey.

In Meyrick's table falls with *S. epicentra*, Meyr., from which it may be distinguished by its much smaller size and different form of transverse lines.

Brisbane; three specimens.

URABA LEUCOSPILA, *n. sp.*

Male, 16 mm.; female, 22 mm. Head white. Palpi fuscous. Antennæ whitish. Thorax white; with some fuscous scales. Abdomen grey. Legs fuscous, mixed with whitish. Forewings triangular, costa moderately arched, apex obtuse, hindmargin almost straight, rather oblique; fuscous (in female pale-fuscous), with some scattered white scales; a triangular white blotch on inner-margin from base to beyond middle, not reaching above middle of disc; two fine fuscous lines, much angulated, first from costa at two-fifths to inner-margin forming outer edge of white blotch, second from costa at three-fifths to inner-margin before

anal angle ; first line edged anteriorly with white ; second edged posteriorly with white, rather broadly in costal portion ; space between two lines suffused with brassy-metallic scales, and with dark-fuscous forming an indistinct median streak ; three or four minute white dots on apical two-fifths of costa ; from the second of these a very fine wavy white line proceeds to anal angle ; cilia pale-fuscous. Hindwings and cilia dark-grey ; paler in female.

Closely allied to *Uraba metallopa*, Meyr., from which it may be distinguished by the absence of basal costal metallic spot, by the sharply-defined white blotch, which does not extend to costa, and by the more angulated transverse lines. The male is much smaller and darker than the female.

Brisbane ; two specimens.

SARROTHRIPA POLYCYMA, *n. sp.*

Male and female, 17-22 mm. Head and palpi dark-fuscous, irrorated with white scales. Antennæ fuscous, basal joint irrorated with white. Thorax white, irrorated with dark-fuscous. Abdomen grey. Legs white, irrorated with dark-fuscous. Forewings elongate-oblong, posteriorly dilated, costa slightly arched, apex rounded, hindmargin obliquely rounded ; white, thickly irrorated with grey ; with six slender, much angulated, blackish transverse lines ; first and second parallel, from costa about one-fifth, becoming lost in disc ; third and fourth parallel, from costa about two-fifths, to inner-margin about middle ; fifth and sixth parallel, describing a sigmoid curve, from costa at four-fifths to inner-margin before anal angle ; one or two blackish dots on costa before apex ; two indistinct whitish lines parallel to hindmargin ; a blackish line, tending to be interrupted, along hindmargin ; cilia grey, mixed with white scales. Hindwings white ; at apex and along hindmargin dark-grey ; cilia white, basal half grey at apex.

Distinguished from *S. ecophila*, Meyr., by the absence of greenish scales, the white hindwings, and other details.

Brisbane ; four specimens from January to April.

THRYPTICODES, *Meyr.* (MSS).

Tongue well-developed. Antennæ in male with very short ciliations (one-eighth), and a small tuft of hairs on upper surface near base (absent in female). Palpi rather long (two), with appressed scales, ascending ; terminal joint long, obtuse. Thorax crested posteriorly. Anterior tibiæ densely tufted with long hairs beneath, especially in male. Forewings with vein two from two-thirds, eight and nine out of seven by a common stalk, ten out of seven. Hindwings in male with a pencil of long hairs

arising from upper aspect of costa (absent in female); three, four, and five from a common stalk, eight from middle.

Allied to *Sarrothripa*, Curt.

THRYPTICODES XYLOGLYPTA, *Meyr.*

Thrypticodes xyloglypta, (*Meyr.*, MSS.), Lucas, Proc. Linn. Soc., N.S.W., 1889.

The markings of forewings are variable, usually darker in the female.

Brisbane; in December, January, and February.

MOSODA HEMICHROA, *n. sp.*

Female, 20 mm. Head and thorax fuscous, irrorated with whitish. Palpi and antennæ fuscous. Abdomen ochreous; tuft dark-fuscous. Legs fuscous; posterior tibiæ ochreous-whitish. Forewings elongate-triangular, costa slightly arched, apex rounded, hindmargin obliquely rounded; fuscous thickly irrorated with whitish scales—the absence of these gives rise to the following markings:—An indistinct transverse line near base, a wavy transverse line from costa at one-third to inner-margin before middle, a third wavy line from costa at two-thirds obliquely outwards, then sharply bent in disc parallel to hindmargin, then bent again inwards to before anal angle; a faint circular spot with paler centre between two of these lines above middle of disc; cilia whitish, basal two-thirds barred with fuscous. Hindwings pale-orange-ochreous; a faint fuscous line parallel to hindmargin at three-fourths; a fuscous spot at apex; cilia pale-ochreous, bases fuscous, except towards anal angle.

Gisborne, Victoria; two specimens taken in November, received from Mr. G. Lyell.

SCAEODORA PLACOCHRYSA, *n. sp.*

Male, 15 mm. Head golden-yellow. Palpi dark-fuscous. Antennæ ochreous-fuscous, in male somewhat serrate. Thorax dark-fuscous; anterior margin and a posterior spot golden-yellow. Abdomen blackish; base and tuft golden-yellow. Legs golden-yellow; anterior and middle tibiæ broadly fuscous at apex. Forewings elongate, posteriorly dilated, costa nearly straight, except posterior one-fourth, which is moderately arched; apex rounded, hindmargin obliquely rounded; dark-fuscous, markings golden-yellow; a very broad transverse fascia near base; a large triangular spot on costa beyond middle, nearly meeting a similar spot on inner-margin beyond middle; a small spot on hindmargin above anal angle; cilia yellow, at anal angle, and middle of hindmargin mixed with fuscous. Hindwings dark-fuscous; basal half golden-yellow; cilia dark-fuscous.

Cairns, Queensland; one specimen taken by Mr. C. J. Wild in January. (Queensland Museum)

GONIOSEMA, *n. g.*

Tongue well developed. Antennæ in male bipectinated. Palpi moderate, loosely scaled, somewhat ascending; terminal joint moderate, pointed. Forewings with two from four-fifths, three and four stalked, five absent, eight and nine out of seven, ten absent. Hindwings with three and four stalked, six and seven stalked, eight from middle.

A development of *Chiriphe*, differing in the pectinated antennæ and absence of vein five of forewings.

GONIOSEMA ANGULISCRIPTA, *Luc.*

Chiriphe anguliscrpta, Lucas, Proc. Linn. Soc., N.S.W., 1889.

THALLARCHA RHABDOPHORA, *n. sp.*

Male, 17 mm. Head, thorax, and antennæ blackish-fuscous. Abdomen dark-fuscous; tuft and inferior surface golden-yellow. Legs dark-fuscous. Forewings golden-yellow; base dark-fuscous; a broad longitudinal dark-fuscous bar from base to hindmargin, where it joins a broad dark-fuscous band along hindmargin; cilia dark-fuscous. Hindwings golden-yellow; with a broad dark-fuscous hindmarginal band.

An exceptionally distinct species.

New South Wales (?); one specimen. (Coll. Lyell).

THALLARCHA LEPTOGRAPHA, *n. sp.*

Male, 15-16 mm. Head white; face fuscous. Palpi whitish; apical joint fuscous. Antennæ grey; basal joints white. Thorax dark-fuscous; collar, apex of patagia, and a posterior spot white. Abdomen whitish-grey. Legs whitish; anterior pair infuscated. Forewings elongate, posteriorly dilated, costa slightly arched, more strongly at base and apex, apex obtuse, hindmargin obliquely rounded; whitish, markings fuscous; base of costa dark-fuscous; a fine interrupted line, sharply angulated outwards in disc, from costa at one-fourth to inner-margin at one-fourth; two fine parallel wavy lines from costa before middle to inner-margin beyond middle; traces of a fourth parallel line posterior to these; a fifth line from costa at three-fourths to before anal angle; a triangular spot on costa before apex; an incomplete sixth line, and some suffusion along hindmargin; cilia whitish, mixed with fuscous. Hindwings and cilia whitish-grey.

Brisbane; two specimens.

COMARCHIS COSMIA, *n. sp.*

Female, 18 mm. Head ochreous-yellow. Palpi dark-fuscous. Antennæ ochreous-whitish. Thorax blackish-fuscous; collar, an anterior spot, and apex of patagia ochreous-yellow. Abdomen dark-fuscous; three apical segments pale-ochreous. Legs ochreous-

yellow; anterior pair infuscated. Forewings elongate, costa moderately arched, apex obtuse, hindmargin oblique, slightly rounded; ochreous-yellow, markings dark-fuscous; a broad oblique fascia from costa at two-fifths to inner-margin beyond middle, tolerably straight and even-margined, somewhat narrowing towards inner-margin; a second fascia from costa at three-fourths to anal angle, narrow on costa, broadening in disc, interrupted above anal angle; a large irregular blotch on costa before apex, its lower angle touching hindmargin; cilia ochreous-yellow, fuscous where subapical blotch reaches margin. Hindwing ochreous-yellow; a well-defined oval dark-fuscous spot in disc at two-thirds; two large suffused-fuscous spots on hindmargin at apex and before anal angle; cilia ochreous-yellow, on spots fuscous.

Brisbane; one specimen at light in October.

COMARCHIS CHIONEA, *n. sp.*

Female, 20 mm. Head snow-white. Palpi blackish. Antennæ, basal joint white, then blackish, apical three-fourths grey. Thorax blackish; collar, a large anterior spot, a small posterior spot, and apex of patagia snow-white. Abdomen ochreous-yellow. Legs fuscous; posterior pair ochreous-yellow. Forewings elongate, scarcely dilated, costa slightly arched, apex rounded, hindmargin obliquely rounded; snow-white, markings dark-fuscous; base of costa blackish; a broad transverse fascia from costa before middle to inner-margin beyond middle, bifurcating below to enclose a white spot on inner-margin, posterior limit of this fascia is paler-fuscous; a dot on costa at three-fourths, tending to be connected with a large spot in disc, containing a few white scales, and connected by a fine line with anal angle; a large spot on costa before apex, confluent with upper portion of discal spot, connected by a line, parallel to that just mentioned, with anal angle; an oblong spot on hindmargin beneath apex; and a few scattered blackish scales on hindmargin; cilia pale-ochreous, on markings dark-fuscous, at apex white. Hindwings ochreous-yellow; a faint fuscous dot in disc (better marked on under surface), a small fuscous spot at apex; cilia ochreous-yellow, beneath apex fuscous.

Sydney; one specimen taken in February on the fence of the Botanical Gardens during a gale.

COMARCHIS MOCHLINA, *n. sp.*

Male, 17 mm. Head and antennæ ochreous-whitish. Palpi ochreous-fuscous. Thorax ochreous-whitish, with a fuscous band across middle. Abdomen whitish-ochreous. Legs whitish-ochreous; anterior pair infuscated. Forewings elongate, posteriorly

dilated, costa slightly arched, more strongly towards apex, apex round-pointed, hindmargin obliquely-rounded; whitish, markings dark fuscous; a broad transverse fascia from costa at two-fifths to inner-margin beyond middle, broadest on costa, narrowing towards inner-margin; a second broad, slightly wavy fascia from costa at four-fifths to anal angle; an elongated spot along upper fourth of hindmargin reaching to apex; cilia whitish, below apex and above anal angle fuscous. Hindwings whitish, with an apical fuscous spot; cilia whitish, beneath apex fuscous.

Brisbane; one specimen taken at light in April by Mr. C. J. Wild. (Queensland Museum.)

ERRATA

‡In my former paper in vol. XXII. of these Transactions.

Pp. 200, 201, for *Hyponomenta* read *Hyponomeuta*; for *paurocentera* read *paurocentra*.

P. 202, for *Simæthis* read *Simæthis*.

P. 203, for *Chorentis* read *Chorentis*.

P. 207, for *beliodora* read *heliadora*.

P. 211, for *coniætia* read *coniortia*.



FURTHER NOTES ON AUSTRALIAN COLEOPTERA,
WITH DESCRIPTIONS OF NEW GENERA AND
SPECIES.

By the Rev. T. BLACKBURN, B.A.

[Read May 2, 1899.]

XXV.

STAPHYLINIDÆ.

PÆDERUS.

The following two new species belong to the same section of the genus as *australis*, Guér., differing from *Simsoni*, Blackb., *Meyricki*, Blackb., and *sparsus*, Fauv., by their well developed parallel elytra, and from *cruenticollis*, Germ., by their subfiliform and comparatively slender antennæ. They all differ from *australis inter alia* in not having in combination black legs and testaceous mandibles; from *Adelaidæ*, Blackb., by much smaller size, apical ventral segments black, &c. As there are now, including these two, nine known species of *Pæderus* from Australia it is perhaps desirable that a statement of their distinctive characters should be given in tabular form as follows:

- A. Apterous species, with the elytra very narrow at the base; eyes very small.
- B. Elytra closely punctulate.
- C. Prothorax with strongly rounded sides,—almost subglobular *Meyricki*, Blackb.
- CC. Prothorax much more elongate in form, its sides not much rounded *Simsoni*, Blackb.
- BB. Elytra sparsely punctulate *sparsus*, Fauv.
- AA. Winged species; elytra normal* (if otherwise,—the eyes not particularly small).
- B. Hind body entirely rufo-testaceous *Adelaidæ*, Blackb.
- BB. Hind body with some or all of the segments of dark colour (piceous or black).
- C. Antennæ long, robust, and apically dilated *cruenticollis*, Germ.
- CC. Antennæ notably more filiform and slender.
- D. Mandibles testaceous.
- E. Legs black *australis*, Guér.
- EE. Femora (except at apex) testaceous *tweedensis*, Blackb.
- DD. Mandibles black.
- E. Apical part of antennæ dark *angulicollis*, Macl.
- EE. Apical part of antennæ testaceous *Koebeli*, Blackb.

P. tweedensis, sp. nov. Alatus; testaceus, capite (mandibulis palpisque testaceis exceptis) et segmentis ventralibus

* This provision is inserted on account of a statement of M. Fauvel that he has seen abnormal specimens of *P. cruenticollis*, Germ., which are apterous.

apicalibus 2 piceis vel nigris, elytris cœruleis, antennis (basi excepta) pedibusque (femorum parte basali excepta) plus minusve infuscatis; antennis modice elongatis, gracilibus, apicem versus vix incrassatis; oculis sat magnis (fere ut *P. australis*, Guér.); capite minus brevi minus lato; prothorace subovato, postice modice angustato, lateribus vix arcuatis, utrinque subtiliter parce punctulato; elytris quam prothorax sublongioribus, sat fortiter sat crebre (nullo modo confluentur) punctulatis; abdomine sat fortiter marginato, leviter minus crebre punctulato. Long., 3 l.

N.S. Wales; Tweed R. district (given to me by the late Mr. Olliff).

P. Koebelei, sp. nov. Alatus, fere ut præcedens (*P. tweedensis*) coloratus, sed mandibulis palpisque nigris, antennarum articulis apicalibus 2 pallide testaceis, femorum (basi summa excepta) infuscatis; antennis modice elongatis sat gracilibus; oculis parvis; capite modico, postice fortiter angustato; prothorace angusto quam latiori manifeste longiori, utrinque parce minus subtiliter punctulato, lateribus leviter arcuatis; elytris quam prothorax nullo modo longioribus, crebre sat grosse punctulatis; abdomine sat fortiter marginato, sparsim subfortiter punctulato. Long., $2\frac{1}{2}$ l.

The most conspicuous character of this species is the colouring of its antennæ which have their basal three joints testaceous, the fourth testaceous at the base only, joints five to nine nearly black; joints ten and eleven very pale whitish testaceous.

N. Queensland (given to me by Mr. Koebele).

P. tenuicornis, Fauv. There seems to be very little doubt that this is identical with *P. angulicollis*, Macl., of which I have examples from Mr. Lea compared with the type. Both species are attributed to Gayndah in Queensland, and the specimens Mr. Lea sent agree very well with the description of Fauvel's insect. Sir W. Macleay's is the older name.

P. cruenticollis, Germ. I have some specimens from W. Australia sent to me by Mr. Lea which I take to be the apterous form of this species referred to by M. Fauvel (Ann. Mus. Gen., 1878, p. 516). They differ from all the other apterous Australian *Pæderi* known to me *inter alia* by their larger eyes.

PHALACRIDÆ.

I have recently received for determination a minute beetle (appertaining to this family) which was taken by Mr. Mitchell, the Overseer of the Queensland Acclimatizing Society, and which that gentleman believes to prey upon the Pink Scale (*Ceroplastes rubra*). I am not acquainted with the life history of any *Phalacrid*, and therefore abstain from expressing an opinion as

to the probability of the beetle being parasitic on the scale beyond saying that I have never myself observed any such habit in the *Phalacridæ*. M. Lacordaire (Gen Col.) stated that he knew nothing of the life history of the family, and I do not find any reference to the subject in any of those I have seen of the (comparatively recent) works of M. Guillebeau on these beetles. I therefore leave the matter to those who devote their attention to the life history of the *Coleoptera*.

The species in question is an undescribed one and belongs to (or at any rate is near) M. Guillebeau's genus *Parasemus*, which I cannot ascertain to have been diagnosed except so far as its characters are indicated in a tabulation of certain genera of *Phalacridæ* (Ann. Soc. Ent. Fr., 1894, pp. 280 and 281): and unfortunately the value of the tabulation is diminished by its containing a line "2a" without any corresponding "2b." In a former paper on the *Phalacridæ* (Tr. R.S., S.A., 1895, pp. 205, &c.) I mentioned the difficulty of identifying *Parasemus*, but referred to that genus provisionally certain Australian *Phalacridæ* whose structure shows them to be at least nearly allied to it. The insect described below is certainly congeneric with (at least some of) them and therefore I place it provisionally in *Parasemus*.

PARASEMUS ?

P. Mitchelli, sp. nov. Sat late ovalis; nitidus; nigro-piceus (exemplis nonnullis pallidioribus), præsertim versus latera, antennis pedibus et corpore subtus plus minusve brunneo-testaceis; corpore supra ferè lævi; antennarum clava 3-articulata; scutello sat parvo; elytrorum stria subsuturali postice sat fortiter impressa; femoribus posticis sat fortiter, tibiis minus fortiter (ambobus quam *P. victoriensis*, Blackb. multo minus fortiter) compressis; tarsis posticis quam anteriores 4 modice longioribus, articulo basali quam 2^{as} breviori; coxis intermediis inter se sat remotis; mesosterno vix perspicuo; clypeo prope oculos manifeste emarginato, antice rotundato; prosterno pone coxas anticæ haud producto. Long. $\frac{3}{5}$ l.; lat. $\frac{2}{5}$ l.

The very small size of this insect together with the absence of discal rows of elytral punctures renders it easy to recognise. It is near *P. obsoletus*, Blackb., structurally. The second joint of the hind tarsi is longer than the first, but not so much as twice its length. All the tarsi are comparatively short and stout, those of the hind legs being decidedly but not very much longer than the rest. In my tabulation of the species I attribute provisionally to *Parasemus* (Tr. R.S., S.A., 1895, p. 214), *P. (?) Mitchelli* will follow *discoideus*, Blackb., thus—

EEE. Elytra without discal rows of punctures. *Mitchelli*, Blackb. Queensland.

LAMELLICORNES.

BOLBOCERAS.

B. Terræ-reginæ, sp. nov. Ferrugineum vel picescens; sat nitidum; subtus hirsutum; capite antice crebre subtilius granulatum, inter oculos rugulose magis grosse, postice sparsissime sat fortiter, punctulato; prothorace crebrius perspicue sat æqualiter subtiliter punctulato, puncturis grossis (his in parte media et in maris parte declivi sparsis vel fere carentibus) creberrime fere confluentem intermixtis; scutello sparsim vel obsoletius punctulato; elytris striatis, striis punctulatis (his et puncturis postice obsoletis), interstitiis sat planis; tibiis anticis extus fortiter 7-dentatis.

Maris clypeo (ut *B. proboscidei*, Schreibers) longe ultra mandibulis productis, parte producta antrorsum sinuatim gradatim angustata et ad basin lamina (hac valde elevata superne bifida) armata; prothorace antice abrupte declivi, spatio ante declivitatem sat lato planato subsemicirculari.

Feminae clypeo haud producto antice fortiter rotundato, ad basin lamina (hac leviter elevata superne bifida) armato; prothorace antice anguste minus abrupte declivi, ante declivitatem spatio plano angusto. Long., 9—10 l.; lat., 5—5½ l.

This species is distinguished from the other described Australian species of *Bolboceras* except *proboscideum*, Schreibers, by the clypeus being produced like a rostrum far beyond the part where on the underside the mandibles are inserted. It differs from *proboscideum* in the elytral interstices being evidently flatter, and the punctulate striae of the elytra becoming much more notably obsolete near the apex. The male differs from that of *proboscideum inter alia* in the produced part of the clypeus being not in the least downward directed at the apex and in the erect lamina at the base of the clypeus being about equal in height to the length of the clypeus in front of it,—so that looked at from the side the head (in front of the eyes) appears as a quadrate rostrum about equal in length and height with its front face deeply and roundly emarginate. This same part from the same point of view also bears a considerable resemblance in outline to the head of a fish with its mouth widely open. The prothorax of the male differs from that of *proboscideum* in there being in front of the vertical declivity a nitid almost lævigata space whose plane is at a right angle to the plane of the declivity and which is marked off from the declivity by a very strong furrow; while the corresponding part in *proboscideum* is very much more punctured, is itself notably declivous (though less strongly so than the part immediately behind it) and is not separated from the part behind it by a defined furrow.

The female of this insect is very close to that of *proboscideum*, differing however in the very much more obsolete sculpture of the hind part of its elytra, in the more strongly rounded front margin of its clypeus and in its prothorax having a flat nitid space (similar to, but very much smaller than, that of the male) in front of the anterior declivity.

B. proboscideum is so extremely variable an insect that it is just possible that the present species is an extreme local variety of it, but in a long series of the former I do not find a single specimen presenting any of the characters mentioned above as distinctive of *B. Terræ-reginæ*.

Queensland; given to me by Mr. Koebele; also from Mr. Lea (Brisbane).

ANODONTONYX.

A. planiceps, Blackb. I am informed by Mr. Jüng of Yorke's Peninsula that the larva of this species is extremely injurious to wheat in his neighbourhood, eating the roots and so killing the plants.

ISODON.

I. nasutus, Blackb. I have recently examined several female specimens (from W. Australia) of an *Isodon* in the collection of Mr. Jüng which I have no doubt appertain to this species. They differ from the (male) type in the prothoracic excavation being reduced to a very small area (immediately behind the front margin of the segment) which is declivous and flattened rather than distinctly concave; in the seriate (and confused lateral) punctures of the elytra being more defined,—though very much feebler than in any other W. Australian *Isodon* known to me; and in the pygidium being much more gibbous, with its puncturation much closer so as to render the surface somewhat opaque. I should have no hesitation in identifying this insect with *I. levigatus*, Burm., were it not for Burmeister's statement that in that species the clypeus is not produced in front (ohne vorsprung); whereas in *I. nasutus* the clypeus is particularly strongly produced in front. I have, however, seen so many specimens from W. Australia of this genus without finding one to agree with Burmeister's description of *levigatus* that I am suspicious of a mistake in the description,—the clypeus having possibly been broken in the type.

I. curtus, Burm. At the time when I tabulated the species of *Isodon* (Tr.R.S., S.A., 1896, p. 237) I had not seen this one, but have since received it from several collectors. It would stand in my tabulation (*loc. cit.*) beside *I. Australasiæ*, Hope, from which it differs *inter alia* by its clypeus much narrower in front, its prothorax and pygidium very much more finely punctulate, its head with a transverse carina in place of a tubercle, and its much smaller size. The elytral sculpture does not differ much.

I. laticollis, Burm. This is another species that I had not seen when I tabulated *Isodon* (*loc. cit.*). I have since received an example from W. Australia which differs from *I. curtus* as *I. laticollis* is said to do; its clypeus is a trifle less narrowed in front, its prothorax evidently more massive and less narrowed anteriorly and its elytra are more regularly punctured and striate than those of an average *curtus*; nevertheless I hesitate to regard it as more than a variety of *curtus*, inasmuch as the differences are all of them comparatively slight and pertain to characters (the prothoracic development of the male and the linear arrangement of the elytral sculpture) in which the *Dynastides* are frequently inconstant; in respect of the latter character *I. curtus* is certainly variable, as also in size.

ANOPLONGNATHUS.

A. Macleayi, Blackb. I have recently received from Mr. Jüng examples of this species which enable me to improve my description (P. L. S., N.S.W., 1891, p. 495) as it is clear that the type was either a colour var. or (more probably) a specimen that had been discoloured in some artificial manner. Fresh specimens are of a uniform pale opalescent testaceous colour both above and beneath, except the legs which have a greenish gloss in certain lights, and the abdomen and pygidium which are coppery but edged (and more or less suffused) with metallic green.

ORYCTES.

O. Barbarossa, Fab. I have lately received from Mr. Price Maurice a remarkably fine and large example of this species taken by Mr. Maurice during one of his explorations in Northern Australia. The specimen is accompanied by two larvæ which are said to be (and evidently are) the larvæ of *O. Barbarossa*. As there does not appear to be any published description of the latter the following record of characters will be of interest: Long. $3\frac{1}{2}$ inches; of the usual *Lamellicorn* type (*i.e.*, with three pairs of legs placed on the anterior three segments, and the apical segments greatly dilated); colour piceous; each dorsal segment thickly studded with granules bearing each a short stiff bristle and also thinly set with long fine hairs (the granules and long hairs however becoming very sparse on the dilated apical four segments, but becoming close again on the apical part of the last segment); ventral segments (except the apical and hind part of the penultimate) devoid of setiferous granules but thinly clothed with long fine hairs. Head comparatively small, closely and very rugulose punctulate; mandibles tridentate, very powerful, transversely strigose beneath; the anterior seven dorsal segments with very strong transverse sulci.

BUPRESTIDÆ.

DIADOXUS.

D. Jüingi, sp. nov. Parvus; postice sat dilatatus; supra niger, capite (basi excepta) viridi, prothoracis lateribus et disco (his longitudinaliter) et elytrorum maculis discoidalibus quaternis vittaque laterali antica testaceo-viribus; subtus pedibusque [abdominis segmentis 2° ad apicem 3°-5° que totis (maculis quaternis flavis exceptis) rufis, tarsisque picescentibus, exceptis] viridibus; capite rugulose punctulato; prothorace leviter transverso, sparsius punctulato; elytris leviter striatis, striis punctulatis, interstitiis planis, apice acuminato; segmento ventrali apicali ad latera angulata (parte intermedia late leviter emarginata) vel ad latera vix angulata (parte intermedia subbisinuata); antennis nigris. Long., $3\frac{1}{5}$ - $3\frac{3}{5}$ l.; lat., $1\frac{1}{5}$ - $1\frac{2}{5}$ l.

In colour and markings this species does not differ much from *D. erythrurus*, White, but it presents several structural distinctions which certainly appear to be specific. It is very much smaller and considerably less narrow in proportion to its length, and its prothorax is shorter being by measurement distinctly wider than long. I was at first disposed to think it the male of *D. erythrurus* and the latter the female, but on careful examination I am satisfied that I have before me both sexes of both species. In *erythrurus* the apical ventral segment is trispinose in both sexes, the middle spine in the male (?), however, being reduced to little more than a strong angulation of the outline; while in the present insect the apical ventral segment is angular at its lateral margins (with the intermediate space feebly emarginate in outline) in one sex, and scarcely angular laterally (with the intermediate space feebly bisinuate) in the other sex. Mr. Jüing informs me that the present insect and *D. erythrurus* feed on different plants.

S.A., taken by Mr. Jüing on Yorke's Peninsula.

CLERIDÆ.

NATALIS.

So many alterations have taken place in the genus *Natalis* since my former paper on it was published (Tr. Roy. Soc. S.A., 1890) that it seems now desirable to furnish an amended tabulation of the species,—more particularly as the numerous specimens of the genus that I have examined have led me to the conclusion that some of the characters made use of in the former tabulation were not well chosen. In the following notes some remarks on those characters will be found as well as on the original descriptions of some of the species. It unfortunately is

not possible for me to place *N. Blackburni*, Waterh., in the following tabulation, as I have not seen any insect that I can identify with it and the description does not happen to mention the characters that I rely upon for purposes of tabulation. The species of *Natalis* are for the most part closely allied *inter se*, and unfortunately I cannot find any external sexual character sufficiently conspicuous and uniform to enable the sex of a specimen to be certainly determined at a glance. The most workable distinction of the sexes that I have been able to find consists in the hind tarsi in one sex (no doubt the male) being notably longer and more slender than in the other sex; the same sex moreover usually has a longer and narrower prothorax, the eyes a trifle less widely separated and (in most species) some peculiarity of sculpture in the ventral segments. There is also in the same sex a tendency to a lengthening of the third joint of the antennæ.

I may add that in 1893 M. Kuwert described a *Natalis* from N. Australia under the name *N. alternicostatus*. I have not seen the description, but should judge from the name that it is extremely unlikely to be any of the new species described in this paper.

The following tabulation contains, I believe, the names of all the described species of *Natalis* except *Blackburni*, Waterh., and *alternicostatus*, Kuwert.

- *A. Disc of prothorax not closely and evenly punctulate.
- B. Size about 18 l. (elytra rounded at apex) ... *Titana*, Thoms.
- BB. Species not at the same time of great size and with elytra rounded at apex.
- C. Elytra mucronate at apex *spinicornis*, Blackb.
- CC. Elytra rounded at apex.
- D. All the elytral interstices evenly convex throughout *integra*, Blackb.
- DD. The elytral interstices not all conspicuously and evenly convex.
- E. The intermediate tibiæ straight or nearly so.
- F. Joints 9 and 10 of the antennæ quite strongly transverse *semicostata*, Blackb.
- FF. Joint 10 feebly, joint 9 not, transverse *lata*, Waterh.
- EE. The intermediate tibiæ quite strongly arched.
- F. Length of prothoracic sulcus not greater than distance from its apex to apex of prothorax.
- G. Elytra with numerous fascicles of short whitish hairs *Leai*, Blackb.
- GG. Elytra not variegated with whitish fascicles *lugubris*, Blackb.

* In *N. longicollis* the sculpture of the prothorax is intermediate between A and AA.

- FF. Length of prothoracic sulcus evidently greater than distance from its apex to apex of prothorax.
- G. Discal depression of prothorax punctured much less closely than in the following species ... *levicollis*, Blackb.
- GG. Discal depression of prothorax less sparingly punctulate.
- H. Elytral alternate interstices all conspicuously costate except close to base ... *hirta*, Blackb.
- HH. Alternate elytral interstices (or at least some of them) not costate.
- I. Ventral segments closely punctured,—in males sexual sculpture begins on second ventral segment, the apical strongly arcuately emarginate ... *fasciata*, Blackb.
- II. Ventral segments not as in *fasciata*.
- J. Ventral segments very sparsely punctulate ... *planipennis*, Blackb.
- JJ. Ventral segments less sparsely punctulate,—in male sexual sculpture begins on third ventral segment ... *longicollis*, Blackb.
- AA. Disc of prothorax closely and evenly punctulate *porcata*, Fab.

N. integra, sp. nov. Sat angusta; sat elongata; minus nitida; pilis sat brevibus recurvis et aliis elongatis erectis vestita; nigra, antennis tarsisque rufescentibus; antennis sat gracilibus modice elongatis, articulis 3°—6° gradatim brevioribus, 6°—8° inter se fere æqualibus, 9°—10° que inter se fere æqualibus vix transversis, 11° quam latiori manifeste longiori; capite crebre subrugulose punctulato; prothorace quam latiori vix longiori, in disco antice sparsim subtiliter (postice,—parte mediana angusta excepta,—sat fortiter sat crebre) punctulato, ad latera ruguloso, sulco mediano longitudinali sat brevi (quam prothorax circiter triplo breviori) antice posticeque penitus carenti impresso, ad basin quam ad marginem anticum paullo angustiori, ante medium subconstricto, pone medium utrinque sat fortiter rotundato-dilatato; elytris cancellato-punctulatis, puncturis postice magnitudine decrescentibus, interstitiis omnibus æqualiter a basi ad apicem anguste carinatis; tibiis anticis leviter, intermediis vix, arcuatis; femoribus posticis longissimis; metasterno crebrius sat fortiter, abdomine minus perspicue, punctulatis; tarsis posticis elongatis gracilibus.

Maris abdomine fere lævi, vel potius sparsissime punctulato, segmento 5° ad apicem truncato. Long., 6 l.; lat., 1 $\frac{3}{8}$ l.

This species is notable for its deep black colour and the uniform sculpture of its elytra which consists of rows of quadrate impressions (the impressions becoming gradually and continuously smaller from base to apex) the interstices between which are narrow, regular, and equal *inter se*. The type is evidently a male. I have a second specimen taken near Adelaide which is, no doubt, a female; it is much larger than the type (long., 9 l. but unfortunately its abdomen has been broken off.

S.W. Australia (Eucla).

N. semicostata, Blackb. All the observed specimens of this insect are, doubtless, males,—assuming that I am right in regarding as a male character the presence of spaces on the ventral segments conspicuous by their very close puncturation.

N. Leai, sp. nov. Minus angusta; minus elongata; minus nitida; pilis erectis brunneis et aliis albis (his in elytris seriatim fasciculatis) vestita; picea, elytris rufescentibus vel potius indeterminate rufo-marmoratis; antennis sat brevibus, modice robustis; capite vermiculato - inæquali sparsim punctulato; prothorace in disco lævi, ad latera rugulose punctulato, sulco longitudinali profundo mediano impresso, quam latiori vix longiori; elytris seriatim punctulatis, puncturis antice magnis foveiformibus retrorsum gradatim decrescentibus, interstitiis 5° 7° que plus minusve carinatis; tibiis anterioribus 4 arcuatis; abdomine fere lævi; tarsis (? maris solum) sat elongatis sat gracilibus. Long., 6 l.; lat., 2 l. (vix).

Quite incapable of confusion with any other species on account of the small fascicles of short white hair with which the elytra are ornamented. Both the specimens before me (I take them to be two males) are somewhat rubbed so that I hesitate to state very confidently the exact disposition of the fascicles, but as far as I can make out they run in about four longitudinal rows,—about 9 or 10 fascicles in each row, and are very conspicuous.

This species must bear much general resemblance to *Opilo floccosus*, Schenkling, but as Herr Schenkling expressly states in describing that insect that it has the securiform maxillary palpi and bifid tarsal lamellæ of an *Opilo*, there can of course be no more than an accidental likeness.

N.S. Wales; taken by Mr. Lea in the Richmond R. district.

N. lugubris, Blackb. I have recently seen examples (males) of this species from N.W. Australia.

N. lævicollis, sp. nov. Sublata; minus elongata; minus convexa; nitida; nigro-picea, antennis tarsisque rufescentibus, elytris pone medium indeterminate vix manifeste rufo fasciatis; antennis sat elongatis minus robustis, articulis

3° 4° que inter se sat æqualibus ad apicem subclavatis, 5°—8° subcylindricis (5° 4° longitudine æquali, 6°—8° paullo brevioribus), 9° quam latiori vix longiori, 10° sat fortiter transverso, 11° quam 9^{as} vix longiori; capite crebre subtilissime punctulato, puncturis paullo majoribus sparsissime intermixtis; prothorace quam longiori vix latiori, subtilissime sat crebre punctulato (in disco puncturis minus subtilibus sparsissime intermixtis), ad latera sat grosse ruguloso, sulco longitudinali mediano (antice abbreviato) impresso, ad basin quam ad marginem anticum paullo angustiori, ante medium subconstricto, pone medium utrinque sat fortiter rotundato-dilatato; elytris grosse cancellato-punctulatis, puncturis postice magnitudine decrescentibus, interstitiis antice sat elevatis (alternis ante medium planescentibus); tibiis anterioribus 4 fortiter arcuatis; abdomine æqualiter confertim subtilissime (vix distincte) punctulato, puncturis majoribus sparsissime intermixtis; tarsis posticis sat brevibus. Long., 9 l.; lat., $2\frac{1}{3}$ l.

A darkly coloured nitid and smooth-looking species, of somewhat robust appearance. Its most conspicuous distinctive character consists in the very nitid disc of its prothorax, which is very much less punctured than in most of its congeners. The type is a female. It is allied to *lugubris* I think more closely than any other *Natalis* known to me, from which it may be at once distinguished (apart from characters that are possibly sexual) *inter alia* by the considerably longer discal sulcus of its prothorax. The possibility of its being the female of *lugubris* is at once set aside by the fact that its prothorax is very evidently longer and narrower than the prothorax of the male of that species. Its strongly curved intermediate tibiæ seem to forbid it being regarded as the female of *N. lata*, Waterh., as the curvature of those tibiæ is certainly not a female character in any species of which I know both sexes. *N. Mastersi*, Macl., is so slightly described that it is difficult to be sure whether it is that insect or not. Sir W. Macleay merely mentions some differences between his *Mastersi* and *porcata*. If he referred to *porcata* of either Fab. or Spinola this species cannot be *Mastersi*, as it is of evidently less (not more, as Sir W. Macleay calls his *Mastersi*) elongate form than either sex of either of those species.

Queensland.

N. planipennis, sp. nov. (= *porcata*, Spinola nec Fab.) In Ann. Mag. of N.H. (6) XIII., Mr. C. O. Waterhouse furnished the interesting information that the type of *N. porcata*, Fab., is not the same species that Spinola called *porcata*, Fab., but in his (Mr. W.'s) opinion is likely to be identical with what Spinola called *N. cribricollis*. All authors subsequent to Spinola, I

believe (including myself), have followed him. Mr. Waterhouse passes on to express the opinion that *N. porcata*, Spin. = "N. Marstersii, Casteln." (which I take to be an erroneous rendering of the name *Mastersii*, Macl.), but this I think very doubtful, inasmuch as the Tasmanian species that seems fairly certainly to be Spinola's *porcata* has never occurred to me in (or found a place in any collection I have seen from) any locality North of Victoria, and Macleay's insect was taken at Gayndah in Queensland. The description of *Mastersii* is quite insufficient for identification unless one had a specimen from Gayndah to compare with it.

In Trans. Roy. Soc. S.A., 1890, p. 125, I described a species as *N. fasciata*, from Southern Australia, which is really very close to the Tasmanian one that Spinola called *porcata*, and distinguished it especially by three characters,—the form of the prothorax, the carination of the elytral interstices, and the puncturation of the ventral segments. Since I described *N. fasciata* I have had the opportunity of examining a considerable number of *Natales* from all parts of Australia and have found that the prothoracic distinctions referred to are not very reliable inasmuch as the males of *Natalis* seem always to have their prothorax more elongate than the females, with its posterior dilatation more conspicuous. Nor is the carination of the elytra an altogether satisfactory character, for although in a series of examples of *fasciata* the alternate interstices are evidently more distinct from the other interstices than they are in the Tasmanian insect, yet undoubtedly there is a certain variability in the degree of their prominence in both species. But the very wide difference in the puncturation of the ventral segments furnishes a perfectly satisfactory distinction between *fasciata* and the Tasmanian insect, and I notice another character (indicated in the Latin diagnosis of my description but not sufficiently emphasised) in the evidently longer and more slender hind femora of the latter.

In the male of *N. fasciata* the middle part of the second and third ventral segments bears close asperate fine puncturation (among which a good many evidently larger punctures are intermingled) and the fifth ventral segment is widely and roundly emarginate at the apex; while in the same sex of *porcata*, Spin. (for which I propose the name *planipennis*), both the finer and less fine punctures are much less close than in *fasciata* and are evenly distributed over the segments, the fifth of which is truncate at the apex.

In the female of both these species the puncturation is evenly distributed over the ventral segments, but in *planipennis* the less fine punctures are evidently less numerous than in *fasciata*; and in both the fifth ventral segment is widely obtuse at its apex.

N. longicollis, Blackb. The puncturation of the disc of the prothorax in this species (especially in the female) is notably closer and stronger than in any other *Natalis* known to me except *porcata*, Fab. (in which, however, it is still *more* closely punctured). In fact I have some hesitation as to whether in the tabulation it ought not to be placed with *porcata* rather than with the species having the disc less closely punctured. It seems to be somewhat intermediate. In the male the close sexual puncturation begins on the third ventral segment.

N. inconspicua, Blackb. I am afraid this name must drop, as the insect on which it was founded is certainly, I think, only a variety of *porcata*, Fab., with the prothoracic puncturation abnormally feeble. I have seen several specimens from Tasmania apparently taken in company with typical *porcata* presenting the same peculiarity. In my former tabulation I distinguished *inconspicua* from *porcata*, Fab. (which is called by its synonym "*eribicollis*, Spin."), by its being clothed with long erect hairs, but this is not a satisfactory distinction, as these hairs are very easily rubbed off, and, as a fact, they are present in fresh specimens of *porcata*, although the specimen of that insect before me at the time I wrote my former paper on *Natalis* was without them.

LYMEXYLONIDÆ.

LYMEXYLON.

L. Adelaidæ, sp. nov. Piceum, capite prothoraceque rufescentibus, pedibus sordide testaceis; capite brevi, confertim subtilius punctulato; prothorace quam latiori ut $\bar{\sigma}$ ad 4 longiori, antice vix angustato, profunde canaliculato, crebre subtiliter (quam *L. australis*, Er., minus crebre minus subtiliter) punctulato, lateribus leviter arcuatis, angulis posticis sat rectis; elytris confertim subtilissime punctulatis, lineis 4 subelevatis instructis; abdomine nitido subtiliter minus crebre (quam *L. australis*, Er., multo minus crebre) punctulato. Long., 6 l.; lat., $1\frac{1}{2}$ l.

The principal differences between this species and *L. australe*, Er., are referred to above, this species being larger, more strongly and less closely punctulate, with the prothoracic channel much stronger, and the shape of the prothorax different. In *L. australe* the sides of that segment (viewed from above) are very straight (even tending to be slightly *incurved* in front of the middle), while in *L. Adelaidæ* the sides form a continuous gentle curve from base to apex. The difference in puncturation is quite noticeable on all parts except the elytra, on which however, the slightly elevated lines are evidently better defined in *L. Adelaidæ*, and are four in number, there being no trace of more than three on any example that I have seen of *L. australe*.

Compared with the European *L. navale*, Linn., the present species is very differently coloured, with more serrate antennæ, evidently stronger puncturation throughout, a much more elongate prothorax, which is strongly canaliculate, &c. I may say that I am confident in my identification of *L. australe*, Er., as I took my specimens in Erickson's locality, and they agree perfectly with the description.

Adelaide district; in the S.A. Museum (taken by Mr. Jennings).

TENEBRIONIDÆ.

HELÆUS.

The number of species of *Helæus* known to inhabit Australia is now large, and the descriptions are very scattered. In 1887 Sir W. Macleay published in the Proc. L.S., N.S.W., a synopsis of the species then known, but he did not attempt to place their distinctive characters in tabular form further than by dividing them into four groups based upon the nature of the elytral sculpture. I have recently been studying the *Helæi* appertaining to the first of Sir W. Macleay's groups, and believe that I have before me all (except perhaps one doubtfully distinct species) described up to the present time. As they are closely allied *inter se* and some of them are very insufficiently described it will be well to furnish a tabulation of them. I take the opportunity to describe two new species and to furnish some notes on several of the older ones.

Sir W. Macleay's "first group" of *Helæus* is distinguished from the other groups by its species having elytra devoid of pilosity and not furnished with either tubercles or continuous costæ. As some of the species have numerous *granules* on the elytra it may perhaps appear that the distinction between those and "tubercles" is rather fine; as a fact, however, the difference between the granules and tubercles in respect of size is extremely strong, and there are other distinctions between the group containing species with granulated elytra and that whose species have tuberculate elytra which render them very easy to distinguish. Of the former group the smallest specimen I have seen is long, 10 l. (most of the species are much larger still); of the latter the largest size attributed to any species is long, $7\frac{1}{2}$ l. Also, in the former group the projecting front processes of the prothorax (with the exception of one very large species somewhat intermediate between the first group and the group having costæ on the elytra) are extremely broad and blunt, while in the latter group these processes are very much narrower.

Several of the *Helæi* of Sir W. Macleay's "first group" are insufficiently described by their original authors. One of these (*H. princeps*, Hope) has been redescribed by Sir W. Macleay,

but it is doubtful whether he had the true insect before him. I shall therefore call this species "*H. princeps*, Macl. (? Hope)." I have before me a specimen named by Sir W. Macleay "*H. intermedius*, De Brême," which is very likely to be correctly identified, but as there is a doubt I shall call it "*H. intermedius*, Macl. (? De Brême)." Through the kindness of Mr. Lea I have been able to examine a specimen ticketed "C.A. (Mitchell's Exped.)" which is no doubt one of those mentioned by Sir W. Macleay (*loc. cit.*) as being in his opinion *H. colossus*, De Brême. I am inclined to agree with that opinion (although the specimen is very much smaller than *colossus* should be,—long, 12 l., instead of 16 l.) but shall call the species "*H. colossus*, Macl. (? De Brême)." I have examples before me from Central Australia which agree very well with the description (mentioning very conspicuous and unusual characters) of *H. interioris*, Macl. (Darling R.), but as the localities are very far apart and different in character I think the determination sufficiently uncertain to require me to call the insect "*H. interioris*, Macl.?" Of *H. pallidus*, Macl., I have an example named by its author. *H. Browni*, Kirby, I do not know, but the description given by De Brême (that of Kirby is quite useless for identification) is so remarkably identical with the description of *intermedius* as to suggest the idea of the two being a large and a small example of one species. The other species I have named and described myself.

The following is a tabulated statement of the characters of the species. A few lines of explanation however seem to be required in respect of a character that I have adopted for distinguishing the main divisions. If a *Helæus* of this "first group" of Sir W. Macleay be looked at from the side the nature of the extreme margin of the prothorax will be seen to vary much according to the species. It assumes three forms,—First, that of an erect edging, its plane perpendicular or nearly so to the plane of the flanks of the prosternum, and separated from the flanks of the prosternum by a distinct carina-like rib; second, a form differing from that just described only in the absence of the carina-like rib, but having the line of contact between the two planes perfectly well-defined; third, a form in which the erect edging is exchanged for a mere bending upward of the flanks of the prosternum, so that there is no line of demarcation indicating the meeting of two planes. In a long series of *Helæi* examined by me I have not found a single specimen that suggests any doubt of the validity of the above characters. The extreme edge of the elytra is in most species similar to that of the prothorax in structure, except that where the prothoracic marginal edging is of what I have called the third form, that of the elytra is of one of the other forms.

- A. Lateral and front face of prothorax with an abruptly erect edging like that of the elytra.
- B. The prothoracic edging opaque, strongly defined both above and below, rarely convex, and usually rugulose.
- C. The prothoracic edging not (or scarcely) narrower than that of the elytra.
- D. Elytra with distinct rows of granules.
- E. Intervals between rows of elytral granules devoid (or nearly so) of granules.
- F. Sutural carina of elytra not (when viewed from the side) straight and parallel with the margin of the elytra
- G. A strongly elevated longitudinal carina on prothorax in front of the basal tubercle on the elytra *princeps*, Macl. [(? Hope).
- GG. No longitudinal carina on disc of prothorax *aridus*, Blackb.
- FF. Sutural carina of elytra (viewed from the side) parallel with the edge of the lateral margin and straight in the middle (about half) part of its length *lubricus*, Blackb.
- EE. The intervals between rows of elytral granules bearing many similar granules *interioris*, Macl. ?
- DD. Elytra not having distinct rows of granules *ingens*, Blackb.
- CC. The prothoracic edging much narrower than that of the elytra.
- D. Elytra with well-defined rows of granules *debilis*, Blackb.
- DD. Elytra not having defined rows of granules [(? De Brême). *colossus*, Macl.
- BB. The prothoracic edging nitid, smooth, rarely strongly defined below, and usually convex.
- C. The prothoracic edging defined below by a carina-like rib (as in *princeps*, *aridus*, &c.) *intermedius*, Macl. (? De Brême).
- CC. The prothoracic edging not defined below.
- D. Disc of elytra with numerous small obtuse granules.
- E. Elytra at their widest close to base ... *scaphiformis*, Blackb.
- EE. Elytra at their widest very far behind base *modicus*, Blackb.
- DD. Disc of elytra not granulose but with exceptionally close and conspicuous puncturation *pallidus*, Macl.
- AA. Lateral and front face of prothorax not having an abruptly erect edging like that of the elytra.
- B. The overlapping front processes of prothorax normally wide.
- C. The elytral puncturation extremely fine, — scarcely distinct *subseriatus*, Blackb.
- CC. Elytral puncturation very distinct (about as much so as in *pallidus*, Macl.) *elongatus*, Blackb.
- BB. The overlapping front processes of prothorax very narrow *brevicostatus*, Blackb.

H. princeps, Hope. Notes on this species will be found below under the heading *H. subseriatus*, sp. nov.

H. princeps, Macl. (? Hope). This species bears considerable resemblance to *H. modicus*, Blackb. It differs by the much better defined, and seriate, discal granules of its elytra; by the presence of a longitudinal strongly elevated carina on its prothorax in front of the basal tubercle; by the basal tubercle being much stouter and less spine-like; by the erect edging of its prothorax being externally opaque, rugulose, and limited below by a carina-like rib, &c.

H. aridus, Blackb. In this species the erect edging of the prothorax is very rugulose and distinctly limited below by a carina-like rib.

H. lubricus, Blackb. The erect edging of the prothorax is opaque but scarcely rugulose, limited below by a very well defined rib.

H. interioris, Macl. ? The erect edging is less opaque than in the preceding and very asperately punctulate, limited below by a distinct rib which however is not sharply cariniform.

H. ingens, Blackb. The erect edging is entirely opaque and non-rugulose, not limited below by a defined rib.

H. debilis, Blackb. The prothoracic erect edging resembles that of *H. lubricus*.

H. colossus, Macl. (? De Brême). Prothoracic edging resembles that of *H. lubricus*.

H. intermedius, Macl. (? De Brême). This is the only species known to me (of those in Sir W. Macleay's "first group" having an abruptly erect prothoracic edging which is subnitid, lævigata and convex) in which the edging is limited below by a defined carina-like rib. The insect when immature is of a very pale brown colour.

H. scaphiformis, sp. nov. Ovalis, postice angustatus; minus latus; sat nitidus; sat glaber; picco-niger, partibus lateralibus antennis pedibusque nonnihil rufescentibus; antennis sat elongatis; prothorace (in disco) postice tuberculo conico armato, ad latera crebre subtilissime granulato, externe (a latere viso) cum elytris margine reflexo ad perpendiculum directo (hoc in prothorace et in elytris æqualiter lato, nitido fere lævi, convexo, subtus haud carina determinato) instructo, processibus anticis perlatis, angulis posticis subacutis retrorsum directis; elytris in disco crebre subtilissime (vix distincte) punctulatis et granulis parvis obtusis confuse dispositis sat crebre ornatis, sutura carinata, parte laterali valde reflexa, crebre distincte punctulata et puncturis majoribus nonnullis prope discum impressa. Long., 14—15 l.; lat., 8—8½ l.

A species of peculiar form, being narrower than any other *Helæus* of this group known to me and narrowed hindward almost from the base of the elytra, with the apex in some specimens (probably males) almost acuminate. The lateral parts of the elytra are so strongly turned up that if a specimen be looked at from the side it will be seen that the sutural carina rises very little (or not at all) above the lateral margins, and is, in fact, invisible or nearly so. In the general character of its sculpture it is nearest I think to *H. intermedius*, but its elytra are much more closely granulate than those of that species, and the granules have much less tendency (in fact, none at all) to fall into rows. The prothorax, too, though not narrow in comparison with the elytra is,—like the elytra,—narrower than in the allied species and therefore is less transverse. I have seen only two examples of this insect,—one from Murray Bridge in the S.A. Museum,—one in my own collection (of doubtful locality). This species is certainly not *H. Browni*, I think, as the latter is described “broadly ovate.”

S. Australia.

H. modicus, sp. nov. Sat late ovatus; modice nitidis; sat glaber; piceo-niger, pedibus antennisque plus minusve rufescentibus; prothorace (in disco) postice tuberculo sat acuto armato, ad latera crebre subtiliter (minus vel vix distincte) granulato, externe (a latere viso) cum elytris margine reflexo ad perpendicularum directo (hoc in prothorace et in elytris sat æqualiter lato, nitido, fere lævi, convexo, subtus haud carina determinato) instructo, processubus anticis perlatis, angulis posticis sat acutis retrorsum directis; elytris in disco minus subtiliter sat sparsim punctulatis et granulis parvis obtusis sparsim subseriatim ornatis, sutura carinata, parte laterali sat fortiter reflexa, crebre (plus minusve distincte) granulata et puncturis sat magnis prope discum sparsius impressa. Long., 12 l.; lat., 8 l.

Rather close to *H. intermedius*, Macl. (? De Brême), but less nitid, with the lateral portions of the elytra more strongly upturned (though much less strongly than in *H. scaphiformis*) the erect edging of the prothorax not limited below by a carina, the disc of the elytra punctured very evidently less finely, and the sub-basal depression of the elytra (which is very strong in *intermedius*) scarcely defined. The distinct discal puncturation of the elytra forbids my regarding this species as possibly *Browni*, Kirby, one of the few characters mentioned by Kirby being “elytra haud punctata.”

S. Australia.

H. pallidus, Macl. Fully matured specimens are of dark colour, so that the name seems applicable only to immature examples.

H. elongatus, Blackb. Since I described this species I have seen two more specimens (one of them a dwarf, long., 10 l.), and I find the tendency of the discal elytral punctures to run in strips between unpunctured intervals less marked than in the type. The species, however, is very easily recognised by the characters attributed to it above in the tabulation.

H. subseriatus, sp. nov. Ovatus; modice latus; nitidus; sat glaber; testaceo-brunneus, in disco parum obscurior, prothoracis elytrorumque marginibus omnibus anguste nigricantibus; antennis sat elongatis; prothorace in disco postice tuberculo conico et ante tuberculum carina brevi longitudinali armato, subtilissime (puncturis nonnullis paulo majoribus intermixtis) punctulatis, parte laterali modice reflexo confertim subtiliter granulosa, basi sinuata, angulis posticis minus acutis, margine haud ad perpendicularum directo; elytris in disco sparsim subtiliter confuse punctulatis et 7-seriatim granulis distinctis instructis (granulis in disci margine externo quam cetera sat majoribus), seriei subsuturalis parte antica circiter tertia vel quarta leviter carinata, parte laterali ut prothoracis granulata et discum versus granulis nonnullis majoribus instructa, sutura sat fortiter carinata, disco fortiter convexo. Long., 15—15½ l.; lat., 9 $\frac{2}{5}$ —9 $\frac{3}{5}$ l.

The characters of this species that appear to me to be of specific value are,—the comparatively light colouring with all the margins of prothorax and elytra narrowly blackish (this is certainly not the result of immaturity); the sculpture of the expanded lateral portions of the prothorax and elytra (not punctulate, though apparently so to a casual glance, but under a strong lens) consisting of fine and close granulation; the disc of the prothorax with a well defined short longitudinal carina in front of the basal tubercle or horn; the absence of carinae (except the sutural one, and a short subsutural one forming the anterior part of the first row of granules) on the disc of the elytra; the presence of seven fairly regular rows of granules on the disc of the elytra, the interstices being finely, sparsely, and confusedly punctulate, and the absence of an erect edging on the lateral margins of the prothorax. *H. princeps*, Hope, is not intelligibly described and might be anything; the disc of its elytra is said to bear “sex punctatae lineae elevatae” and to be sparsely impressed with “puncta atra elevata,” whatever that may mean; moreover the description of its colouring does not at all agree with the present species,—which, however, is as likely as any other known to me to be *H. princeps*. If “puncta elevata” are granules the present species may be definitely asserted to be distinct from *princeps* as the disc of the elytra

bears no granules except those in the series and a very small number placed more or less out of line with them, and the granules are emphatically not black. Among its allies with rows of granules, *H. subseriatus* is distinguished by the presence of a short longitudinal strongly elevated carina on the prothorax in front of the basal horn from all except *princeps*, Macl. (? Hope) and *elongatus*, Blackb.

W. Australia.

H. brevicostatus, Blackb. This species must be regarded as connecting Sir W. Macleay's "first group" with his "third group," resembling the latter in the comparative narrowness of the overlapping front processes of its prothorax and in the rudimentary subsutural costæ of its elytra being a little more defined and elongated than in the other species of the first group though extremely different from the well-defined subsutural costæ of the third group. It agrees with the first group in the space between the subsutural quasi-costæ not being flattened.

CHALCOPHTERUS.

C. puer, sp. nov. *C. difficilis*, Blackb., affinis; oculis inter se magis approximatis (interspatio quam antennarum articuli basalis longitudo subangustiori); prothorace magis crebre punctulato, margine laterali (a latere viso) multo minus fortiter arcuato; elytrorum puncturis seriatis postice obsolete, interstitiis subtilissime punctulatis; metasterno et episternis minus subtiliter punctulatis; tarsorum posteriorum articulo basali quam ceteri conjuncti haud breviori; cetera ut *C. difficilis*, Blackb. Long., 6 l.; lat., 3 l.

It seems hardly necessary to repeat the numerous characters common to this species and *C. difficilis* (which are elaborated in Pr. L.S., N.S.W., 1892, pp. 426-7); the description of *C. difficilis* may be read as applying to *C. puer* in all respects except those specified above. It should, however, be remembered that where *C. difficilis* is compared with *C. cupripennis*, the insect referred to under the latter name is *cupripennis*, Germ. and Blessig, which has been shown (P. L.S., N.S.W., 1893, p. 70) not to be identical with *C. cupripennis*, Hope, but to be *C. affinis*, Blessig. [= *C. (Amarygnus) Howitti*, Pasc.]

In my tabulation of the species of *Chalcopterus* (P. L.S., N.S.W., 1893, pp. 56, &c.) *C. puer* would fall on p. 59 besides *C. vigilans*, Blackb., and *proximus*, Blackb., though not much resembling them, between which the seriate punctures of its elytra are somewhat intermediate; it, however, differs from both *inter alia* in the very evidently wider interval between its eyes, and its considerably more nitid elytra.

Central Australia.

C. vividus, Blackb. I regret to find that owing to a clerical error the description of this species contradicts one of the characters assigned to it by its place in the tabulation, viz., the black colour of the tarsal vestiture. The vestiture is black (as indicated in the tabulation), although in describing the species I wrote (by some slip of the pen that I cannot account for) "tarsis subtus *fulvo*-setosis." Of course it should have been "tarsis subtus *nigro*-setosis."

C. versicolor, Blackb. In a recent re-examination of my "Revision of the Australian *Amarygmides*" I have come to the conclusion that this species is not well placed in the tabulation. If the tabulation in question be referred to (P. L.S., N.S.W., 1893, pp. 56, &c.) it will be seen that *versicolor* is placed among the species indicated under the letter "E" (on p. 56) as having "the prothorax of normal form and sculpture," but it would really be more at home among those indicated under EE (on p. 61) as having the "base of the prothorax not more than half again as wide as the front, front angles prominent and acute," although the front angles of its prothorax are not so decidedly acute as in some others of that aggregate. It would then fall (under GG.) along with *vividus*, Blackb., which might be thus tabulated farther.

- H. Prothorax strongly transverse ; its width being
to its length as $1\frac{3}{4}$ to 1 *versicolor*, Blackb.
HH. Prothorax notably less transverse... .. *vividus*, Blackb.

As there is a certain approximation in the form of the prothorax between some species which in my tabulation (P. L.S., N.S.W., 1893, pp. 56, &c.) of *Chalcopteri* I placed in the aggregate E (on p. 56), and some which I placed in the aggregate EE (on p. 61); it seems desirable here to state that in those cases the prothorax should be looked at from the side, when it will be found that in the members of the aggregate EE the convexity of the prothorax will appear evidently less than in the species of the other aggregate and the lateral margins straight—the lateral margins in the aggregate E from a similar point of view appearing distinctly arched

C. oblongus, Blackb. This is another species which in a re-examination of my "Revision of the Australian *Amarygmides*" I think might have been placed more satisfactorily than I placed it. It is one of a very small number of species which are more or less intermediate between the two main groups into which I divided the genus *Chalcopterus*, having feeble (but not well marked) ocular sulci. I placed it in the group having ocular sulci, but it would be better placed in the other group. In fact its ocular sulci scarcely differ from those of *C. difficilis* (which I classified among those with the ocular sulci wanting, but with

a note that it has traces of the sulci). Placed among the species not having ocular sulci, *C. oblongus* will take its place beside *C. placidus*, Blackb., from which it differs *inter alia multa* in having the seriate punctures of the elytra (as in *confluens*, Blackb.) almost lost among the interstitial punctures, and the elytra marked with longitudinal zones of various metallic colours.

C. Iris, sp. nov. Oblongus, sat parallelus (forma fere ut *C. longuli*, Blackb. vel *Leai*, Blackb. sed magis depressa), sat nitidus; niger, elytris purpureo—et viridi—et aureo—versicoloribus, tarsis subtus fulvo-setosis; capite æqualiter distincte sat crebre punctulato; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis; sulcis ocularibus nullis; antennis ut *C. longipennis*, Hope; prothorace quam longiori (et postice quam antice) ut $1\frac{2}{3}$ ad 1 latiori, crebre distincte punctulato, antice modice vix sinuatim emarginato, a basi antrorsum (superne viso) ad medium leviter (antice arcuatim sat fortiter) angustato, basi media sublobata, angulis anticis fere rectis; elytris crebre minus subtiliter punctulatis, haud striatis, inter puncturas confusas puncturis quam ceteræ paullo majoribus (fere ut *C. confluentis*, Blackb.) impressis; prosterno medio sulcato; metasterno sat distincte punctulato et oblique rugato, episternis minus nitidis obsolete punctulatis; abdomine antice distincte crebre (postice obsolete) punctulato et longitudinaliter rugato; femoribus anticis subtilius punctulatis; tarsorum posticorum articulo basali quam ceteri conjuncti paullo breviori. Long., $7\frac{1}{5}$ l.; lat., $3\frac{3}{5}$ l.

A very distinct species. In my tabulation of the species of *Chalcopterus* (P. L.S., N.S.W., 1893, pp. 56, &c.), there would be a doubt whether it should be placed under E (on p. 62) having the prothorax normal or under EE (on p. 65) having the prothorax nearly parallel-sided in the hinder half. If placed under E it would stand beside *velutinus*, Macl. (on p. 63),—with which, however, it is not at all closely allied,—and might be thus distinguished from it:

- | | | |
|--|--------|--------------------------|
| O. Seriate puncturation of elytra quite distinct | ... | <i>velutinus</i> , Macl. |
| OO. Seriate puncturation of elytra scarcely distinct | ... | |
| from the interstitial | ... .. | <i>Iris</i> , Blackb. |

If placed under EE, *C. Iris* would stand beside *C. imperialis*, Blackb., as not having the elytral interstices “very finely” punctured (though they are punctured more finely than in *imperialis*), and would be distinguishable from *imperialis* as follows:—

- | | | |
|--|--------|-----------------------------|
| I. Seriate puncturation of elytra very distinct | ... | <i>imperialis</i> , Blackb. |
| II. Seriate puncturation of elytra scarcely distinct | ... | |
| from the interstitial | ... .. | <i>Iris</i> , Blackb. |

The species to which this one appears to me most nearly allied is *C. Leai*, Blackb. (regarding the position of which in the genus some remarks will be found, applying also to this insect, in P. L.S., N.S.W., 1893, p. 80), but the exigencies of classification remove it from the neighbourhood of that species in my tabulation on account of its eyes being less widely separated from each other.

Queensland; sent to me by Mr. French.

C. Cræsus, sp. nov. *C. Mercurio*, Blackb., affinis; oculis inter se minus (vix magis quam antennarum articuli 2ⁱ longitudine) remotis; prothorace quam longiori fere duplo latiori, distincte (sed subobsolete) punctulato, antice distincte (et fortiter sinuatim) emarginato et minus angustato, elytris parum distincte striatis, striis magis subtiliter punctulatis, interstitiis parum distincte convexis; cetera ut *C. Mercurius*. Long., $6\frac{1}{2}$ l.; lat., $3\frac{1}{5}$ l.

Except in respect of the differences specified above the description of *C. Mercurius* (P. L.S., N.S.W., 1892, p. 449) applies to the present species, which in my tabulation of the species of *Chalcopterus* (*loc. cit.* 1893, pp. 56, &c.) would stand beside *Mercurius* (on page 64), and may be thus distinguished from it:—

L.	Interval between eyes considerably greater than length of 2nd antennal joint	...	...	...	...	<i>Mercurius</i> .
LL.	Interval between eyes scarcely greater than length of 2nd antennal joint	...	...	...	...	<i>Cræsus</i> .

This species is also very near *C. major*, Blackb., which has the interval between its eyes of about the same width, but differs in its notably larger size, different colour (the elytra being much less conspicuously tinged with purple) and different elytral sculpture, the punctulate striæ being effaced near the base, while in *Cræsus* the punctulate striæ are continuous quite close to the base.

N.W. Australia (given to me, I believe, by Mr. J. J. Walker).

C. major, Blackb. Since I described this species (P. L.S., N.S.W., 1892, p. 449), I have seen some more specimens, and am now satisfied that the type, which I mentioned as probably a male is in reality a female. The male is somewhat smaller (the smallest I have seen is long. $7\frac{3}{4}$ l.) with the apical ventral segment more strongly punctured than in the female and with its surface even, while in the female there is a well marked longitudinal concavity.

C. proditor, sp. nov. *C. majori*, Blackb., affinis; colore in elytris viridis nonnihil purpureo-micans; oculis inter se manifeste magis remotis; elytrorum interstitiis perspicue magis convexis apicem versus fere subcostatis; cetera ut *C. major*. Long., 8— $9\frac{1}{2}$ l.; lat., 4— $5\frac{1}{5}$ l.

Apart from the characters mentioned above, the description of *C. major* (P. L.S., N.S.W., 1892, p. 449) applies to this species. In my tabulation of the species of *Chalcopterus* (*loc. cit.*, 1893, pp. 56, &c.) *C. proditor* would stand beside *C. major*. The colour of the elytra is difficult to describe,—it may be called “green with a tendency to look blue in certain lights.”

N. W. Australia (Mr. French, &c.).

C. gracilicornis, sp. nov. *C. majori*, Blackb., affinis; capite prothoraceque nigris, elytrorum sutura aureo-micanti; oculis quam antennarum articuli basalis longitudine fere magis inter se remotis; antennis gracillimis, articulo 3° quam 1^{us} 2^{us} que conjuncti multo longiori, articulis 8—11 quam mox præcedentes multo brevioribus; elytris multo magis subtiliter seriatim, interstitiis paullo magis crebre magis distincte punctulatis; abdomine magis perspicue punctulatis; cetera ut *C. major*. Long., 9 l.; lat., 4 $\frac{3}{5}$ l.

Apart from the characters mentioned above, the description of *C. major* (P. L.S., N.S.W., 1892, p. 449) applies to this species. In my tabulation of the species of *Chalcopterus* (*loc. cit.*) *C. gracilicornis* would stand beside *C. major*. The interval between its eyes is perhaps a trifle wide for that aggregate, but is notably narrower than in the aggregate containing *Leai*, *similis*, &c.

As the above descriptions add to *Chalcopterus* several species closely allied to *major* and *Mercurius*, it seems desirable to furnish a new tabulation of distinctive characters for the species that now stand under “J prothorax notably less nitid than the elytra.” (P. L.S., N.S.W., 1893, p. 64),—as follows:—

- K. Width of interval between the eyes scarcely, if at all, greater than length of second antennal joint.
- L. Size large (7 $\frac{3}{4}$ —9 $\frac{1}{2}$ l.). Elytral striæ effaced near base *major*, Blackb.
- LL. Size much smaller (about 6 $\frac{1}{2}$ l.) Elytral striæ almost reaching actual basal line of elytra *Cræsus*, Blackb.
- KK. Width of interval between the eyes notably greater than length of second antennal joint
- L. Antennæ of average robustness.
- M. Size large (8—9 $\frac{1}{2}$ l.) Elytra for the most part green, scarcely tinged with purple *proditor*, Blackb.
- MM. Size much smaller (about 7 l.) Inner half of elytra entirely bright purple *Mercurius*, Blackb.
- LL. Antennæ very exceptionally slender *gracilicornis*, Blackb.
- C. boops*, sp. nov. *C. oculari*, Blackb., affinis; angustus, subcylindricus; prothorace nigro, elytris suturam versus viridi-micantibus; antennis gracilibus, articulo 3° quam 1^{us} 2^{us} que conjuncti sat longiori; prothorace quam longiori ut

$1\frac{1}{3}$ ad 1 latiori, minus crebre minus fortiter punctulato prosterno medio haud carinato; corpore subtus magis subtiliter punctulato; cetera ut *C. ocularis*. Long., 6—7 l.; lat., $2\frac{2}{5}$ — $3\frac{2}{5}$ l.

Apart from the characters mentioned above, the description of *C. ocularis* (P. L.S., N.S.W., 1893, p. 79), applies to this species, which stands beside it in my tabulation of the species of *Chalcopterus* (*loc. cit.*, p. 64). It differs from all the hitherto described Australian *Chalcopteri* except *ocularis* in its (all but contiguous) eyes, and from *ocularis* by its different colouring, much more slender antennæ, less tranverse prothorax, &c.

W. Australia; sent to me by Mr. French.

C. zonatus, sp. nov. *C. Mercurio*, Blackb., affinis; coloribus in elytris magis vittatim dispositis; capite inter oculos magis perspicue punctulato; oculis magis inter se remotis; antennarum articulo 3^o minus elongato; prothorace multo magis nitido, distincte sat crebre punctulato; elytrorum striis antice et suturam versus quam in ceteris partibus multo minus fortiter punctulatis, interstitiis paullo magis perspicue punctulatis; prosterno medio haud sulcato; cetera ut *C. Mercurius*. Long., $7\frac{1}{5}$ l.; lat. 4 l.

Except in respect of the characters mentioned above the description of *C. Mercurius* (P. L.S., N.S.W., 1892, p. 450), may be read as the description of this insect. In my tabulation of the species of *Chalcopterus* (*loc. cit.*, 1893, pp. 56, &c.), the present species would stand beside *mimus*, Blackb., under JJ, and may be distinguished from it as indicated under the next species (*C. costatus*).

N. Queensland (Mr. Koebele).

C. costatus, sp. nov. Elongatus, subparallelus; modice nitidus; niger, elytris obscure cyaneis latera versus nonnihil aureomicantibus; capite sat æqualiter crebre minus subtiliter punctulato; oculis antennarum articuli basalis longitudine inter se remotis; sulcis ocularibus nullis; antennis quam corporis dimidium subbrevioribus modice robustis, apicem versus haud incrassatis, articulo 3^o quam 1^{us} 2^{us} que conjuncti vix longiori quam 4^{us} 5^{us} que conjuncti parum breviori, articulis apicalibus quam præcedentes haud brevioribus; prothorace quam longiori ut $1\frac{1}{2}$ ad 1 (postice quam antice ut $1\frac{5}{7}$ ad 1) latiori, subtiliter sat crebre punctulato, antice fere truncato, a basi antrorsum (superne viso) arcuatim angustato, basi media parum lobata, angulis (superne visis) obtusis (anticis ad apicem summum certo adspectu minute fere subdenticulatis); elytris profunde striatis, striis crenulato-punctulatis, interstitiis omnibus obtuse costiformibus vix

perspicue punctulatis; prosterno medio vix distincte carinato; corpore subtus sat obsolete punctulato; femoribus anticis antice subtiliter punctulatis; tarsis subtus fulvo-setosis, posticorum articulo basali quam apicales 2 conjuncti vix longiori. Long., 7 l.; lat., $3\frac{2}{5}$ l.

An extremely isolated species in the genus on account of its decidedly costate elytra. In a natural arrangement it would stand, I think, near *longiusculus*, Blackb., but the exigencies of classification would cause it to stand in my tabulation of the *Chalcopteri* beside *mimus*, Blackb., from which it, and the preceding species, may be thus distinguished:—

K. Interstices of elytra feebly convex.

L. Elytral striæ much more strongly punctured near apex than near base *zonatus*, Blackb.

LL. Elytral striæ evenly (or nearly so) punctured ... *mimus*, Blackb.

KK. Interstices of elytra quite strongly costate ... *costatus*, Blackb.

An example from Queensland in Mr. French's collection must, I think, be referred to this species, although it is coloured very differently, the elytra being bright blue, with the suture and all the striæ purple.

W. Australia.

C. *acutangulus*, sp. nov. Oblongo-ovalis; sat nitidus; niger, elytris aureo cupreo et viridi versicoloribus; capite crebre subtilius æqualiter punctulato; oculis quam antennarum articuli basalis longitudine paullo magis inter se remotis; sulcis ocularibus subfoveiformibus; antennis quam corporis dimidium sat brevioribus minus robustis, articulis 6—11 perspicue dilatatis inter se sat æqualibus, articulo 3^o quam 1^{us} 2^{us} que conjuncti vix longiori quam 4^{us} 5^{us} que conjuncti paullo breviori; prothorace quam longiori (et postice quam antice) fere duplo latiori, crebre subtilius fere ut caput punctulato, antice leviter emarginato, a basi antrorsum (superne viso) angustato sed parum arcuato, basi media vix lobata, angulis anticis obtusis posticis (superne visis) acutis fere dentiformibus; elytris vix striatis, seriatim subtiliter punctulatis, interstitiis planis vel vix obsolete convexis subtilius (fere ut prothorax) crebre punctulatis; prosterno medio planato; corpore subtus sparsim subtiliter punctulato, abdomine crebre rugato; femoribus anticis antice subtiliter punctulatis; tarsis fulvo-setosis, posticorum articulo basali ceteris conjunctis longitudine æquali. Long., 6—7 l.; lat., $3\frac{1}{5}$ — $3\frac{2}{5}$ l.

This species, and the next described, fall into an aggregate distinguished from all other described *Chalcopteri* by the presence of ocular sulci in combination with legs of dark colour (the tarsi having fulvous vestiture). They are both extremely distinct

from the three previously described members of the same aggregate. *C. acutangulus*, in a natural arrangement, would stand near *C. lepidus*, Blackb., which differs from it *inter alia* in its eyes being still wider apart, its tarsal vestiture black, and the hind angles of its prothorax (viewed from above) much less prominent.

Central Australia.

C. mundus, sp. nov. Elongato-ovalis, subparallelus; sat nitidus, capite prothorace que subopacis; niger, prothorace elytris que cupreo et viridi versicoloribus; capite æqualiter subtilissime punctulato; oculis antennarum articuli basalis longitudine inter se remotis; sulcis ocularibus subfoveiformibus; antennis fere ut *C. acutanguli* sed articulo 6° vix dilatatis; prothorace quam longiori (et postice quam antice) fere duplo latiori, subtiliter minus crebre punctulato, antice (superne viso) subtruncato, a basi antrorsum (superne viso) arcuatim angustato, basi media leviter lobata, angulis (superne visis) anticis obtusis posticis subacutis; elytris haud striatis, seriatim sat fortiter punctulatis (puncturis seriatim postice haud minus fortiter impressis), interstitiis planis vix perspicue punctulatis; prosterno medio antice carinato; corpore subtus vix punctulato, abdomine leviter rugato; tarsi fulvo-setosis, posticorum articulo basali ceteris conjunctis parum breviori. Long., 5 l.; lat., 2½ l.

Evidently allied to the preceding (*C. acutangulus*) but *inter alia* much smaller, with the interval between the eyes narrower, the elytral seriate punctures much larger, &c., &c. Also bears much superficial resemblance to several species which have dark tarsal vestiture or no ocular sulci. The continuance to the apex of the elytra (without enfeeblement) of the seriate punctuation is a somewhat unusual character.

This species and the preceding (*C. acutangulus*) do not fit any line to which a specific name is attached in my tabulation of *Chalcopterus* (P. L. S., N.S.W., 1893, pp. 56, &c.). They would stand under "CC" (on p. 69), but not under either "D" or "DD" (the two sub-divisions of "CC"). Their place in the tabulation will be found set forth under the heading *C. obtusus*, Pasc., below.

C. (Amarygmus) obtusus, Pasc. In my "Revision of the *Amarygmides*" I stated (P. L.S., N.S.W., 1893, p. 54) that this species was one of four *Chalcopteri* which I had been unable to identify. I have since received from Mr. Lower an example from Queensland which agrees fairly well with Mr. Pascoe's description. The discrepancies are that the colour of the elytra should be *uniformly* brownish-copper, but is tinged with green along the

suture and the hind part of the sides, that the prothorax is implied to be black whereas it is black with some coppery reflection, and that the punctures of the prothorax should be "minute" but are scarcely so fine as is indicated by that word. I think, however, that I may venture to assign a place in my tabulation to *obtusus* on the strength of this specimen, enclosing the name, however, between brackets to indicate that (as in the case of other species so marked in the tabulation) there is an element of doubt in its identification.

Its place in the tabulation should be beside *acutangulus* and *mundus* (described above) on page 69, *loc. cit.*, and the three will have to follow *levicollis*, Blessig., thus :—

DDD. Prothorax punctulate ; eyes not bordered by a carina.

E. The elytral seriate punctures comparatively large (much more so than in *Howitti*, Pasc.).

F. The elytra evidently striate (size comparatively large—71. or more) [*obtusus*, Pasc.]

FF. The elytra absolutely devoid of striation... .. *mundus*, Blackb.

FE. The elytral seriate punctures much finer *acutangulus*, Blackb.

C. (*Amarygmus*) *rufipes*, Macl. In my Revision of the *Amarygmides* I treated this species as being the only representative of the aggregate distinguished by the following characters in combination, viz., ocular sulci present, legs not of uniformly dark colour. There is every reason to believe that the names *picipes*, Macl., and *nigritarsis*, Pasc., were given to insects appertaining to this aggregate, and in my Revision I indicated the opinion that they might both be synonymous with *rufipes*, Macl. Among the numerous *Chalcopteri* that I have accumulated since the publication of my Revision I find at least three good species of this aggregate closely allied to, but distinct from, *rufipes*, and it is extremely difficult to determine whether any of them is *picipes* or *nigritarsis*. As regards *rufipes*, I possess an example from Gayndah (the original locality) sent to me by Mr. Masters (the original captor of the species), and ticketed by him "compared with type." It does not agree with Sir W. Macleay's description, inasmuch as its head, prothorax, and under surface are (not black but) blue, and its legs are not "entirely red," but have the tarsi of dark piceous colour. I consider, nevertheless, that the specimen is rightly named, and have no doubt the description is wrong, as Mr. Masters is about the most careful and reliable authority I know in the matter of identifying a species by comparison with the type specimen. One of the three species mentioned above I am disposed to think is *picipes*, Macl., the description of which is merely a statement that its elytra (not blue but) green, its legs (not red but) piceous brown, its elytra a little more largely punctured, and its form shorter and broader distinguish it from *rufipes*. The specimens I am discussing

present these characters—though the last mentioned two are only slightly marked, and in addition its head is of black colour and is very much more strongly punctured, its prothorax is black (scarcely tinged with green), and the interval between its eyes is quite evidently narrower. *C. nigratarsis* is either identical with one or other of Sir W. Macleay's species or is an insect I have not seen; for it cannot be either of the other two species before me on account of its seriate elytral punctures being described as "minute." I do not think it can be the species I take to be *picipes*, Macl., inasmuch as its head is called "nearly impunctate," but it may well be a colour var. of *rufipes* with the description (or rather with Mr. Master's type) of which it agrees very well in all respects except in its elytra being "green." I have seen several specimens of *rufipes*, and find the elytra to vary from blue towards a reddish purple tone, but have not seen any with elytra green. So *nigratarsis* remains an enigma to me. There are thus before me two species (having ocular sulci and legs not entirely dark) which are distinct from any species yet described possessing those characters, but unfortunately one of them is represented by a broken specimen unfitted to be treated as a type. I proceed to name and describe the other.

C. jucundus, sp. nov. Ovalis (modice late); sat nitidus; viridis, capite nigro, prothorace nigro viridi-micanti, femoribus tibiisque testaceo-brunneis, tarsis piceis; capite minus crebre (in clypeo crebre) subtiliter punctulato, parte mediana lævi; oculis quam antennarum articuli basalis longitudine nullo modo minus inter se remotis; sulcis ocularibus bene definitis; antennis quam corporis dimidium subbrevioribus sat robustis apicem versus vix incrassatis, articulo 3^o quam 1^{us} 2^{us} que conjuncti sat longiori quam 4^{us} 5^{us} que conjuncti sat breviori, articulis apicalibus quam præcedentes parum brevioribus; prothorace quam longiori ut $1\frac{2}{3}$ ad 1 (postice quam antice fere duplo) latiori, subtilissime vix perspicue punctulato, utrinque basin versus oblique subsulcato, antice vix emarginato, a basi antrorsum (superne viso) arcuatim angustato, basi media vix lobata, angulis (superne visis) obtusis; elytris haud striatis, seriatim punctulatis, puncturis sat magnis (fere ut *C. lævicollis*, Blessig, sed basin versus magis subtilibus et apicem versus subobsoletis), interstitiis planis lævibus; prosterno medio planato; corpore subtus fere lævi; femoribus anticis antice subtilissime punctulatis; tarsis subtus fulvo-vestitis, posticorum articulo basali quam ceteri conjuncti parum breviori. Long., 7 l.; lat., $3\frac{4}{5}$ l.

This species is easily distinguishable from the other described ones having ocular sulci and legs not uniformly of dark colour by

the much coarser puncturation of its elytral series. In my tabulation of the *Chalcopteri* (P. L.S., N.S.W., 1893, pp. 56, &c.) it stands beside *C. rufipes*, Macl., from which it differs (as stated above) by its elytral puncturation. It is possible that the oblique sulcus near the posterior angle on either side of the prothorax may be an individual peculiarity of the typical specimen.

Victoria; I have no record of the exact locality.

RHIPIDOPHORIDÆ.

EUCTENIA.

E. occidentalis, sp. nov. Mas. Obscure castanea; subnitida; breviter pubescens; capite supra prothoracem elevato, subfortiter sat crebre punctulato; oculis magnis supra et subtu subcontiguis; antennarum articulo basali modico (fere ut *E. sericeæ*, Gerst., sed minus dilatato), 2° brevi, 3° quam basalis vix breviori, 4° brevi, 5° ramum elongatum emittenti, 6° ramum etiam longiorem emittenti, 7°—11° ramos inter se æquales (sed quam 6ⁱ longiores) emittentibus; palporum maxillarium articulo apicali quam *E. sericeæ* longiori et graciliori; prothorace conico, cum elytris crebre aspere subfortiter (quam *E. sericeæ* multo magis fortiter) punctulato, basi fortiter (fere ut *E. sericeæ*) sinuata, angulis posticis acutissimis; elytris (fere ut *E. sericeæ*) lineis elevatis obsolete instructis; pedibus ut *E. sericeæ*. Long., 4½ l.; lat., 1½ l. (vix).

It is only with extreme hesitation that I refer this species to *Euctenia*. It would seem much more at home in *Pelecotomoides* were it not for the one character of its head being elevated above the level of the prothorax (as in *Euctenia*), a character to which Mm. Gerstäcker and Lacordaire seem to attribute much importance. The eyes and antennæ are altogether those of a *Pelecotomoides*. It would, perhaps, be better to found a new genus for it, but I abstain from doing so on the ground that the observation of more species may quite possibly show the elevation of the head to be of less than generic importance. In fact, I have in my collection examples (unfitted by their condition or sex for being types) of several species that seem in respect of some character or another to be intermediate between *Pelecotomoides* and *Euctenia*.

W. Australia; Coolgardie (in the S.A. Museum).

EVANIOCERA.

Below will be found descriptions of two new species appertaining to this genus, and notes on a species previously described by me. The following tabulation will show the male characters of the described species with the exception of one that was des-

cribed by Sir W. Macleay, without any detailed record of such characters, as *E. Gerstäckeri*; and one that was doubtfully referred by Mr. Champion to *E. Gerstäckeri*, Macl., likewise without a sufficiently detailed description of the antennæ to enable me to place it in the tabulation confidently. Notes on those two will be found below. It should be observed that the length of the third and fourth joints of the antennæ (mentioned in the tabulation) has reference, not to the length of the *rami* of those joints, but to the length of the basal piece of the joints (from which their *rami* are emitted).

A. Antennæ of male with nine *rami*.

B. The third joint of the antennæ much longer than fourth.

C. Eyes widely separated from each other ... *pruinosa*, Gerst.

CC. Eyes approximate *inter se* *Meyricki*, Blackb.

BB. The third and fourth joints of antennæ sub-equal *inter se* *perthensis*, Blackb.

AA. Antennæ of male with eight *rami*.

B. The third joint of the antennæ strongly transverse *nervosa*, Gerst.

BB. The third joint of the antennæ not transverse *minuta*, Blackb.

E. Meyricki, sp. nov. Mas. *Picea*, prothoracis lateribus elytris pedibusque rufescentibus, capite palpis antennisque nigris; minus nitida; confertim subtiliter punctulata; cinereo pubescens (lineatim in elytris); oculis magnis in fronte sat approximatis (interspatio quam antennarum articuli basalis longitudo haud latiori); antennarum articulis basali valde compresso subtriangulari, 2° minuto transverso, ceteris ramos elongatos singulos emittentibus, articuli 3ⁱ ramo quam ceterorum breviori et a ramo articuli 4ⁱ longe remoto; prothorace conico, basi valde bisinuata, lateribus (superne visis) vix sinuatis; elytris postice sat angustatis. Long., $2\frac{2}{5}$ l.; lat., 1 l.

Resembles *E. nervosa*, Gerst., somewhat in the disposition of the whitish pubescence on the elytra, but differs from it *inter alia* in the third joint of its antennæ emitting a long ramus, and in the much narrower interval between the eyes; from *pruinosa*, Gerst., it differs by the ramus of the third antennal joint being much longer, the eyes much more approximate, the elytra *striped* (rather than marbled) with whitish pubescence, &c., from *Gerstäckeri*, Macl. (which is practically undescribed) by the linear disposition of the elytral pubescence, and no doubt other characters; from *E. Gerstäckeri*, Champ. (Macl.), by its striped elytra, and probably other characters (Mr. Champion does not describe the antennæ, eyes, &c., minutely), and from *E. minuta*, Blackb., by its much larger size, more approximate eyes, head more elongate, and much more finely rugulose in front, elytra very differently coloured, black mandibles (they are red in *minuta*), &c. It should be noted that the long interval between

the first and second rami of the antennæ results from the elongate form of the third joint.

W. Australia; King George's Sound; taken by Mr. E. Meyrick.

E. perthensis, sp. nov. Mas. Picea; minus nitida; confertim subtiliter punctulata; pube fulva et albida vestita (hac in prothorace postice, in elytrorum basi suturaque, in corpore subtus et in tibiis condensata); oculis modicis inter se late remotis; antennarum articulis basali modico minus dilatato, 2° minuto transverso, ceteris ramos elongatos singulos emittentibus, articuli 3ⁱ ramo quam 4ⁱ parum breviori et ad 4ⁱ ad basin contiguo; prothorace conico, basi valde bisinuata, lateribus (superne visis) vix sinuatis; elytris postice modice angustatis. Long., $2\frac{2}{3}$ l; lat., 1 l.

This species seems to be entirely piceous, and to owe its variegation entirely to pubescence. The upper surface is densely clothed with very fine pubescence, which is of red-brown colour except on certain parts where it is whitish,—viz., the hind part of the prothorax and the front part and suture of the elytra. The underside is uniformly but less closely (and consequently somewhat inconspicuously) clothed with very fine pale hairs, and similar hairs clothe the legs, being more conspicuous and pallid on the tibiæ and tarsi than on the femora. The head and antennæ are of darker colour than the general surface. Apart from colour and markings (which seem very distinctive) the present insect is at once distinguishable from *nervosa*, Gerst., *pruinosa*, Gerst., *Meyricki*, Blackb., and *minuta*, Blackb., by the antennæ of its male having the ramus of the third joint nearly as long as that of the fourth, and at the base scarcely further from that of the fourth than the latter is from that of the fifth. As noted above the descriptions of *Gerstäckeri*, Macl., and *Gerstäckeri*, Champ. (? Macl.) are not sufficiently minute for comparison apart from colour, but I am almost sure that the insect before me is not identical with Sir W. Macleay's, as the colouring seems entirely different, and the remoteness of locality is unfavourable to the idea of identity. *Gerstäckeri*, Champ., evidently has very different markings; its antennæ have the ramus of the third joint elongate, but it is not specified whether the first ramus is placed at a long interval from the second; but even if Mr. Champion's insect is identical with mine, it is somewhat certainly not *Gerstäckeri*, Macl., and in that case needs a new name.

W. Australia; taken at Perth by Mr. Meyrick.

E. minuta, Blackb. In comparing this very small insect with the above two species, I regret to find that there is an error in my description of its antennæ (Trans. Roy. Soc., vol. XVI., p.

178), as the first ramus is emitted from the basal end of the fourth joint (not, as I supposed, from the apex of the third joint). The peculiar antennal structure of each ramus (except, of course, the apical one) being connected with the *base* of its joint is easily seen in the larger species, but in the much smaller one very careful examination is required to see which joint emits it, and it is not a character that one would look for unless one were expecting it,—indeed, it is only by observing it under a high power that I have been able, even now, to determine the point.

EMENADIA.

Below I furnish descriptions of six new species of this genus, preceded by a tabulation showing distinctive characters for all the species as yet described, except *luteipennis*, Macl. (the description of which is insufficient for identification). It should be noted that I have not seen specimens of *tricolor*, Gerst., *luteipennis*, Champ. (? Macl.), *maculicollis*, Bohem., and *cucullata*, Macl., but that the descriptions of those species mention characters which enable me to place them in the tabulation.

- A. Head nitid and (at any rate except in front) lævigata or nearly so.
 B. Prothorax not carinate.
 C. Apex of prothoracic lobe not upturned.
 D. Apex of prothoracic lobe not emarginate.
 E. Head black.
 F. Elytra closely punctulate.
 G. Basal 2 joints of hind tarsi much compressed; hind angles of prothorax considerably divergent *diversiceps*, Blackb.
 GG. Basal 2-joints of hind tarsi much more slender; hind angles of prothorax not or scarcely divergent *sobrina*, Waterh.
 FF. Elytra sparsely punctured *difficilis*, Blackb.
 EE. Head more or less red.
 F. Head entirely red *tricolor*, Gerst.
 FF. Head red in front, black behind.
 G. Prothorax and elytra sparsely punctured [(? Macl.)
luteipennis, Champ.
 GG. Prothorax and elytra closely punctured *Championi*, Blackb.
 FFF. Head black in front, red behind
 DD. Apex of prothoracic lobe emarginate *capito*, Blackb.
 CC. Apex of prothoracic lobe upturned *Novæ-Hollandiæ*, Gerst.
 BB. Prothorax bearing a longitudinal median carina *cucullata*, Macl.
 AA. The whole of the head conspicuously punctulate.
 B. The head black, and very closely punctured even behind *punctulaticeps*, Blackb.
 BB. Head mostly red, with the puncturation notably less close behind *interioris*, Blackb.

E. diversiceps, sp. nov. Nigra, cyaneo-iridescens, antennarum basi et oris membris picescentibus, segmentis ventralibus postice rufescentibus; nitida, capite antice sat crebre vix aspere postice subtilissime sparsissime punctulato; prothorace elytris (horum puncturis sat elongatis, illius basin versus minus crebris magis grossis) crebre sat fortiter punctulatis; elytrorum disco longitudinaliter impresso; tarsorum posticorum articulis basalibus 2 compressis.

Var. Prothorace elytrisque plus minusve rufescentibus. Long., $5\frac{3}{4}$ l.; lat., 2 l.

The blue iridescence of this species is probably characteristic. The puncturation of the head and elytra is not unlike that of *E. sobrina*, Waterh.; that of the prothorax is notably coarser and less close near the base. The prothorax resembles in shape that of *E. sobrina*, Waterh., except in having its hind angles distinctly divergent. An example in the S.A. Museum has the disc of the elytra longitudinally reddish, and one in my collection has the elytra nearly entirely (and the prothorax entirely) reddish; both have distinct traces of bluish iridescence.

S.W. Australia.

E. sobrina, Waterh. I have seen only two specimens that I can refer to this species, which considerably resembles in colouring some varieties of *E. diversiceps*, Blackb., but is of notably narrower form, with the hind angles of its prothorax even more decidedly non-divergent, and the basal two joints of the hind tarsi evidently more cylindrical. The two examples before me are both females, but the tarsal character is certainly not sexual, as the females of *E. diversiceps* have the basal two joints quite strongly compressed. The prothorax (especially behind) is much more closely, and less coarsely, punctulate than that of *diversiceps*.

E. difficilis, sp. nov. Nigra, prothorace abdomine tibiis tarsisque (nonnullorum exemplorum) et elytris antennis mandibulis palpisque (plus minusve) testaceis; nitida; capite antice crebre fortius postice sparsissime subtilissime punctulato; prothorace supra æquali minus crebre punctulato lobo mediano ad apicem rotundato, angulis posticis divergentibus; elytris in disco longitudinaliter impressis, antice sparsius (apicem versus crebre) punctulatis, puncturis subelongatis. Long., 3— $4\frac{1}{2}$ l.; lat., 1— $1\frac{1}{2}$ l.

The following characters in combination distinguish this species from its previously described congeners:—Head black, its hind part scarcely distinctly punctured, median lobe of prothorax rounded and not upturned and not carinate, elytra more or less testaceous and with comparatively sparse isolated (except close to the apex) punctures. It is variable to the last degree in colour and markings; in a long series, however, of both sexes I

find the head, sterna, and femora, invariably black or pitchy-black. The prothorax varies from entirely testaceous red, through forms in which the disc is diversely marked with fuscous or blackish, to a form in which it is entirely black. The elytra vary from a rare form in which they are entirely testaceous except a slight infuscation round the middle part of the base, through forms in which the whole base is black or blackish with that colour extended, more or less widely, for a greater or less distance along the suture, to forms in which the sutural blackening is extended to fill up the whole apical quarter. The number of antennal joints having their base testaceous (the rami of the male and the serrations of the female are invariably blackish) is variable. The hind angles of the prothorax are somewhat strongly divergent.

E. tricolor, Gerstäck. I have not seen any specimen that I can refer to this species, which is described as having the head and prothorax and the under surface red. Although the *Emenadice* are extraordinarily variable in the colours and markings of the prothorax and elytra, I have not seen (even in some fairly long series) any variation in the colour of the head in any species. Gerstäcker evidently had at least more than one specimen of *tricolor* before him, so that his description cannot have been founded on an isolated extreme aberration of a species usually having the head black. Mr. Waterhouse (Ann. Nat. H., 1883) describes a black-headed male *Emenadia*, which he says is probably the male of *tricolor*, and supposes the difference of colour to be sexual. I have not seen any specimen coloured as that male is described, but I can say positively that in no *Emenadia*, of which I have seen both sexes, is there a sexual difference of colour, and I have little doubt that the male in question is distinct from *tricolor*, and also from the other named *Emenadice*. In Mr. Masters' Catalogue, "South and W. Australia," is cited as the habitat of *E. tricolor*, but I notice that Gerstäcker gives the habitat merely as "Nova-Hollandia."

E. Championi, sp. nov. Nigra; capite antice antennis (articulorum parte producta excepta) palpis mandibulis (apice excepto) prothorace (parte discoidali variabili excepta) elytris (basi suturaque anguste infuscatis exceptis) abdominis maculis nonnullis et pedibus (femoribus posticis exceptis) testaceis vel rufis; sat ritida; capite antice subtiliter postice vix manifeste punctulato; prothorace crebre punctulato, supra æquali, lobo mediano ad apicem rotundato, angulis posticis divergentibus; elytris fere æqualibus, ad apicem acutissimis fere spiniformibus, crebre minus fortiter punctulatis. Long., 3 l.; lat., 1 l.

The most striking character of this insect is the absence of the longitudinal impression that is so conspicuous on the elytra of (at any rate most of) its Australian congeners. In colouring (which, however, is probably variable) it resembles the W. Australian species that Mr. Champion calls "*luteipennis*, Macl.?" but differs from it (judging from the description) *inter alia* by the much closer puncturation of its prothorax and elytra.

S. Australia.

E. capito, sp. nov. Nigra, capite (parte inter labrum et antennas excepta) mandibulis basin versus antennarum basi palpis prothorace elytris tibiis spinis tarsorumque unguiculis ferrugineo-rufis; capite antice subtilius (postice vix manifeste) punctulato; prothorace supra sat æquali, sat fortiter crebre (sed basin versus mediam multo minus crebre) punctulato, lobo mediano postice truncato, angulis posticis leviter divergentibus; elytris in disco longitudinaliter impressis, sat fortiter crebre (antice vix minus crebre) punctulatis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{2}$ l.

The colouring of the two examples that I have seen of this species may be briefly characterised as entirely ferruginous red above, including the hind half of the head, and entirely black beneath, the only exception being the palpi, the base of the antennæ, the apical spines of the tibiæ, and the claws ferruginous, the front half the head black and some of the tarsal joints inclining to piceous. I have no doubt but that the colouring of the head is a reliable character, in which case this insect needs distinguishing only according to the tabulation (above), but it may be added that it differs also from *E. Championi*, Blackb., by the presence of a well-defined discal impression on the elytra, from *luteipennis*, Champ. (? Macl.), by the close puncturation of its elytra, and that the difference in the colouring of almost every part from that of *tricolor*, Gerst. far surpasses the limits of probable variation. (Unfortunately Gerstäcker's description is scarcely precise enough to allow a minute comparison of structural characters.) If there should turn out to be a black-headed form of this species it would come nearest to *diversiceps* and *sobrina*, from the former of which it differs *inter alia* by the lateral margin of its elytra very much more strongly sinuate behind the shoulder, and from the latter by the evident divergence of the prothoracic hind angles, and the much less close puncturation of its prothorax.

Victoria.

E. punctulaticeps, sp. nov. Tota nigra, oris membræ plus minusve piceis vel rufescentibus exceptis; minus nitida; supra (capite incluso) crebre subfortiter (fere ut *E. sobrina*, Waterh.) punctulata, puncturis sat elongatis; elytrorum disco longitudinaliter impresso.

Var. ? Elytris in parte antica dimidia (basi summa excepta) fulvis. Long., 3—5½ l.; lat., 1—2 l.

This species is very easily recognised by its closely and asperately punctured head (which is even more closely and asperately punctured in the front part than on the vertex.) Its prothorax is considerably more dilated at the base than that of *E. sobrina*, Waterh., with the hind angles notably more divergent. The puncturation of the prothorax and elytra is as in *E. sobrina*, Waterh. In respect of colouring, the unicolorous antennæ and entirely black elytra seem to form a reliable distinction from most others of the genus. The "var.?" mentioned above does not seem to differ from the type except in the presence of fulvous colouring on the elytra.

Southern Australia (widely distributed).

E. interioris, sp. nov. Nigra, capite antice antennarum basi palpis mandibulis (ad basin) prothorace (magna ex parte) elytris (postice et ad latera) sterna (maculatim) et abdomine rufis; modice nitida; capite antice aspere creberrime (postice minus confertim nec aspere) fortius punctulato; prothorace supra sat æquali, confertim (a basi antrorsum gradatim magis subtiliter) punctulato, lobo mediano postice anguste rotundato, angulis posticis divergentibus; elytris in disco longitudinaliter impressis, sat fortiter (antice sparsius, retrorsum gradatim magis confertim) punctulatis. Long., 6 l.; lat., 2 l.

The red colour of the front part of the head in combination with the strong puncturation of the whole of that segment and the narrowly rounded sub-acuminate apex of the basal lobe of the prothorax distinguishes this species from all its previously described Australian congeners. The black mark on the prothorax is probably variable; in the type it occupies the greater part of the segment, and is trilobed in front (the lobes not quite reaching the front margin, and having their apices so connected together as to enclose two red spots), and bilobed behind (the lobes not reaching the base). The elytra may be described as being red, with on each of them a somewhat triangular elongate black spot which has its base on the base of the elytra, its apex a little beyond the middle, and touches the suture for a greater distance than it does the lateral margin.

In colouring &c., *E. interioris* bears a rough resemblance to the description of *E. maculicollis*, Bohem., but is no doubt very distinct from that species (which is said, *inter alia*, to have the apex of its prothoracic lobe emarginate, and its head "subtiliter punctulatum.") From *E. punctulaticeps* it differs, apart from colour, chiefly by the notably less close puncturation of the hind

part of its head and the front part of its elytra,—the *prothoracic* puncturation being very similar in the two species.

Central Australia.

RHIPIDIUS.

The species described below may be referred, I think, to this genus, which has not been hitherto recorded as occurring in Australia, although it appears to be widely distributed, species being known from Europe and South Africa. I regret that I have not one of those species before me for comparison, but, nevertheless, I feel confident in the present identification, as the characters of the insect concerned agree quite satisfactorily with those attributed to *Rhipidius* by M. Lacordaire, with the single exception that the claws are scarcely to be called "simple" in the strict sense (inasmuch as the basal portion is somewhat strongly compressed), and would be more accurately described as subappendiculate. This, however, is not a discrepancy that would justify the creation of a new generic name. I should add, however, that as I have only a single specimen I have not been able to investigate characters that cannot be observed without dissection. As the genus is new to Australia it will be well to mention its distinctive characters, as follows:—Elytra extremely short (scarcely surpassing the base of the abdomen) and very widely separated from each other (the interval between them at their base being about as wide as the head); maxillary palpi wanting; head small and globular, the greater part of its surface being occupied by the strongly granulated eyes (which are almost contiguous); antennæ contiguous at their base, their basal 3-joints short, the other 8-joints produced into long rami; legs stout and hairy, the tibiæ dilated towards the apex which is devoid of spines, the tarsi heteromerous and short with small sub-appendiculate claws; scutellum large and transverse.

This insect is probably parasitic upon *Diptera*, as I found it crawling over some dead blow-flies.

R. Australasie, sp. nov. Mas. Obscure brunneus, pedibus dilutioribus, capite nigro; hoc crebre subaspere punctulato; prothorace nitido, leviter transverso, antrorsum angustato, subtilissime punctulato, angulis posticis acutis extrorsum directis; elytris opacis, postice acutis, confertim sat aspere punctulatis; antennarum articulo 3^o extrorsum fortiter dentiformi. Long., 2 l.

S. Australia; Eyre's Peninsula.

CANTHARIDÆ.

ZONITIS.

I have recently made an attempt to determine the species of this genus in my own collection and that of the S.A. Museum.

The task presents much difficulty on account of the unsatisfactory character of many of the earlier descriptions of species. The generic determination, moreover, of many of the described species belonging, or near, to *Zonitis* is a matter of the utmost difficulty. The following genera have been recorded as Australian—*Cantharis*, *Palaestra*, *Tmesidera*, *Zonitis*, *Palestrida*. *Cantharis posticalis*, Fairm., might be confidently supposed to be distinct from *Zonitis*, but I have a species from Northern Australia which agrees remarkably well with the specific description of that insect, and it is undoubtedly a *Zonitis*. If *C. posticalis* should prove to be a *Zonitis*, *Cantharis* would disappear from our catalogue. *Palaestra* is a good genus, distinguished from *Zonitis* by the dilated and compressed form of its antennal joints, &c. *Tmesidera* is almost certainly identical with *Palaestra*, and is a later name; but of its species, only the type (*T. rufipennis*, Westw.) and *assimilis*, Hope, appear to be *Palaestra*, the other two species attributed to the genus *Tmesidera*, by Hope, being in reality species of *Zonitis*. *Palestrida* is, I should say, certainly inseparable from *Palaestra*.

The genus *Zonitis* I regard, then, as including (besides the species that have been attributed to it by their authors) two of the *Tmesideræ*, and possibly *Cantharis posticalis*, Fairm. In 1880 M. Fairmaire published (Stett. Ent. Z., pp. 261, &c.) a monograph of the genera *Zonitis*, *Tmesidera*, and *Palaestra*, quoting the exact words of the description of species he had not seen, and adding numerous new species; and since that time, so far as I know, nothing further has been published concerning the Australian species of *Zonitis* and its allies, except isolated descriptions of additional species.

This seems like an exceptionally favorable condition for a group of *Coleoptera* but, unfortunately, there are few other groups containing so large a proportion of descriptions that are incapable of identification with any particular insect (without examination of the types), and, moreover, M. Fairmaire's work is exceedingly difficult to follow out to any satisfactory result; thus, without *tabulating* the species, he arranges them in groups, but in many instances the detailed descriptions are inconsistent with those of the groups. For example, in Group VIII. the first sub-group is characterised as follows:—"Abdomen rufum, femoribus rufis," and of the species associated together under that heading the first is described in detail as having the abdomen red, but it is implied that the legs are *black*; the description of the second is simply a quotation from Blessig, which thus describes the legs—"beine schwarzblau;" the third is stated to have a variety with black legs; and only the fourth (and last) is described as definitely characterised by its red femora. Then, further, M.

Fairmaire has distributed among his groups numerous species which he definitely states are unknown to him, and the descriptions of which contain no hint as to the presence of the characters on the assumed presence of which M. Fairmaire assigns them their place. And again the head of *Z. limbipennis* is characterised in the description of that species as "rufo-testaceous," and a note at the end of the description says—"This species is easy to recognise by its black head."

As I have recently had occasion, for the purpose indicated above, to go carefully through all the literature bearing upon *Zonitis* and ascertain which of the descriptions are capable of identification with any particular insect, and which are mere brief indications of colour, or of two or three differences from some other insect, it seems desirable to put the results on record for the use of other workers, and to add a tabular statement of the characters that I have found available for identifying those species which are known to me either through intelligible description or inspection of types.

The names that have been attributed to *Zonitis* by M. Fairmaire or subsequently by their authors, together with Mr. Hope's two *Tmesidera* are, I think, 42 in number. Of these, I think, I can definitely state that two are synonyms,—viz., *Z. æneiventris*, Redt. = *tricolor*, Le Guillou and *Z. ventralis*, Fairm. = *rostrata*, Blessig. The former of these instances of synonym is asserted, and the latter suspected, by Fairmaire. Of the remaining 40 names the following four are attached to descriptions in which not a single valuable character is mentioned (apart from colour, and this is too variable in at least many species of *Zonitis* to be of value when standing alone, at any rate when the colours are not very unusual), viz., *annulata*, Macl.; *apicalis*, Macl.; *fuscicornis*, Macl.; *rubricollis*, Hope. The following eleven names represent species, the descriptions of which are more detailed than those of the four just mentioned, but, which for the reasons assigned below, I have been unable to place in a tabulation. They are as follows:—

Z. pallida, Macl. Probably near *Cowleyi*, Blackb. (described below). The description states that the under-surface is black, and does not mention the palpi as being particularly long, or the eyes as being approximate above, two remarkable characters that the author could hardly have failed to notice. Moreover, the elytra are said to have three obsolete longitudinal lines, so I presume it is distinct from *Cowleyi*. The absence of information concerning the structure of the antennæ excludes this species from my tabulation.

Z. cylindracea, Fairm. Some remarks on this species will be found below under the heading of *Z. yorkensis*. The ambiguity

of the description of the antennal structure prevents my assigning this insect a place in my tabulation.

Z. flaviceps, Waterh. This is evidently a very distinct species, described as having strongly punctured black elytra narrowly flavo-piceous at the base and sides. The absence of information concerning its antennæ obliges me to omit it from my tabulation.

Z. limbipennis, Fairm. As noted below, the head of this insect is described as flavo-testaceous, and a note following the description states that it is easily recognisable by its *black* head. It is from the same locality (Swan R.) as *flaviceps*, and if its head is flavo-testaceous, is similarly coloured, but seems to have closer and finer elytral puncturation.

Z. flavicrus, Fairm. The antennæ of this species are not described. It appears to be near *rugosipennis*, Fairm., but to have the *foveæ* of its prothorax different, and a slight difference in colour. I suspect it of being a variety,—*rugosipennis* being, according to its author, variable in colouring; indeed, a note states that *flavicrus* differs from *rugosipennis* by its testaceous femora, and yet both species are grouped as having red femora.

Z. rugata, Fairm. The description of the antennæ is too vague to be used in tabulation. As the type is stated to be immature, it is difficult to form any clear conception of its characters.

Z. semirufa, Fairm. I have not included this species in my tabulation because I cannot find any character whereby to distinguish it from *rostrata*, Blessig, except in the colour and the prothoracic foveæ (which do not seem to me reliable).

Z. indagacea, Fairm. The description gives the second joint of the antennæ longer than the third, while an appended note distinguishes it from *nigro-cenea*, Fairm., by the second joint being "notably *shorter* than the third."

Z. janthinipennis, Fairm. Not described; merely briefly compared with *indagacea*, without any reference to the comparative length of the antennal joints.

Z. nigro-cenea, Fairm. The description does not mention the comparative length of the second and third antennal joints. If the second joint is considerably shorter than the third it is probably identical with *violaceipennis*, Waterh., of which I have examples. In that case Mr. Waterhouse's name becomes a synonym.

Z. (Tmesidera) violacea, Hope. The structure of the antennæ is not described. Evidently very near to *violaceipennis*, Waterh., but differently coloured in respect of the under-surface and legs. If it is a mere variety of the latter, the name has priority.

After eliminating the above there remain 25 names as representing the species that up to this time have been described in a fashion that will allow of their being confidently identified and their characters arranged in a tabular form. I now add seven

new names, including a new name that I propose for an insect previously described as a "var. (?)"—and furnish a tabulation of the characters of the 32 species thus regarded as recognisable members of the genus. As it seems undesirable to altogether leave out the 15 species that are not satisfactorily described, I have drawn up a supplementary tabulation of them founded upon such characters as their authors have mentioned, which will, perhaps, assist in their identification. I have been unable in the case of one of them [*Z. (Tmesidera) rubricollis*, Hope], however, to place it even in the supplementary tabulation owing to there being no precise description of either the structure of its antennæ or the sculpture of its elytra.

- A. Joint 2 of antennæ not notably shorter than 3 (see note in the description of *Z. Cowleyi*, Blackb.).
- B. Elytra not of uniform metallic colouring.
- C. Head not black.
- D. Base (at least) of elytra testaceous.
- E. Legs unicolorous, or nearly so.
- F. Scutellum black.
- G. Elytra black at apex... .. *Andersoni*, Blackb.
- GG. Elytra entirely testaceous *dichroa*, Germ.
- FF. Scutellum testaceous.
- G. Head of short triangular form... .. *tenuicornis*, Fairm.
- GG. Head more elongate.
- H. Eyes almost contiguous *Cowleyi*, Blackb.
- HH. Eyes normally distant from each other *lutea*, Macl.
- EE. Legs not unicolorous.
- F. Elytra with black markings.
- G. Elytra very closely punctulate *nigro apicata*, Fairm.
- GG. Elytra sparsely punctulate *nigroplagiata*, Fairm.
- FF. Elytra devoid of black markings.
- G. Elytra much less closely punctured near base than behind *tricolor*, Le Guill.
- GG. Elytra uniformly punctured.
- H. Prothorax rather closely punctured (size about 5 l.) *pallicolor*, Fairm.
- HH. Prothorax thinly punctured (size about 2½ l.) *obscuripes*, Fairm.
- DD. Base of elytra black *bizonata*, Macl.
- CC. Head black.
- D. Prothorax and scutellum black *opacorufa*, Fairm.
- DD. Prothorax and scutellum ochraceous yellow *seminigra*, Fairm.
- BB. Elytra uniformly metallic in color.
- C. Head comparatively short.
- D. Prothorax black *splendida*, Fairm.
- DD. Prothorax testaceous or rufo-testaceous *brevicornis*, Blackb.
- CC. Head extremely elongate *gloriosa*, Blackb.
- AA. Joint 2 of antennæ notably shorter than 3.
- B. Puncturation of elytra not coarsely vermiculate-rugulose.
- C. Interval between the eyes at least as great as length of basal joint of antennæ.

- D. Elytra extremely closely (about as closely as in *Z. tricolor*) sculptured.
- E. Antennæ not conspicuously more slender than in the generality of *Zonites*.
- F. Eyes transverse or nearly so.
- G. Prothorax nitid *Murrayi*, Blackb.
- GG. Prothorax opaque, owing to close rugulosity *subrugata*, Blackb.
- FF. Eyes very oblique (sublongitudinal).
- G. Prothorax closely and somewhat strongly punctulate... .. *rustica*, Blackb.
- GG. Prothorax very finely and very sparsely punctulate *cyanipennis*, Waterh.
- EE. Antennæ extremely slender *Helmsi*, Blackb.
- DD. Elytra very much less closely punctulate.
- E. Surface of head with a large concave area reaching hindward behind the level of the back of the eyes.
- F. Eyes very large. (Head black)... .. *queenslandica*, Blackb.
- FF. Eyes small, like those of *Z. tricolor*. (Head rufo-testaceous) *bipartita*, Fairm.
- EE. Surface of head not having a large concave area.
- F. Maxillary palpi very long (as long as the basal 3-joints of the antennæ together) *longipalpis*, Blackb.
- F. Maxillary palpi normal *yorkensis*, Blackb.
- CC. Interval between the eyes less than length of basal joint of antennæ *Carpentariae*, Blackb.
- BB. Punctuation of elytra coarsely vermiculate rugulose.
- C. Head closely rugulose.
- D. Prothorax moderately narrow in front (not narrower than in *cyanipennis*, Waterh.) *rugosipennis*, Fairm.
- DD. Prothorax extremely narrow in front (less than half as wide as the base of the head) *aspericeps*, Blackb.
- CC. Head thin and feebly punctulate, not at all rugulose.
- D. Prothorax red *rostrata*, Blessig.
- DD. Prothorax black or metallic.
- E. The underside black.
- F. The median channel of prothorax continuously well-defined to base *violaceipennis*, Waterh.
- FF. The median channel of prothorax well defined only for a short distance in middle of the segment *Sedilloti*, Fairm.
- EE. The underside brilliantly metallic *purpureipennis*, Waterh.

Supplementary tabulation of *Zonites* that for want of information on the antennal characters could not be included in the preceding tabulation.

- A. Elytra not coarsely rugulose.
 B. Elytra entirely or for most part testaceous or rufo-testaceous.
 C. Head testaceous.
 D. Legs not black.
 E. Elytra closely punctulate.
 F. Elytra unicolorous *fuscicornis*, Macl.
 FF. Elytra brown about base and apex *annulata*, Macl.
 EE. Elytra thinly punctulate... .. *apicalis*, Macl.
 DD. Legs black *pallida*, Macl.
 CC. Head black *cylindracea*, Fairm.
 BB. Elytra black, narrowly bordered with testaceous.
 C. Elytra strongly punctulate *flaviceps*, Waterh.
 CC. Elytra very finely punctulate *limbipennis*, Fairm.
- A A. Elytra coarsely rugulose.
 B. Prothorax testaceous or rufo-testaceous.
 C. Under-surface black.
 D. Prothorax strongly canaliculate *flavicus*, Fairm.
 DD. Prothorax feebly and interruptedly canaliculate *rugata*, Fairm.
 CC. Under-surface rufo-testaceous *semirufa*, Fairm.
- BB. Prothorax black.
 C. Under-surface black.
 D. Prothorax 3-foveolate on each side *indagacea*, Fairm.
 DD. Prothorax with less than 3 foveæ on each side.
 E. Prothorax strongly canaliculate *nigro-enea*, Fairm.
 EE. Prothorax very feebly canaliculate *fanthinipennis*, Fairm.
 CC. Under-surface red *violacea*, Hope.
- Z. *Cowleyi*, sp. nov. Testacea, antennis palpis pedibusque (femoribus ad basin exceptis) infuscatis; minus nitida; capite valde elongato antice anguste rostriformi (labro quam latiori multo longiori), sparsius subfortiter punctulato, inter oculos longitudinaliter canaliculato; palpis maxillaribus valde elongatis (quam antennarum articuli basales 3 conjuncti vix brevioribus), articulo apicali gracili apicem versus parum incrassato; antennis exempli typici fractis, articulo 2° quam 1^{as} vix breviori; oculis permagnis, supra et subtus subcontiguis; prothorace quam (ad basin) latiori parum longiori, a basi ad apicem arcuatim angustato supra sat æquali, fere ut caput punctulato sed paulo magis crebre; elytris breviter pubescentibus confertim subtiliter punctulatis, lineis elevatis haud instructis. Long., 6 $\frac{1}{4}$ l.; lat., 1 $\frac{3}{5}$ l.

The head of this species is so peculiar as to suggest a question whether it might not be regarded as generically distinct from *Zonitis*, but most of the characters seem to be only exaggerations of what is to be found in other species of the genus. The head is not much longer (though it is narrower and more rostriform in front) than that of *Z. rostrata*, Blessig. The eyes are much larger than in any other *Zonitis* that I have seen, and the maxillary palpi much longer than in any other except longipalpis

(described below). I cannot find any other character at all suggestive of generic difference from *Zonitis*, of which it has completely the facies. It should be noted that only two joints of an antenna remain in the unique type, so that I am not absolutely certain of the second joint being not much shorter than the third, but as the second joint is scarcely shorter than the basal one there is no likelihood of its being much shorter than the third.

Tropical Queensland ; taken by Mr. Cowley.

Z. subrugata, sp. nov. Sat brevis ; minus angusta ; obscure rufa, elytris obscure viridibus submetallicis, capite tibiis tarsisque picescentibus ; minus nitida ; capite modice elongato, antice minus angustato (labro leviter transverso, antice truncato), dupliciter (subtiliter et rugulose sat grosse) confertim punctulato ; antennarum articulo 2^o quam 3^{is} tertia parte breviori ; oculis modicis sat transversis ; prothorace quam latiori parum longiori, antice sat angustato, ut caput punctulato, pone medium longitudinaliter breviter canaliculato, sat inæquali (ante medium bifoveolato), lateribus pone medium sat parallelis ante medium antrorsum arcuatim convergentibus, angulis anticis nullis ; elytris confertim nec grosse rugulosis, lineis elevatis nullo modo perspicuis. Long., 5 l. ; lat., 2 l.

The head and prothorax are subopaque owing to the presence of close fine puncturation, among which is thinly intermingled a number of feebly impressed somewhat coarse punctures. The elytral puncturation is not unlike that of *Z. tricolor*, but is very evidently less fine and more asperate. This species in many respects corresponds with the description of *Z. rugata*, Fairm. (of which its author says he has seen only examples probably immature), but I do not think it can be that species, as its elytra are described as "rugose-vermiculate with the interstices sparsely punctulate," which does not at all fit the present insect, which also differs from the description in having the under-surface (not black but) red, an improbable variation if the type was immature ; also in the elytra not being acuminate behind, the prothorax having two very well defined round foveæ in front of the middle, &c.

Australia ; exact locality uncertain, but probably S.A.

Z. queenslandica, sp. nov. Anguste subcylindrica ; testacea, capite palpis antennis pedibusque (coxis femorumque basi anticis exceptis) nigro-piceis, corpore subtus maculatim infuscato, elytris apicem versus externe piceis ; sat nitida ; capite sat elongato (labro transverso antice subtruncato), antice (ut *Z. bipartita*, Fairm.) leviter concavo (area concava

postice rotundata bene definita); antennarum articulo 2^o brevissimo; oculis magnis subtransversis; prothorace quam latiori paullo longiori, antice modice angustato, supra sat æquali, sparsim subtiliter punctulato, lateribus leviter arcuatis, latitudine majori paullo pone medium posita; elytris subcervice minus subtiliter punctulatis, lineis nonnullis subelevatis vix manifeste instructis. Long., 6 l.; lat., 1 $\frac{2}{3}$ l.

The most elongate and cylindric species known to me of the genus. Its form seems to forbid any possibility of identity with *Z. apicalis*, Macl., which is described as having elytra "subdepressed, broad, and broadest at the apex," but seems to bear a considerable resemblance to this insect in colouring, though differing by its testaceous head. This insect also resembles *Z. bipartita*, Fairm., but differs from it *inter alia* by its black head, third joint of antennæ much longer in proportion to the second, even surface of prothorax, much closer and distinct puncturation of elytra, much longer and narrower form, and the better defined concave area on the head, which has its hind margin much more sharply defined.

Queensland.

Z. longipalpis, sp. nov. Minus elongata, minus angusta; nigro picea, mandibulis prothorace elytris tarsorum posticorum basi summa et unguiculis flavis; sat nitida; capite fortiter elongato antice angustato (labro quam latiori longiori), sparsim punctulato, antice minus sparsim; antennarum articulo 3^o quam 2^{us} tertia parte longiori; oculis sat magnis sat transversis, supra interspatio lato separatis, palpis maxillaribus valde elongatis (quam antennarum articuli basales 3 conjuncti sublongioribus); prothorace quam latiori paullo longiori, antice sat fortiter angustato, sparsissime punctulato, foveolis antice 2 postice 1 impressis, haud canaliculato, lateribus a medio antrorsum fortiter sinuatim (retrorsum leviter sat recte) convergentibus, angulis anticis distinctis; elytris leviter sparsius indeterminate punctulatis vix subrugulosis, lineis subelevatis 3 manifeste instructis. Long., 5 l.; lat., 1 $\frac{3}{5}$ l.

This species may be distinguished from the other Australian *Zonites* known to me, except *Z. Cowleyi*, Blackb., by the great length of its maxillary palpi. From *Z. Cowleyi* it differs widely by *inter alia* the very much shorter second joint of its antennæ, and the very much less defined sculpture of its elytra. The number and arrangement of the impressions on its prothorax are peculiar, but I do not feel confident that these present very reliable specific distinctions in the *Zonites*.

S. Australia (Hawker district). In the S.A. Museum.

Z. yorkensis, sp. nov. Elongata, subcylindrica; nigra, elytris et (nonnullorum exemplorum) prothorace aliqua ex parte rufis; sat nitida; capite sat elongato, antice minus angustato (labro transverso), antice sparsim vix subtiliter (postice sparsissime) punctulato, vertice manifeste canaliculato; antennarum articulo 3^o quam 2^{us} circiter duplo longiori; oculis modicis quam *Z. tricoloris* magis oblique positis; prothorace quam latiori paullo longiori, antice minus angustato, sparsissime punctulato, pone medium longitudinaliter breviter canaliculato, utrinque foveolis nonnullis plus minusve fortiter impresso, lateribus pone medium sat parallelis ante medium antrorsum arcuatim convergentibus, angulis anticis nullis; elytris sparsius leviter minus subtiliter punctulatis, lineis subelevatis 3 vel 4 vix perspicue instructis. Long., 5 l.; lat., 1½ l.

A narrow cylindrical species near *cylindracea*, Fairm., but I think it can hardly be that species, chiefly because the latter is described as having antennæ, the second joint of which is "distincte" shorter than the third, whereas in this species it is not more than half the length of the third (in other species with a second joint as short M. Fairemaire uses the term "multo brevior") because the prothorax is said to be non canaliculate; because the elytra are described as having three somewhat elevated lines, the intervals between which are "sat fortiter punctata" and "tenuiter rugosula," with which the elytra of this insect by no means correspond; and because the head is said to be "sat dense punctatum," and impressed in an oblong form between the antennæ, while in *Z. yorkensis* the head is *sparsely* (though not very finely) punctulate (very much more sparsely than in *opaco-rufa*, Fairm., with which its author compares *cylindracea* without mentioning a difference in the puncturation of the head), and has nothing of the nature of an oblong impression occupying the space between the bases of the antennæ; but that space is somewhat vaguely uneven in its middle part, with a short furrow on either side close to the base of the antennæ. It may be added, moreover, that *Z. cylindracea* is said to be from Richmond R. district, N.S.W., a region certainly having very few species in common with the locality of *Z. yorkensis*.

S.A. (Yorke's Peninsula).

Z. Carpentariae, sp. nov. Angusta, cylindrica; testacea, palpis labro mandibulis ad apicem antennis tibiis tarsis et (basi excepta) elytris nigro-piceis; sat nitida; capite valde elongato sparsim subtilius punctulato, lateribus ante oculos sat parallelis (labro leviter transverso); antennarum articulo 3^o quam 2^{us} duplo longiori; oculis sat magnis sat transversis

(inter hos interspatio supra quam antennarum articuli basalis longitudo haud latiori); prothorace quam latiori ut $1\frac{3}{8}$ ad 1 longiori, antice valde angustato, subtilissime (vix perspicue) punctulato, subtiliter canaliculato, utrinque pone medium fovea leviter impresso, lateribus pone medium sat parallelis ante medium sat fortiter sinuatis, angulis anticis (superne visis) obtusis; elytris subtilissime crebre ruguloso-punctulatis, lineis subelevatis vix perspicuis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{2}{5}$ l.

A very distinct species, most readily recognisable perhaps by the space between the eyes on the upper surface (at any rate in one sex—probably in both sexes) being scarcely as wide as the length of the basal joint of the antennæ. This results from the narrowness of the head rather than the eyes being particularly large. The prothorax, also, is unusually narrow and elongate.

Tropical Queensland; given to me by Mr. Koebele.

Z. aspericeps, sp. nov. I propose this name for a *Zonitis* which I described (Tr. Roy. Soc., S.A., XII., p. 141) as “var (?) A” of *nigro-enea*, Fairm. It is quite distinct from *nigro-enea* by *inter alia* the rugulose and much closer puncturation of its head.

PALÆSTRA.

In the only two species (of this genus) of which I know both sexes, the male is very much smaller than the female, and has much longer antennæ, their joints only slightly dilated. Seven names have been applied to members of this genus, but three of them seem to be certainly synonyms, partly through the non-recognition of the fact that the difference in the length and dilatation of the antennæ is sexual. The names, I think, should stand as follows:—

1. rufipennis, Cast.
rufipennis (*Tmesidera*), Westw.
quadrifoveata, Fairm. (Mas.).
2. eucera, Fairm.
3. assimilis (*Tmesidera*), Hope.
platycera, Fairm.
4. rufocincta, Fairm.

GOETYMES.

G. pictipes, sp. nov. Niger, labro antennis (harum laminis apicem versus obscuris) tibiis tarsisque flavis, elytris (apice nigro excepto) pallide brunneis; setulis brevibus erectis in capite prothorace que crebre vestitus; capite crebre subfortiter punctulato; prothorace transverso, canaliculato, subinæquali, subtiliter sat crebre punctulato, antice abrupte angustato, lateribus rectis, basi lobato; scutello elongato canaliculato; elytris costatis, fere ut prothorax punctulatis. Long., $5\frac{1}{2}$ l.—6 l.

I have seen only two specimens of this insect, and I take them to be males. The antennæ are structurally quite as Mr. Pascoe describes those of *G. flavicornis*. The present species *inter alia* differs so entirely in colour from the earlier one, and is so much smaller (only about half the size) that there can be no fear of confusing them.

Victoria ; on the sea beach near Melbourne (Mr. French).

ÆDEMERIDÆ.

I have recently been overhauling the *Ædemeridæ* in the South Australian Museum and in my own collection, and find many undescribed species. There is great difficulty in apportioning them generically, as considerable confusion seems to exist regarding the names of some of the genera, and much alteration has taken place during recent years. For example, in Cist Ent. II., p. 228, Mr. Waterhouse described two Tasmanian species under the generic name *Sessinia* ; in Trans. Ent. Soc., 1895, Mr. Champion placed them in *Asclera* ; in the Catalogue of *Ædemeridæ*, recently published by the same author (Ann. Soc. Ent., Belg., XLIII., pp. 55 and 56) they appear under the name *Ischnomera*, *Asclera* being dropped. The type of *Ischnomera* is stated by Lacordaire to be *I. melanura*, Linn., but as that species is far, indeed, generically from the Tasmanian species mentioned above it is to be supposed that Mr. Champion has discovered *melanura* not to be the real type of *Ischnomera*. Mr. Champion's Catalogue of *Ædemeridæ* including only recently described species, it is of course impossible to ascertain from it to what genus he regards *melanura* as really belonging, but it is probable that he would place it in *Nacerdes*, in which Lacordaire placed it (treating *Ischnomera* as a synonym of *Nacerdes*, which Mr. Champion, no doubt, has found to have been error).

Scarcely any of the Australian *Ædemeridæ* are now referred to the genera in which they stand in Mr. Masters' Catalogue. *Selenopalpus* appears to rest upon Sir W. Macleay's very hesitating reference to it of his *S.* (?) *fuscus* and *S. Mastersi* ; the other species (*cyaneus*, Fab.) having been called *Edemera* by its author (it has been called also *Lagria* and *Dryops*.) I should say that Sir W. Macleay's species are perhaps not *Ædemeridæ*, as their author, in his description, says "neck large," and the description of the prothorax of *fuscus* does not read like that of a member of the family. Why he refers the species to *Selenopalpus* it is difficult to discover, as he says "they do not answer exactly to the description given of the maxillary palpi of *Selenopalpus*, and as far as I can ascertain no other characters have been given for that genus." Fabricius' species is certainly, I think, not recognisable unless the type could be examined, especially as Olivier's later description does not agree with that of Fabricius.

Ananca (to which most of the remaining described *Ædemeridæ* have been attributed) is now stated by Mr. Champion to be an insufficiently characterised genus, most of the species of which belong to *Copidita* or *Oxacis*. *Sessinia* (accidentally omitted from Masters' Catalogue) is dismissed on the same grounds as *Ananca* and its Australian species, as noted above, are referred to *Ischnomera*. *Ischnomera mansueta*, Newm. (the only one of the genus enumerated in Master's Cat.) is from its description evidently not congeneric with the species now placed in *Ischnomera*. Of the Australian genera added since Mr. Masters' Cat. was published, *Ithaca* is stated to be identical with *Dohrnia*, *Trichananca*—as stated below, is perhaps not an *Ædemerid*, and *Pseudananca* was described as an extremely anomalous form whose place in the *Ædemeridæ* is doubtful. This leaves only *Pseudolycus* and *Dohrnia* of Masters' Cat. unchanged, and there have since been added (most of them including species enumerated under other names by Mr. Masters) *Copidita*, *Ischnomera*, and *Techmessa*. As the insect which Lacordaire calls *Nacerdes melanura*, Linn., occurs in Australia (imported, no doubt) and is certainly not a member of any of the genera I have mentioned above as now admitted to be Australian, *N. acerdes* must be added.

Unfortunately, I do not find that the Australian *Ædemeridæ* before me can be satisfactorily placed in so small a number of genera as the six above enumerated. I have tried to apportion the specimens generically by means of Mr. Horn's paper on the *Ædemeridæ* of N. America (in Proc. Calif. Acad. of Sci., 1896) but I find in it such serious discrepancies in the treatment of genera with Mr. Champion's views that it does not seem safe to follow him. For example, he says that almost the only difference between *Copidita* and *Asclera* consists in the claws of the former being simple while those of the latter are toothed, and intimates that he considers it a scarcely sufficient distinction for treating them as two genera. But in this he differs from Lacordaire, who makes the claws of *Asclera* simple. In examples of the European *A. cœrulea*, Linn., in my collection the claws are not *absolutely* simple (as they are in e.g. *Copidita 4-maculata*, Motsch., of which I have specimens before me), but "toothed" certainly seems to me scarcely the term to describe their structure; I should call them "appendiculate." Mr. Champion, however (*loc. cit.*) places in *Asclera* species (e.g. *sublineata*, Waterh.) which have simple claws, and distinguishes the genus from *Copidita* by its finely granulated eyes.

In the face of all these difficulties it would evidently be undesirable for me, at present, to found new genera for the Australian *Ædemeridæ* that do not satisfactorily fit into the six

genera enumerated above, and it would be misleading to refer them without qualification to those genera. I therefore adopt the expedient of furnishing the following table, which will enable the student to determine with ease the genus to which I should refer any specimen that might be under observation, and at the same time will indicate which of the species I describe are not typical representatives of the genera in which I place them. The species of this non-typical description are for the most part allied to *Copidita* and *Oxacis* by their principal characters rather than to any other genera, and it is worthy of note that the characters distinguishing them from *Copidita* and *Oxacis* are in most cases characters that Mr. Horn regards (*loc. cit.*) as not involving generic distinction from *Copidita* and *Oxacis* although exceptional in those genera. I may say however that I do not share this opinion with Mr. Horn, and that I am deterred from founding new genera on those characters only by the uncertainty that prevails (or at any rate has lately prevailed even if Mr. Champion's recent Catalogue can be regarded as final on the subject) as to what are the real types of some of the older genera.

I should add that *Pseudolyucus apicalis*, Macl. (of which I have an example compared with the type) is certainly not a member of any of the genera mentioned in the following table. I doubt its being an *Edemerid*, judging from such examination as is practicable without damaging my unique example, and incline to think it a *Pyrochroid*. I may remark in passing that M. Lacordaire's diagnosis of the *Pyrochroidæ* differs very little from that of the *Edemeridæ*, the principal distinctions he gives being that the former has mandibles scarcely passing the apex of the labrum, the head narrowed behind into a neck, antennæ pectinated or flabellated; while in the latter the mandibles are longer, the antennæ simple or with some compressed joints, and the head gradually narrowed behind. *Pseudolyucus apicalis* has mandibles reaching considerably beyond the labrum, the head with certainly a little more of a neck than *Pseudolyucus*, and the antennæ strongly serrate. Comparing examples of *Pyrochroidæ* and *Edemeridæ* in my own collection I find that the *Edemeridæ* have (at least) the apical joint of their tarsi spongiose beneath and their prothorax more or less cordiform (or at least tending towards that shape), neither of which characters can I find in any *Pyrochroid* known to me. *P. apicalis*, Macl., presents neither of these latter characters. In the following table I have included this species and the two doubtful *Edemerid* genera, and place their names in italics to indicate the uncertainty of their position.

- A. Antennæ filiform, more or less slender, and decidedly elongate.
 B. Mandibles bifid at apex.
 C. Two spines at apex of front tibiæ.
 D. Eyes coarsely granulate.
 E. Claws simple.
 F. Apical joint of maxillary palpi about twice as long as penultimate.
 G. Antennæ inserted close to the eyes Copidita (*typical*).
 GG. Antennæ inserted not close to the eyes... .. Copidita (*Sub-section I*).
 FF. Apical joint of maxillary palpi scarcely longer than penultimate Copidita (*Sub-section II*).
 EE. Claws strongly toothed beneath (sub-bifid) Copidita (*Sub-section III*).
 DD. Eyes finely granulate. [Schmidt].
 E. Head short, eyes somewhat round Ischnomera (*Asclera*,
 EE. Head more elongate, eyes more oblong Dohrnia.
 CC. Only one spine at apex of front tibiæ Nacerdes.
 BB. Mandibles simple at apex (eyes coarsely granulate, claws simple, front tibiæ bi-spinose).
 C. Head short Oxacis (? *typical*).
 CC. Head considerably more elongate.
 D. Eyes gently transverse Oxacis (*Sub-section I*).
 DD. Eyes strongly longitudinal Oxacis (*Sub-section II*).
 AA. Antennæ more robust and considerably shorter.
 B. Eyes coarsely granulate Trichananca.
 BB. Eyes finely granulate Techmessa.
 AAA. Antennæ with intermediate joints more or less compressed in contrast with the others Pseudolyeus.
 AAAA. Antennæ serrate. [Macl.
 B. Size moderate (about 4 l.) (*Pseudolyeus*) *apicalis*,
 BB. Size very small (less than 2 l.) *Pseudananca*.

COPIDITA (*typical*).

C. baldiensis, sp. nov. Angusta, valde elongata; testacea, capite prothoracis macula utrinque posita et abdominis segmentis posticis 3 nigris, elytris nigro-cyaneis, antennis (harum articulis ultimis 4 apicem versus testaceis) palpis maxillaribus pedibusque (femoribus, apicibus exceptis, testaceis) piceis; capite parum elongato, minus crebre minus subtiliter punctulato; palporum maxillarium articulo ultimo elongato-cultriformi; mandibulis ad apicem bifidis; antennis gracilibus, articulo ultimo appendiculato; oculis magnis sat fortiter granulatis; prothorace pernitido, sparsim subtiliter punctulato, cordiformi, inæquali (antice canaliculato et utrinque foveolato, postice fovea magna mediana impresso, partibus nigris subtuberculiformibus), quam latiori paullo longiori; scutello crebre subtiliter punctulato; elytris

pube brevi minus dense vestitis, crebre subtiliter punctulatis, lineis subelevatis 3 obsolete instructis. Long., $4\frac{1}{2}$ —6 l.; lat., $1-1\frac{1}{4}$ l.

A very slender and elongate species, not very close to any other known to me. Resembling in form and structure *C. nigronotata*, Bohem.; its colours and markings are more like those of *australis*, Boisd. (though differing considerably in the black head, yellow scutellum, yellow sterna, piceous tibiæ and tarsi, &c.).

Victoria; Australian Alps (near the summit of Mount Baldi).

C. Kershawi, sp. nov. Sat angusta, sat elongata; testacea, antennarum articulis (ultimo excepto) in parte majori apicali nigris, prothorace (parte basali—in medio antrorsum producta,—excepta) elytris (sutura,—hac fere ad medium late et prope apicem ut fascia lata margines laterales attingenti dilatata—excepta) genubusque nigris, tibiis (plus minusve) et tarsis (articulis apicalibus 2 exceptis) piceis; capite sat elongato, subtilius vix crebre punctulato, in parte postica longitudinaliter canaliculato; palporum maxillarium articulo apicali elongato-cultriformi; mandibulis ad apicem bifidis; antennis sat gracilibus, articulo ultimo appendiculato; oculis magnis sat fortiter granulatis; prothorace pernitido, subtilius sparsius punctulato, subcordiformi, inæquali (postice in medio canaliculato et impresso, antice utrinque fovea lata leviter impresso), quam latiori vix longiori; scutello crebre punctulato; elytris pube brevi sat dense vestitis, confertim sat subtiliter subaspere punctulatis, lineis subelevatis 3 minus perspicue instructis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

The colours and markings of this species are very different from those of the other described Australian *Copiditæ*. The conspicuous yellow and black variegation of its antennæ is very noticeable. It is, perhaps, nearest structurally to the preceding (*C. baldiensis*), but differs *inter alia* by its head strongly canaliculate in the hinder part, its shorter and wider prothorax, the more crowded and asperate puncturation of its elytra, &c.

Victoria; taken by Mr. Kershaw.

C. Sloanei, sp. nov. Angusta, sat elongata; supra breviter pubescens; testacea, capite palpis antennis abdominis segmentis 3° 4° que pedibusque (femorum basi et tarsorum articulis apicalibus 2 exceptis) piceis vel nigris, elytris piceis vel nigris plus minusve cyanescentibus et testaceo-notatis (scil. macula communi mediana quadrata, et apice summo); capite sat elongato crebrius subtilius punctulato; palporum maxillarium articulo ultimo elongato-cultriformi; mandi-

bulis ad apicem bifidis; antennis gracilibus, articulo ultimo appendiculato; oculis magnis, fortiter granulatis; prothorace sparsim subtiliter punctulato, cordiformi, inæquali (postice in medio, antice utrinque, late leviter impresso), quam latiori paullo longiori; scutello crebre punctulato; elytris confertim sat subtiliter subaspere punctulatis, lineis subelevatis 3 minus perspicue instructis. Long., 4 l.; lat., 1l.

Resembles the preceding (*C. Kershawi*) in style of colouring though differing much in detail (*e.g.*, in its unicolorous antennæ), but widely distinct in colour and markings from all the other described species. Structurally it differs from *C. Kershawi*, *inter alia*, by its much longer and narrower prothorax, and its non-canaliculate head.

Australia; taken by Mr. Sloane (probably in N.S.W.).

C. (?) (Edemera) bivittata, Boisd. The brief description of this species reads very much as if it might have been founded on the insect that Mr. Champion has since described as *C. bipartita*, but the question of identity could only be decided by an examination of Boisduval's insect, so for the present it is best to disregard his name.

C. languida, sp. nov. Modice elongata, minus gracilis; breviter pubescens (prothorace glabro excepto); testacea, palporum antenarumque articulis singulis (horum ultimis 4 exceptis) prothoracis utrinque macula lunata, elytris [macula basali parva et vitta communi suturali (hac antice et postice abbreviata, ante et pone medium fasciatim dilatata,—fasciis margines laterales haud attingentibus sed ad apicem ramos longitudinales emittentibus) exceptis] tibiis tarsis abdomineque (his maculatim) et genubus piceis vel nigro piceis; capite modice elongato, confertim subtiliter punctulato; palporum maxillarum articulo ultimo elongato-cultriformi; mandibulis ad apicem bifidis; antennis sat gracilibus, articulo ultimo in medio valde constricto (subdeformi); oculis magnis sat grosse sed leviter granulatis; prothorace pernitido, sparsim subtiliter punctulato, cordiformi, inæquali (postice in medio, antice utrinque, late profunde impresso), quam latiori paullo longiori; scutello crebre subtiliter punctulato; elytris confertim subtiliter punctulatis, lineis subelevatis 3 perspicue instructis. Long., 6 l.; lat., $1\frac{3}{8}$ l.

Resembles *C. Sloanei* somewhat in the style of its colours and markings, though differing considerably in detail. It is considerably larger than that species, with its elytral puncturation very evidently finer, less asperate, the raised lines on its elytra much more defined, its prothorax more strongly cordiform with the inequalities of the surface much deeper, the variegation of

colours on its antennæ much less defined, &c., &c. It differs from all its congeners known to me by the very strong median constriction of the apical joint of its antennæ, and by the feebler, though scarcely less coarse, granulation of its eyes.

Queensland (In the S.A. Museum).

COPIDITA (Sub-section I.).

- C. hilaris*, sp. nov. Modice elongata, minus angusta; nigra, antennis basin versus subtus (articulis ultimis exempli typici carentibus) prothorace (hoc utrinque apicem versus nigro-gibboso) elytris rufis; capite parum elongato, nitido, subtiliter minus crebre punctulato; palporum maxillarium articulo ultimo elongato-cultriformi; mandibulis ad apicem bifidis; antennis gracilibus, articulo apicali appendiculato, parte appendiculata dilutiori; oculis magnis, sat fortiter granulatis; prothorace nitido, fere lævi, cordiformi, inæquali (postice in medio, et antice utrinque, foveolato), quam longiori vix latiori, ad latera antice gibboso; elytris pube sat densa vestitis, confertim subtiliter subaspere punctulatis, lineis subelevatis 3 perspicue instructis. Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{3}$ l.

An extremely distinct species, not resembling any other known to me in its colouring. Its antennæ inserted not close to the eyes are suggestive of *Chrysanthia*, of which genus it is, perhaps, a member, but I hesitate to place it there on account of its eyes being feebly emarginate, the second joint of its antennæ very short, its general form not exceptionally slender, &c. Mr. Horn includes in *Copidita* species having the antennæ inserted not close to the eyes, so I have good authority for placing the present species (at any rate provisionally) in that genus.

Victoria; sent to me by Mr. Kershaw.

COPIDITA (Sub-section II.).

- C. pulchra*, sp. nov. Elongata, angusta; minus nitida; rufotestacea, capite antennis palpis pedibus (femorum basi excepta) abdomineque nigro-piceis, elytris læte cyaneis; capite sat brevi, crebrius subtilius punctulato; palporum maxillarium articulo ultimo subsecuriformi quam penultimus parum longiori; mandibulis ad apicem bifidis; antennis sat gracilibus; oculis magnis, fortiter granulatis; prothorace crebrius subfortiter punctulato, sat cordiformi, leviter inæquali (postice in medio, et antice utrinque, leviter impresso), quam latiori sat longiori; elytris confertim subtilius aspere punctulatis, lineis subelevatis 3 perspicue instructis. Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{3}$ l. (vix).

A very pretty species, with the general appearance of a *Dohrnia*, but having eyes granulated like those of a typical *Copidita*. The short apical joint of its maxillary palpi seems to me inconsistent with a place in the latter genus. However, for present convenience I follow Mr. Horn in treating that as a non-generic character.

Victoria.

COPIDITA (Sub-section III.).

C. dentipes, sp. nov. Elongata, sat angusta; minus nitida; rufo-testacea, capite antennis palpis tibiis tarsis (horum articulis apicalibus 2 exceptis) metasterno abdomineque piceis vel nigro-piceis, elytris obscure cyaneis; capite sat brevi, subtilius minus crebre punctulato; palporum maxillarium articulo ultimo elongato-cultriformi; mandibulis ad apicem bifidis; antennis sat gracilibus; oculis magnis, grosse granulatis; prothorace crebrius subtilius punctulato, cordiformi, vix inæquali, quam latiori vix longiori; elytris confertim vix aspere subtilius punctulatis, lineis elevatis vix perspicue instructis; unguiculis subtus apicem versus dentatis (sub-bifidis). Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

Very like the preceding (*C. pulchra*) in colour and general appearance, but, *inter alia*, easily distinguishable by its strongly dentate claws, which Mr. Horn would regard as removing it from *Copidita*. Its very strongly granulated eyes are inconsistent with *Ischnomera* (*Asclera*). No doubt it will eventually form a new genus.

Australia (exact locality uncertain).

DOHRNIA.

This genus was founded upon a species having extraordinary antennal sexual characters. The eminent specialist on the *Heteromera*, Mr. Champion (Tr. E.S., Lond., 1895, p. 246) states that those sexual characters are not generic, and describes a species from Tasmania in which they are wanting. I find that I have an undescribed species in my collection which may be referred to *Dohrnia*.

D. (Ananca?) Boisduvali, Blackb. This species, referred by me to *Ananca* doubtfully (I regarded its simple antennæ as removing it from *Dohrnia*) is closely allied to *D. simplex*, Champ., which I have collected in various localities in Tasmania. It differs from the latter *inter alia* by the colouring of its head and legs, and by its much smaller prothorax, the sides of which are much more strongly incurved behind the anterior tuberosity, making the segment very much narrower in the hinder part and the extremities of the base much more prominent.

D. eremita, sp. nov. (Fem.). Elongata; supra plumbeo-nigra, prothorace rufo-testaceo; subtus nigroviridis, prothorace coxis (anticis aliqua ex parte exceptis) femoribusque (parte apicali excepta) testaceis; pube brevi subtus sparsim supra sat crebre vestita; antennis sat elongatis, articulis singulis pube (basin versus cinerea, apicem versus nigra) vestitis, 3^o quam 2^{us} vix tertia parte longiori, ultimo vix perspicue constricto; capite crebre subtilius punctulato, ante oculos modice elongato (quam *D. simplicis*, Champ., paulo magis lato minus elongato); oculis ut *D. simplicis*; prothorace cordato, antice transversim leviter impresso, crebre fortius subaspere punctulato; elytris ut *D. simplicis*, Champ. (crebre subtiliter punctulatis, lineis subelevatis 4 instructis). Long., 4 l.; lat., 1½ l.

Resembles *D. simplex*, Champ., but differs from it by, *inter alia*, the different colouring of its legs and under surface, the considerably greater length of its antennæ, the evidently less prolongation of its head in front of the antennæ, and the much closer and stronger puncturation of its prothorax.

Victoria; Black Spur.

NACERDES.

N. melanura, Linn. This now cosmopolitan species occurs in widely separated localities in Australia. The examples before me are from S. Australia, N.S. Wales, and Victoria.

OXACIS (?)

As I have not seen an example of any American species of *Oxacis*, there is a doubt as to whether, if compared with an American specimen, the Australian insects that I attribute to the genus might not require the provision of a new generic name. Nevertheless, there is no character mentioned in Mr. Horn's diagnosis of the genus (unless it be "form slender," which scarcely fits the species before me) inconsistent with its applying to at least the first two of the species enumerated below. The other species do not appear to be separable from those two if structural differences so great as Mr. Horn includes within the limits of *Copidita* may be regarded as non-generic; although I have little doubt that the aggregates, which I now call sub-sections of *Oxacis*, will sooner or later be treated as good genera.

O. (Edemera) australis, Boisd. (?). Modice elongata, minus angustata; breviter pubescens; cyaneo-plumbea, capite in medio palpis maxillaribus (apice summo excepto) mandibulis (nonnullorum exemplorum apice excepto) antennarum basi prothorace (macula magna utrinque posita excepta) coxis femoribus tibiisque rufo-testaceis; capite sat brevi, crebre

minus subtiliter punctulato ; palporum maxillarium articulo ultimo securiformi, quam præcedens multo longiori ; mandibulis ad apicem simplicibus minus acutis ; antennis modice robustis longioribus (maris multo, feminae parum) quam corporis dimidium, articulo 2° brevi, ultimo vix perspicue appendiculato ; oculis modicis, sat transversis, modice (*i.e.*, vix fortiter) granulatis ; prothorace subcordiformi, crebre subfortiter punctulato, ante medium transversim depresso, quam latiori paullo longiori ; elytris confertim subtiliter subaspere punctulatis, lineis subelevatis 3 vix perspicue instructis ; antennis ab oculis intervallo parvo separatis ; unguiculis inermibus. Long., 3—5 l. ; lat., 1—1½ l.

Boisduval's description merely mentions the colours and the puncturation of the prothorax, but as they apply very satisfactorily to the insect before me, I have thought it best to re-describe it with Boisduval's name,—which appears in Master's Cat. under *Ancana*. It agrees in all respects with Horn's diagnosis of *Oxacis* except in its form being (for an *Ædemerid*) somewhat robust rather than slender. Champion calls the eyes of *Oxacis* "coarsely" granulate (Horn does not characterise the eyes), which they are not in the present species, though they can scarcely be called "finely" granulate ; their granulation is finer than in *Copidita*, and less fine than in *Dohrnia* (e.g., *Simplex*, Champ.).

S. Australia ; not rare on flowers.

O. (Ananca) Zietzi, Blackb. This species agrees like the preceding with the characters attributed by Mr. Horn to *Oxacis* (in one of them even better, the antennæ being more slender) and agrees better with Mr. Champion's additional character, its eyes being somewhat more strongly granulated ; nevertheless, it cannot, in my opinion, be rightly regarded as congeneric with the preceding, differing from it in respect of characters that are not mentioned by Horn or Champion, of which the principal seems to be as follows :—The apical joint of the maxillary palpi, while twice as long as the preceding joint, is much less strongly securiform than the same joint in *australis*, Blackb. (? Boisd.) ; the tarsi are much more slender, and, owing to the penultimate joint being much smaller, the claw joint projects very much further beyond the penultimate ; owing to the long immersion in spirits of the insects of the Callabonna expedition, the exact structure of the under surface of the tarsal joints in this species is not easy to determine, but as far as I can see the antepenultimate, as well as the penultimate, joint is spongy-pubescent, and if I were sure of that character it would, no doubt, justify the creation of a new genus for *O. (?) Zietzi*. Its mandibles are (like those of *australis*) simple at the apex ; though narrowed to the

apex, the actual termination [is obtuse, not (as it should be in *Oxacis*) acute, but if the expression be taken in a general sense as equal to "pointed," it would apply well enough.

OXACIS (?) (Sub-section I.).

- O.* (?) *inquisitor*, sp. nov. Modice elongata, minus angusta; breviter pubescens; pallide testacea, mandibularum apice prothoracis linea longitudinali mediana elytris (margine angusta excepta) et abdomine plus minusve infuscatis; capite elongato, minus crebre minus subtiliter punctulato; palporum maxillarium articulo ultimo leviter securiformi, quam præcedens paullo longiori; mandibulis ad apicem simplicibus, vix acutis; antennis gracilibus, articulo apicali vix perspicue appendiculato; oculis magnis, leviter transversis sat fortiter granulatis; prothorace subcordiformi ut caput punctulato, vix inæquali, quam latiori vix longiori latitudine majori ad apicem sita; elytris confertim subtiliter nec aspere punctulatis, lineis subelevatis vix perspicue instructis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{1}{3}$ l.

This species is unmistakable, by the characters cited in the preceding table. In colouring it evidently resembles *Copidita bipartita*, Champ., from which its simple mandibles, no doubt, readily separate it. In one specimen there is on the elytra a short streak of paler colour from the base on the middle of the disc in addition to the pale margin; in another example (an immature one, I think) the prothorax has several feeble impressions.

N.W. Australia.

- O.* (?) *ornatipennis*, sp. nov. Elongata, angustata; pubescens; piceo-nigra, labro mandibulis basin versus antennæ palpis prothoracis vittis 2 elytrorum marginibus vittisque discoidalibus nonnullis et pedibus plus minusve testaceis; capite minus elongato, crebrius minus subtiliter punctulato; palporum maxillarium articulo ultimo elongato-securiformi, quam præcedens duplo longiori; mandibulis ad apicem simplicibus subacutis; antennis gracilibus, articulo ultimo vix manifeste appendiculato; oculis magnis, transversis, fortiter granulatis; prothorace subcordiformi, ut caput punctulato, inæquali (utrinque longitudinaliter impresso), quam latiori parum longiori, latitudine majori paullo ante medium sita; elytris crebre subtilius punctulatis, lineis subelevatis vix perspicue instructis. Long., 4 l.; lat., 1 l.

The testaceous lines on the elytra are one sutural, one marginal, and one intermediate between the former two, all narrow, sharply defined, and apparently constant; some examples have

faint indications of other lines in the intervals between the three well-defined lines. This species is quite unlike any other of the preceding species on account of its long narrow form as well as its style of colouring; its general appearance is distinctly suggestive of the *Longicorn* genus *Syllitus*. Its structural characters do not seem to differ much from those of the preceding species (*inquisitor*) except in its head being less elongate, and the apical joint of its maxillary palpi being longer in proportion to the second joint. Its prothorax is distinctly more elongate, and has its greatest width not very much in front of the middle. Compared with *australis* and *Zietzi* it has the head narrower (and consequently longer in proportion to the width) in front, and its eyes considerably more strongly granulate, with the apical joint of the maxillary palpi more strongly securiform than in *Zietzi*, and less so than in *australis*.

N.W. Australia.

OXACIS (Sub-section II.).

O. (?) caviceps, sp. nov. Modice elongata, minus angustata; pubescens; testacea, capite (postice) mandibulis ad apicem prothorace (hoc inæqualiter trivittatim) elytris (margine et notulis nonnullis longitudinalibus discoidalibus antemedianis exceptis) antennis tarsisque plus minusve infuscatis; capite elongato longitudinaliter concavo, subtilius minus crebre punctulato; palporum maxillarium articulo ultimo leviter securiformi, quam præcedens paullo longiori; mandibulis ad apicem simplicibus subacutis; antennis gracilibus, articulo apicali vix perspicue appendiculato; oculis permagnis, fortiter longitudinalibus (superne visis), fortiter granulatis; prothorace subcordiformi, ut caput punctulato, vix inæquali, quam latiori parum longiori, latitudine majori sat longe pone apicem sita; elytris confertim subtiliter subaspere punctulatis, lineis subelevatis vix perspicue instructis. Long., $4\frac{1}{2}$ — $5\frac{1}{2}$ l.; lat., $1\frac{1}{3}$ — $1\frac{2}{3}$ l.

Evidently near *inquisitor* and much like it in colour and markings, the infuscate parts however being much darker in the present species, which moreover is decidedly more nitid. The difference in the shape of the eyes however is so great as to suggest more than specific separation, and I do not think that difference is sexual. The shape of the ventral segments is uniform in all the specimens before me of both species (the apical segment being widely rounded at its apex), but there are specimens of either species with protruding *genitalia* obviously identical in sex. Other structural differences are to be found in the head of *caviceps* being longitudinally concave and

its prothorax at the widest considerably behind the middle, while the head of *inquisitor* is not longitudinally concave, and its prothorax is at the widest across the apex.

N.W. Australia.

- O. (?) *linearis*, sp. nov. Elongata, angusta; pubescens; piceofusca, labro mandibulis basin versus clypeo (antice) antennarum articulo basali (subtus) prothoracis vittis 2 elytrorum marginibus vittisque discoidalibus nonnullis et pedibus (his fusco-adumbratis) testaceis; capite valde elongato, sparsius fortius inæqualiter punctulato; palpis maxillaribus elongatis, articulo ultimo elongato-cultriformi quam præcedens sat longiori; mandibulis ad apicem simplicibus minus acutis; antennis gracilibus (exempli typici articulo ultimo carenti); oculis permagnis fortiter longitudinalibus (superne visis), fortiter granulatis; prothorace vix subcordiformi, fere ut caput sed paullo magis crebre punctulato, indeterminate inæquali (in medio longitudinaliter plus minusve subcarinato et latera versus subimpresso), quam latiori dimidio longiori, latitudine majori paullo ante medium sita; elytris crebre subtilius aspere punctulatis, lineis subelevatis haud instructis. Long., $3-4\frac{1}{2}$ l.; lat., $\frac{4}{5}-1\frac{1}{10}$ l.

This is a very interesting little insect, and combines resemblance to one and another of the preceding five species in a distinctly perplexing fashion. In shape, colour, and markings it is extremely like *ornatipennis*, but has, *inter alia*, the head very much more elongate, the maxillary palpi very much more elongate, the eyes quite differently shaped, the prothorax very much more elongate and differently shaped, and the elytral markings different in detail. In *ornatipennis* the well-defined apparently constant lines are three in number (including the suture and lateral margins) while in *linearis* there is an additional one similar to the other three, and placed a short distance from the lateral margin, and another (which, however, only reaches to about the middle of the elytra) placed at a short distance from the suture. The prothorax, to a casual glance, might appear as if it ought to be called subcylindric, but on careful inspection it is found to be of essentially similar form to those of its allies, the difference being only of degree, owing to the less development of the rotundity of outline in the front part of the sides. Its eyes are altogether like those of *O. caviceps*, from which, *inter alia*, it differs by the even longer and more rostriform front part of its head, its very differently shaped and proportioned prothorax, its very different markings, and much narrower build.

W. Australia (Coolgardie, &c.).

TRICHANANCA.

A specimen sent to me by Mr. Lea as his *Lemodes corticalis* is certainly congeneric (I think it is conspecific, though somewhat differently coloured) with my *T. victoriensis*. On careful consideration I think that, in spite of much unlikeness in facies, it is really allied to *Lemodes*, though not generically identical. Apart from general facies, I find *inter alia* that the apical joint of the maxillary palpi in *Lemodes* is an equilateral triangle reversed (its apex in contact with the penultimate joint, its base forming the truncate apex of the palpus), while in *Trichananca* the apical joint is an isosceles triangle connected with the penultimate joint by a short stem protruding from the extremity of the base,—much as it is in *Copidita*; in *Trichananca* the eyes are very much larger and more coarsely granulate than in *Lemodes*; in *Trichananca* the front tarsi have their basal two joints of equal length viewed from above, on the undersurface the basal joint is seen to be considerably the longer (the basal joint being strongly produced on one side, so as to resemble a bilobed joint with one of its lobes broken off), and the claw joint is very short (the part projecting beyond the fourth joint not being longer than the fourth joint itself), while in *Lemodes* the basal joint is simple, and twice as long as the second, the second third and fourth joints are equal *inter se* and the claw joint is as long as the preceding three together; in *Trichananca* the head is very short in front so that the interval between the base of the mandibles and of the antennæ is almost nil, while *Lemodes* has a distinct muzzle so that there is quite a long interval between the base of the antennæ and of the mandibles; in *Lemodes* the base of the head is almost straight and scarcely narrower than the head across the eyes, while in *Trichananca* the width across the eyes is by far the greatest width of the head. Unquestionably, however, the structure of the sterna and coxæ is sufficiently similar in the two genera to suggest the probability of their being allies, which is further indicated by the resemblance of the penultimate two joints of the maxillary palpi in one and the other. It is possible, therefore, that I was in error in referring this insect to the *Edemeridæ*, and that if *Lemodes* is rightly placed in the *Pyrochroidæ* (concerning which M. Lacordaire expresses his doubt) the present genus also should, perhaps, stand in that family. It should, however, be added that *T. victoriensis* bears much more superficial resemblance to the Tasmanian and New Zealand *Techmessa* than to *Lemodes*, except, perhaps, in its distinctly cordiform prothorax and stouter legs; though its coarsely granulated eyes and other characters forbid its being referred to that genus. I cannot agree with Mr. Lea's remark that the head has a distinct neck. The relation between the head and prothorax is quite as in *Techmessa*.

TECHMESSA.

I have in my collection a Tasmanian specimen which seems to be decidedly congeneric with Mr. Champion's *T. ruficollis*. Indeed, as I can find no discrepancy even as a *species* between it and Mr. Champion's description, except in respect of colour, I am obliged to regard it provisionally as a variety of that insect. It is entirely black, except the mouth organs and labrum the summit of the front coxæ and the trochanters which are pitchy-testaceous. It even presents the same prothoracis peculiarity as Mr. Champion's specimen (and which he mentions as abnormal) in that the prothorax is rounded on one side and subangularly dilated on the other. I consider it unquestionably allied rather closely as a genus to my *Trichananca* from which, however, it is readily separated by good generic characters, especially the fineness of the granulation of its eyes, the considerably less dilatation of the apical three joints of its maxillary palpi, and the greater slenderness of its front tarsi—and, indeed, of its legs altogether.

PSEUDOLYCUS.

The species of this genus are extremely variable in respect of colour and markings and unfortunately colour distinctions are almost the only ones that have been referred to in the descriptions. The number of names that have been applied to real or supposed members of *Pseudolycus* are, so far as I know, seven, and one of them (*P. apicalis*), as I have already stated, does not represent a true *Pseudolycus*. *P. cinctus*, Mr. Champion has shown (*loc. cit.*) to be a variety of *hæmorrhoidalis*, Fab., and it seems to be hardly doubtful that *atratus*, Guèr., is another variety of the same. *P. (Ædemera) luctuosa*, Boisd., is described in seven words, which exactly agree with the brief description of *P. atratus*, Guèr.; nevertheless, inasmuch as there is another species of which they might very well be a Boisduvallian description, and there is good reason to think that *luctuosa* was not founded on a Tasmanian specimen, it seems desirable to claim Boisduval's name for this latter species which, although very close to *P. hæmorrhoidalis*, Fab. (= *cinctus*, Guèr. = *atratus*, Guèr.) is, I believe, really distinct from it. *P. marginata*, Guèr., is the one species of the genus that may be identified with some confidence by the description of its author, and this identification is confirmed by the specimens which agree with the description having been taken in the locality cited by Guèrin. There remains *P. hæmoptera*, Guèr., and this its author only *conjectures* to be Australian. I have before me a *Pseudolycus* (in Victoria the most plentiful species of the genus) which agrees fairly well with Guèrin's description (differing most in being smaller than the size Guèrin states) and which, I think, may fairly be treated as

hæmoptera—at any rate until an examination of the type shall prove the contrary.

Thus I regard *Pseudololycus* as at present consisting of four species, viz., *hæmorrhoidalis*, Fab., *luctuosa*, Boisd., *marginata*, Guèr., and *hæmoptera*, Guèr., to which I have to add two new ones. The following table indicates characters by which the six may be identified:—

- | | | |
|-----|--|------------------------------|
| A. | Prothorax having two ridges, which diverge obliquely hindward from the middle of the median line enclosing a triangular depression. (Antennæ unicolorous). | |
| B. | Prothorax distinctly cordiform. | |
| C. | Prothorax notably wider than long. (Hind tarsi unicolorous) | <i>hæmorrhoidalis</i> , Fab. |
| CC. | Prothorax not (or scarcely) wider than long. (Base of hind tarsi testaceous) ... | <i>luctuosus</i> , Boisd. |
| BB. | Prothorax scarcely cordiform. (Base of hind tarsi testaceous) | <i>marginatus</i> , Guèr. |
| AA. | Middle longitudinal line of prothorax continuously convex or carinate. (Antennæ not unicolorous) | |
| B. | Surface of prothorax very uneven through the presence of large impressions and foveæ. | |
| C. | Prothorax notably longer than wide, and feebly cordiform | <i>elegantulus</i> , Blackb. |
| CC. | Prothorax only slightly longer than wide, strongly cordiform | <i>hæmopterus</i> , Guèr. |
| BB. | Surface of prothorax even or nearly so | <i>puberulus</i> , Blackb. |

P. hæmorrhoidalis, Fab. I have not seen this species except from Tasmania. So far as my observation goes the colour is uniformly black, except the elytra, which vary from entirely black (if *atratus* is a var. of it) through forms in which only the apex of the elytra is red (type), and others in which the sides, or the sides and suture (*cinctus*), as well as the apex are red, to a form in which the elytra are entirely red (figured by Mr. Champion, *loc. cit.*, and in my collection). From its nearest allies it is distinguishable also by its prothorax of evidently (though not at all strongly) cordate form, and quite strongly transverse.

P. luctuosus, Boisd. The species to which I apply this name occurs in Victoria, and closely resembles *hæmorrhoidalis*, Fab. In colour its elytra vary exactly as those of *hæmorrhoidalis* do, and in addition the specimens with red elytra have some red blotches on the prothorax. The base of the basal joint of the hind tarsi seems to be invariably whitish testaceous. The prothorax is sculptured on the upper surface like that of *hæmorrhoidalis*, but is scarcely wider than long, and is very evidently more cordiform. The antennæ are like those of *hæmorrhoidalis* in their dilated joints being very strongly dilated in both sexes.

P. marginatus, Guèr. A wider, more depressed, and more fragile-looking species than either of the preceding. I have seen only two examples of it, and, therefore, cannot say much about its variability. In both of these there is a large, somewhat oval spot of pale testaceous colour on either side of the prothorax, one side of either spot (as viewed from above) placed so close to the side of the prothorax as almost (but not quite) to form the lateral margin. The shoulders and apex of the elytra in both are testaceous. In one of them the apical colour runs up the suture and lateral margin only for a short distance; in the other it extends forward to the shoulders on the lateral margin, and almost to the base on the suture. The hind tarsi are coloured as in *luctuosus*, but the pale colouring is only at the *extreme* base. The prothorax can be called cordiform even less decidedly than that of *hæmorrhoidalis*, the greater part of the sides being only very feebly rounded, and their hinder situation being only close to the base. The antennæ are like those of *luctuosus*.

P. elegantulus, sp. nov. Mas. Elongatus, gracilis; colore probabiliter variabilis, [exempto typico nigro rufo-notato [sc. prothorace (vitta mediana et macula parva utrinque posita exceptis) elytris (vittis angustis 3 exceptis) et antennarum articulis 8° fere toto 9° que ad basin, rufis]; capite subtilius minus crebre punctulato; antennarum articulis 3°—7° leviter dilatatis (3° quam 1^{us} parum latiori, ceteris gradatim angustioribus, 7° quam 8^{us} parum latiori); prothorace nitido, leviter cordiformi, quam latiori sat longiori, in medio longitudinaliter leviter obtuse elevato, utrinque late minus profunde impresso; elytris confertim subtiliter subaspere punctulatis pubescentibus, costis 4 latis obtusis discoidalibus instructis. Long., 3½ l.; lat., ¼ l.

Fem. latet.

Differs from all the other *Pseudolyçi* known to me by the sculpture of its prothorax; also differs from *hæmorrhoidalis* and *luctuosus*, and probably also from *marginatus* (of which I have not seen a male) in the dilatation of the intermediate joints of the antennæ being very feeble in the male. Its nearest ally seems to be the species I have called *hæmoptera*, from which it differs, *inter alia*, by its much less cordiform more nitid less closely punctulate and very differently coloured prothorax (which, moreover, has not a well-defined median carina), by the much greater width of the elevated lines on its elytra, and by its shorter head.

Victoria.

P. hæmopterus, Guèr. The insect that I believe to be the original of this species is somewhat common in the mountainous

parts of Victoria, and is (as its author says *hæmopterus* is) somewhat more convex than most *Pseudolyci* are. Its colour is very variable as regards the prothorax and elytra, the former being usually black but in some examples with red markings, and the latter red with black markings which vary from a single subsutural line through intermediate forms to a form in which only the apex and the hind part of the lateral margin are red. The rest of the insect is black except the eighth and ninth antennal joints, which are partly testaceous. In the male the antennal structure is like that of the male of the preceding species (*elegantulus*). In the female joints 3—7 (especially 3—5) are more strongly dilated, but evidently less strongly (6 and 7 very much less strongly) than in *hæmorrhoidalis* and its allies. The prothorax is subopaque, strongly cordiform, distinctly longer than wide, closely finely and subasperately punctulate, finely and quite sharply carinate the length of the middle line (the carina, however, not quite reaching the base), and has a large strong fovea on either side of the middle line a little behind the apical margin.

P. puberulus, sp. nov. Fem. Elongatus, sat angustus; sat dense pubescens; colore probabiliter variabilis, exemplo typico nigro rufo-notato [sc. prothoracis macula magna hirsuta basali utrinque posita, elytrorum vitta brevi angusta subsuturali, et antennarum articulis 8° 9° que (hujus apice excepto), rufis vel testaceis]; capite minus brevi, sat nitido, crebrius subtilius (nullo modo aspere) punctulato; antennarum articulis 3° — 5° modice (6° 7° que leviter) dilatatis; prothorace quam latiori parum longiori, cordiformi, fere æquali, longitudinaliter in medio minus perspicue elevato; elytris confertim subtiliter subaspere punctulatis, lineis 4 discoidalibus leviter elevatis instructis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{3}{10}$ l.

Mas. latet.

A very distinct species; more closely pubescent than its allies; and at once distinguishable from the other *Pseudolyci* known to me by the large patch of fulvous pubescence at the base of the prothorax on either side of the median line, as well as by the almost even surface of that segment. The structure of the antennæ of the female is much like that of the female of *hæmopterus*.

N.S. Wales; Blue Mountains.

CURCULIONIDÆ.

ECRIZOTHIS (gen. nov. *Leptopsidarum*).

Rostrum robustum breve, ad apicem dilatatum et ut *Leptops* lamina glabra subtriangulari instructum, supra 3-carinatum;

scrobes submedianæ, antice latæ, postice vix distinctæ; antennæ robustæ, scapo prothoracem vix attingenti, funiculo 7-articulato (articulis 3 basalibus quam latioribus paullo longioribus, 4—6 brevioribus, 7° longiori), clava distincta; oculi modici obliqui late ovales; prothorax subcylindricus, lobis ocularibus fere nullis; scutellum indistinctum; pedes modici; tibiæ corbulæ apertæ; unguiculi liberi; metasternum breve; processus intercoxalis minus latus; corpus squamosum et setosum.

I found this genus for a remarkable little species that I have had for some time past unnamed in my collection, and which has recently been sent to me by Mr. French with the information that it is destructive to vegetation in Victoria. I feel some hesitation in assigning it to the *Leptopsides*, but it seems to be more at home there than anywhere else; moreover, Mr. Lea (who has lately been much occupied with the Australian *Curculionidæ*) tells me that he regards it as an undescribed *Leptopsid* genus. The extreme feebleness of the ocular lobes and the wide obliquely-placed eyes are unusual in the Tribe. The following characters in combination distinguish this from the other characterised Australian *Leptopsid* genera:—Corbels of hind tibiæ open, claws normal and free, scape of the antennæ reaching (when set back) to the prothorax. Probably its nearest ally is *Scotasmus* (which I have not seen), which differs from it, *inter alia*, by the scape of its antennæ reaching only to the eyes.

E. inæqualis, sp. nov. Piceus, squamis albidis fuscisque confertim et setis brevibus suberectis (his ut squamæ coloratis) minus crebre vestitus; prothorace quam longiori vix latiori (latitudine majori paullo ante medium posita), crebre subtilius ruguloso et indeterminate inæquali; elytris striatis, striis crenulato punctulatis, interstitiis confertim subtilius punctulatis, interstitio 3° tuberculis circiter 4 obtusis armato (ex his posterioribus 2 sat magnis), interstitio 5° tuberculis nonnullis subobsoletis armato. Long. (rostr. incl.), $2\frac{2}{3}$ l.; lat., 1 l.

In fresh specimens the whitish and pale fuscous scales so thickly cover the whole surface that no sculpture is noticeable, except the hinder two tubercles on the third interstice of each elytron.

Victoria.

CUBICORHYNCHUS.

C. tortipes, Blackb. Mr. Lea tells me that he has examined the type of *C. angularis*, Macl., and finds that *tortipes* is identical with it. Mr. Pascoe (Journ. Linn. Soc., 1873) states, "on the authority of Mr. Duboulay," that *angularis* is the male of

Bohemanni, Schh. There is nothing in the description of *C. angularis* on which any opinion could be formed as to the correctness of the above synonymy.

HYBORRHYNCHUS.

H. aurigena, sp. nov. Piceus, squamis albidis fuscisque intermixtis confertim vestitus; rostro lato brevi, utrinque obtuse carinato-marginato, margine supra oculum abrupte desinente tuberculum conicum simulanti; capite postice convexo, a clypeo sulco profundo distincto, pone sulcum longitudinaliter rugato et tuberculis parvis instructis, in vertice anguste impresso et bituberculato; prothorace transverso, postice angustato, canaliculato, supra sat plano confuse tuberculato, ad latera utrinque ante medium acute bituberculato; elytris seriatim tuberculis parvis instructis (tuberculis inter se sat æqualibus, crebre dispositis, singulis setas singulas ferentibus), biseriatim in interstitio 3° leviter 4-gibbosis, ad apicem inermibus. Long. (rostr. incl.), 5 l.; lat., $1\frac{4}{5}$ l.

The absence of a mucro at the apex of the elytra distinguishes this species from all its previously described congeners except *rugosus*, Macl., *crassiusculus*, Macl., and *Mastersi*, Macl. From *rugosus* and *Mastersi* it differs, *inter alia*, by its elytra having no tubercles notably larger than the rest about the hind declivity, and from *crassiusculus* by the very different sculpture of its head and prothorax.

W. Australia; taken by Mr. Froggatt at Kalgoorlie.

CENTYRES.

C. delens, sp. nov. Piceus, setulis brevibus albidis minus crebre, et squamis ochraceis fuscisque dense vestitus, his in prothorace medio vittatim et in elytris disperse maculatim condensatis; antennis fuscis, scapo modice elongato, articulis basalibus 2 sat elongatis inter se sat æqualibus; rostro subobsolete tricarinato; prothorace leviter transverso, antice leviter angustato, punctulato, obsolete vermiculato-ruguloso, lateribus minus fortiter rotundatis; elytris ampliatis, sat convexis, punctulato-striatis, interstitiis leviter convexis; tibiis anticis intus minus perspicue denticulatis,—posticis ad apicem cavernosis; abdominis segmento 2° quam 3^{us} parum longiori. Long. (rostr. incl.), 4 l.; lat., $1\frac{3}{5}$ l.

Differs from the previously described species by the median fuscous vitta of its prothorax and the small fuscous spots on its elytra, and by the less distinct denticulations of its front tibiæ. Compared with *C. turgidus*, Pasc., it is much smaller, &c.; with *ovis*, Pasc., it is of considerably more convex build; while i

differs from *sinuatus*, Blackb., *inter alia* by its prothorax with less strongly rounded sides and narrower in proportion to the elytra.

N.S.W. ; sent by Mr. Froggatt, and stated to be destructive to vines.

LONGICORNES.

YORKEICA (gen. nov. *Phoracanthidarum*).

Palpi subæquales sat breves robusti, ad apicem truncati ; caput breve ; antennæ quam corpus parum longiores (articulis 1° subpiriformi, 2° brevi, 3° quam 1^{us} paullo longiori, 4° quam 1^{us} vix longiori, 5° quam 3^{us} sublongiori, ceteris longioribus, 11° appendiculato), articulis 3—7 ad apicem utrinque spinosis (spina externa quam interna majori) ; oculi sat grosse granulati ; prothorax inermis ; elytra ad apicem bispinosa ; pedes antici quam posteriores multo breviores ; femora sat lineares ; tarsi sat breves, articulo basali quam latiori vix duplo longiori, quam sequentes 2 conjuncti sat breviori, unguiculi divergentes ; coxæ intermediæ clausæ.

The position of this genus is very difficult to determine. According to Lacordaire's classification it is a *Phoracanthid* on account of the strongly granulated eyes, spined antennæ, and closed intermediate coxal cavities ; therefore I place it among the *Phoracanthid* genera.* But its prothorax unarmed at the sides and scarcely tuberculate above, and its short tarsi (with the basal joint distinctly shorter than the following two together, and the claw joint very little shorter than the preceding three together) separate it very widely from all other *Phoracanthides* known to me, and are almost *Lamiid* in appearance. The front legs very short in comparison with the four hinder legs perhaps suggest an affinity to the genus *Xypeta*, Pasc., but, otherwise, it does not seem to resemble *X. grillaria*, Pasc. I am not sure of the sex of the type, but think it probably a female.

Y. marmorea, sp. nov. Picea, pube cinerea et fulva marmorata ; prothorace leviter transverso, in disco ante medium tuberculis parvis nonnullis instructo, lateribus leviter arcuatis ; elytris antice sat grosse punctulatis et tuberculis plurimis nitidis parvis armatis, postice sparsim minus profunde punctulatis nec tuberculatis. Long., 16 l. ; lat., 5 l.

The markings resulting from the presence of ashy and fulvous pubescence on the piceous derm are extremely intricate. On the head an ashy line runs down the middle, a fulvous line runs

* Since this was written Mr. Gahan,—to whom as an eminent specialist on the *Leucicornes* I submitted my specimen for inspection,—has favored me with his opinion that *Yorkeica* is correctly placed in *Phoracanthides* as a new genus. He thinks it near *Demelius*.

across the base, and there is fulvous pubescence on the labrum and the inner margin of the eyes. The prothorax is confusedly marbled with ashy and fulvous pubescence. The elytra may be described as marbled with ashy pubescence, which is interrupted here and there by bare spaces of piceous derm and also by nitid tubercles, and is traversed by four longitudinal lines of fulvous pubescence extending from the base to the apex,—these lines being themselves much interrupted by bare spots of derm and nitid tubercles. The antennæ are closely clothed with ashy pubescence except at the extreme apex of each joint. The legs are marbled with ashy pubescence, and there are some spots of fulvous pubescence on the femora. The under surface is covered with ashy pubescence in which, however, are numerous small bare spots of derm, and also many large blotches (generally transverse) of fulvous pubescence.

N. Queensland (Cape York); sent to me by Mr. French.

BETHELIUM.

B. (?) spinicorne, sp. nov. Rufo-ferrugineum (nonnullorum exemplorum elytris abdomineque infuscatis), elytris fasciis binis pallide flavis (altera angusta angulata ante medium, altera sat lata obliqua pone medium, positis) suturam haud attingentibus ornatis; parce setosum; prothorace subcylindrico, antice posticeque leviter angustato, crebre subobsolete punctulato, lateribus leviter arcuatis; elytris a basi usque ad fasciam posticam sat crebre sat fortiter (postice obsoletius) punctulatis; antennis quam corpus paullo longioribus, articulis 3^o (hoc ad apicem spina elongata armato) quam 1^{us} vel 4^{us} sat longiori, 5^o—9^o inter se sat æqualibus (his quam 3^{us} sublongioribus). Long., 5 l.; lat., $1\frac{1}{3}$ l.

I have recently received this species from Mr. French. It is evidently the insect referred to by Mr. Gahan (Tr. Ent. Soc., Lond., 1893, p. 178) as allied to, but distinct from, *B. Blackburni*, Gahan. Mr. Gahan thinks it doubtful whether it is a true *Bethelium*, and I share his doubt, as the antennal spine is not present, and the elytral markings are of a different kind (not of the slightly raised, ivory-like, description they are in the present species) in the type of the genus (*B. signiferum*, Newm.). From Mr. Gahan's remarks on *B. Blackburni*, however, I should judge that that insect is intermediate between the present species and *B. signiferum*, having the elytral markings of the former but not the antennal spine; and if so there may be other intermediate forms yet to be discovered which may prove the antennal spine not to be a truly generic character.

Victoria.

B. tricolor, Blackb. Mr. Gahan (*loc. cit.*) thinks that this may be the same thing as *Ectosticta simillima*, White, remarking at the same time the close resemblance and alliance between *Bethelium* and *Ectosticta*, a resemblance which I also had referred to in a former paper. It is difficult to arrive at certainty without seeing the type of *E. simillima* as to whether Mr. Gahan's surmise is correct, but it is quite certain that *B. tricolor* has the eyes of a *Bethelium* and not of an *Ectosticta*—so that if the above synonymy is to be accepted *E. simillima* must be removed from *Ectosticta* to *Bethelium*.

SISYRIUM.

S. sparsum, Blackb. Mr. Gahan (*loc. cit.*) thinks it not unlikely that this is identical with *S. stigmatosum*, Pasc. Unfortunately the matter could be decided only by a comparison of types. My species was described on a unique male, Mr. Pascoe's on a female. Compared with the figure of the latter, *S. sparsum* is very much smaller and of more slender build, with the anterior dark mark on the elytra (not a fine line as in *stigmatosum*, but) a large quadrate blotch nearly as wide as long. It is quite possible that these differences appertain to the sexes of one species that is variable in its markings, but it is to be noted that when the type of *sparsum* is compared with Pascoe's description the following differences also appear:—The prothorax is of much darker colour than the description indicates, and I cannot trace five unpunctured spaces on that segment, the unpunctured spaces appearing as three longitudinal zones. In the type of *sparsum* there is a large deep fovea on the disc of the prothorax immediately in front of the base which looks, however, as if it might be accidental, and on account of my suspecting it to be so I did not emphasize it in describing the species, but merely called the prothorax "inæqualis."

S. ventrale, Blackb. Mr. Gahan (*loc. cit.*) seems to think that this may be identical with *stigmatosum*, Pasc., if *sparsum*, Blackb., is not; this, however, can hardly be the case, for he states that by measurement the length of the prothorax of *stigmatosum* is all but half greater than the width, whereas, in *ventrale* the length is all but the same as the greatest width (it is about as 16 to 15).

S. vittatum, Blackb. (? var. of *stigmatosum*). I do not see where the mistake that Mr. Gahan perceives in my remarks on this insect comes in, as I expressed no opinion as to the proportions of the prothorax in *stigmatosum*, but merely indicated as my reason for not emphasising very much the difference between the proportions of the prothorax in it and the var. *vittatum* that Mr. Pascoe did not say that he had measured the prothorax of *stigmatosum*, and that if he had not done so his statement of the proportions would not be reliable enough to confirm the distinctness of *vittatum*

from his insect. It is satisfactory, however, that Mr. Gahan is able to decide this point definitely, and states that *S. vittatum* is not a var. of *stigmatosum*.

TESSAROMMA.

T. nanum, sp. nov. Subtus piceum, metasterno dilutiori; supra piceum, capite prothoracis parte antica-mediana et elytris postice indeterminate rufescentibus, antennis palpis pedibusque (femorum parte clavata obscura excepta) rufo-testaceis; setis fulvis erectis sparsis instructum, elytris pube argenteo-sericea maculatim ornatis; capite confertim subtiliter aspere punctulato, lineal longitudinali mediana vix perspicue impresso; antennarum articulo 3° leviter arcuato; prothorace quam latiori perspicue longiori, antice posticeque leviter constricto, ad latera media spinoso, dorso longitudinaliter bicristato, cristis a margine antico fere ad basin continuis; elytris basin versus sparsim granulatis, ad apicem rotundato-truncatis. Long., $3\frac{1}{2}$ l.; lat., 1 l. (vix).

At once distinguishable from its previously described congeners by, *inter alia*, its much more slender legs and antennæ, its head not impressed with a well-defined median longitudinal furrow, its prothorax with (the ill-defined pair of median gibbosities of the other species represented by) two well-defined elevated longitudinal crests, which are quite traceable to the front margin, though much more feeble (and also more widely separated from each other) on the part in front of the anterior constriction than behind it (in fact the crests on that part ought perhaps to be described rather as isolated sub-obsolete crests not quite in line with the larger ones), and its elytra with spots of silvery pubescence similar to those of *P. undatum* in the front two-thirds of their length, but having the apical one-third densely and quite uniformly clothed with the pubescence. The very small size of this species, of course, also distinguishes it. The two divisions of the eyes are very widely separated from each other, and coarsely granulated. Viewed from the side the gibbosity of the prothorax is markedly greater than in either *undatum*, Newm., or *sericans*, Er.

Queensland; sent by Mr. French.

PHYTOPHAGA.

COOLGARDICA (gen. nov. *Sagridarum*).

Caput abrupte declive, modice elongatum; palporum maxillarium articulus ultimus ovalis; oculi sat parvi, transversim ovales, fortiter prominentes, grosse granulati; antennæ filiformes quam corpus circiter dimidio breviores, articulo ultimo appendiculato; prothorax cordiformis, angulis anticis rotun-

dati, posticis subdentiformibus; elytra quam prothorax sat latiora, sat brevia, ad apicem inermia; prosternum inter coxas anticæ angustum, quam coxæ minus elevatum; mesosternum ante coxas intermedias sat longe productum; metasternum inter coxas intermedias haud productum; abdominis segmentum basale quam sequentia 3 conjuncta vix brevius, antice sat angustatum; pedes sat breves, femoribus (præsertim posticis) crassis, posticis subtus prope apicem dente acuto armatis, tarsis brevibus (inter se æqualibus, articulis basilibus 3 inter se æqualibus latis quam latioribus haud longioribus, unguiculis simplicibus).

It will be seen from the preceding diagnosis that this genus in many respects resembles *Duboulayna*, but differs from it notably by its small excessively prominent eyes, and its front coxæ rising considerably above the level of the narrow intermediate space. Its eyes are not unlike those of *Polyoptilus*, though smaller, but it differs entirely from *Polyoptilus* in the structure of its tarsi. From *Megamerus* it differs, *inter alia*, by the small oval apical joint of its maxillary palpi, from *Prionesthis* and *Cheiloæna* by its strongly toothed hind femora, from *Carpophagus*, *Diaphanops*, *Mecynoderæ*, and *Amettala* by the extremely coarse granulation of its eyes, and from *Pseudotoxotus* by its short tarsi. In Chapuis' arrangement of the *Sagrides* its place is in the "Groupe" *Megamerites*. There are four examples before me (three of them belonging to the S.A. Museum) among which I cannot detect any indication of sexual differences. Although I have not a specimen that I can damage sufficiently to make a proper examination of its *ligula* I can see that that organ is of the *Sagrid* as distinguished from the *Criocerid* character.

C. tenebrioides, sp. nov. Nigra vel ferruginea, omnium exemplorum palpis antennarum basi apiceque et abdomine rufescentibus; sat nitida; capite prothoraceque confertim subtilius subaspere punctulatis; antennis quam corporis dimidium vix longioribus, sat gracilibus articulis 3° 4° que inter se sat æqualibus; oculis sat parvis, transversis, grosse granulatis; prothorace subcordato (nonnullorum exemplorum indeterminate inæquali); elytris sat fortiter vix crebre subseriatim punctulatis, lineis subelevatis 4 instructis; corpore supra fere glabro, subtus pubescenti. Long., 4 l.; lat., 1 $\frac{3}{5}$ l.

A short robust insect somewhat resembling in build certain small species of the *Tenebrionid* genus *Menepphilus*, varying in colour from ferruginous to black. In one of the darkest specimens the shoulders are ferruginous.

W.A. (Coolgardie).

NEODIAPHANOPS (gen. nov. *Sagridarum*).

Caput declive, minus elongatum; palporum maxillarium articulus ultimus ovalis; oculi sat parvi, transversim ovales, sat prominuli, subtilius granulati; antennæ robustæ, quam corpus paullo breviores, articulis intermediis compressis (maris quam feminae magis fortiter, ultimo feminae appendiculato maris deformi); prothorax subcylindricus, latitudine majori ad basin sita (fere ut *Diaphanopsis*), angulis anticis vix distinctis; elytra quam prothorax multo latiora, fere a basi dehiscentibus, ad apicem rotundata; prosternum inter coxas angustum, quam coxæ vix minus elevatum; metasternum inter coxas intermedias haud productum; pedes modici, femoribus modice incrassatis (posticis quam anteriores paullo magis, illis prope apicem dente acuto armatis), tarsis modice elongatis (fere ut *Diaphanopsis*), robustis, articulo basali quam 2^{as} parum longiori, unguiculis simplicibus; abdominis segmentum basale quam 2—4 conjuncta parum brevius.

Nearest I think to *Diaphanops* of described genera, beside which it would stand in M. Lacordaire's arrangement as a member of the "Groupe" *Carpophagites*, on account of the greatest width of its prothorax being at the base of that segment. In that "Groupe" it differs from *Carpophagus inter alia* by its prosternum not prominent behind the coxæ and its very much less dilated femora, and from *Diaphanops* by its head not rostriform in front, transversely oval eyes, and much longer antennæ. Its elytra (of ordinary length but) dehiscent almost from the base in both sexes, and strongly depressed distinguish it at once from all described Australian genera of *Sagrides*. Its ligula is of the *Sagrid* type. The upper surface of the typical species is pubescent (rather closely on the prothorax and head, very sparsely on the elytra), and the under surface is densely so. The facies, and especially the colours and markings, are suggestive of *Polyoptilus*, but I do not look upon that genus as at all closely allied structurally to the present one.

N. Froggatti, sp. nov. Niger, antennis (articulis basalibus 3 exceptis) tarsisque rufis, elytris flavo-variegatis; minus nitidus; capite prothoraceque confertim subtiliter aspere punctulatis; antennarum articulis 1^o sub-globoso, 2^o perbrevis, 3^o quam 1^{us} 2^{us} que conjuncti vix breviori obovata, 4^o quam 3^{us} vix breviori subtriangulari fere transverso, 5^o quam 4^{us} parum longiori, 4^o—11^o gradatim longioribus; prothorace leviter transverso sub-cylindrico, ad basin dilatato, lateribus leviter sinuatis; elytris sparsius subfortiter nullo modo seriatim punctulatis, sutura manifeste carinata.

Maris antennarum articulis 4—10 manifeste compressis, articulo apicali breviter appendiculato deformi (sc. inæquali versus apicem tuberculo magno mamillato et tuberculis nonnullis minoribus armato.)

Fem. antennarum articulis 4—10 leviter compressis, ultimo breviter appendiculato. Long., 5 l. ; lat. 2 l. (vix).

Evidently variable in the markings of its elytra. I have before me three examples, no two of which are quite alike. In one of them the elytra may be described as bright yellow with the suture narrowly black for a short distance behind the base, this narrow black suture suddenly and squarely dilating about half-way between the base and the middle of the elytra into a very wide common sutural vitta and then dilating again about half-way between the middle and apex of the elytra to occupy the whole apex. The apical black is narrowly produced up the lateral margin nearly to its middle and then turns inward on the elytron and joins the sutural vitta, so as to enclose a large yellow spot. There is also an oblique black dash running hindward and sutureward (but not reaching the suture) from the lateral margin near its front. In another example the base of the elytra is narrowly black, and the oblique dash is continued so as to connect with the front margin of the transverse connection between the sutural vitta and the black part of the lateral margin. The third example is like the type, except that the connection between the sutural vitta and the black part of the lateral margin is wanting.

N.W. Australia ; sent by Messrs. Froggatt and Masters.

POLYOPTILUS.

It appears to me doubtful whether all the species that have been attributed to this genus are really congeneric, but there certainly seem to be serious difficulties in the task of separating them, inasmuch as there is only one of them (*P. Lacordairei*, Germ.) of which both sexes are known with certainty. At present, therefore, it seems well to regard the genus as distinguished from other described Australian *Sagrides* by the following characters in combination ; metasternum not prominent between the intermediate coxæ (as it is in *Mecynodera*), elytra not spiniform at apex (as they are in *Ametalla*), prothorax not at its widest at the base (as it is in *Carpophagus*, *Diaphanops*, *Pseudotoxotus*, and *Neodiaphanops*), mandibles not bifid at the apex (as they are in *Cheiloxena*), apical joint of maxillary palpi not securiform (as it is in *Megamerus*), hind femora not unarmed in combination with normal elytra (as they are in *Prionesthis*), eyes not depressed (as they are in *Duboulayia*), tarsi not short and having their basal three joints equal or nearly so, *inter se* (as

they are in *Coolgardica*). Species referable to *Polyoptilus* by the characters indicated above, and not distinguishable by any well-marked and obviously generic character from the species already attributed to that genus, seem to me best placed for the present in *Polyoptilus*. I make the above remarks with a view to describing two new species of *Sagrides*, which were taken in Tropical Queensland by Mr. Koebele, and which certainly do not seem to a casual glance congeneric, *inter se*, and yet one of them is evidently closely allied structurally to *P. Lacordairei*, Germ., and the other to *P. Ericksoni*, Germ. They differ from all the known Australian *Sagrid* genera, except *Polyoptilus*, as I have noted above that *Polyoptilus* does, and I fail to discover in them any well-marked structural character that would decidedly separate them from both the species of *Polyoptilus* named above.

I may perhaps remark in passing that the description of *Polyoptilus pachytoides*, Baly, reads in some respects as if it might have been founded on a female example of the genus described above as *Neodiaphanops*, although I find it difficult to believe that if that had been the case Mr. Baly would have referred the insect to *Polyoptilus*.

P. costatus, sp. nov. Sat parallelus, modice elongatus; ferrugineus, elytris (margine angusto ad suturam et ad lateris excepto) dilutioribus; capite crebre fortius punctulato; antennis quam corpus vix brevioribus, articulis 2° perbrevis 3° quam 2^{us} duplo longiori (his conjunctis 1° æqualibus) 4° quam 1^{us} vix longiori 5° quam 4^{us} vix longiori 5°—11° gradatim longioribus; oculis prominentibus grosse granulatis (ut *P. Lacordairei*); prothorace cordato, leviter transverso, sat crebre (quam *P. Lacordairei* magis crebre) subfortiter punctulato, mox ante basin constricto, lateribus ante medium fortiter rotundatis; elytris costis 4 (his bene definitis et ante apicem obsoletis) instructis, interspatiis et parte apicali sat crebre subfortiter punctulatis; tarsis quam *P. Lacordairei* paullo minus elongatis; corpore subtus pubescenti; femoribus posticis subtus (sicut *P. Lacordairei*) armatis. Long., $4\frac{4}{5}$ l.; lat., $1\frac{2}{3}$ l.

The prothorax is notably longer than wide in all the previously described species except *Ericksoni*, Germ., and *Waterhousei*, Baly, the former of which however has antennæ not much more than half the length of the body their third joint being very little shorter than the fourth, while the latter has punctulate-striate non-costate elytra. Its strongly prominent eyes (with their hind outline, viewed from above, forming a right angle with the lateral outline of the head), elongate antennæ, pubescent under surface, and comparatively slender build connect this species much more closely with *P. Lacordairei* than with

P. Ericksoni. From *P. Lacordairei* it is abundantly distinct (apart from its very different colouring) by, *inter alia*, its short prothorax, and elytra with strongly defined (quite costiform) elevated lines.

N. Queensland.

P. torridus, sp. nov. Robustus, sat latus; piceus, antennis palpis tarsisque dilutioribus; capite et prothorace confertim fortiter subrugulose punctulatis; antennis quam corporis dimidium vix longioribus, articulis 2° brevi, 3° quam 2^{ns} duplo longiori, 4° quam 3^{ns} longiori (1° longitudine sat æquali), 5° 4° sat æquali, 6°—10° brevioribus inter se sat æqualibus, 11° 4° longitudine sat æquali; oculis sat parvis sat prominulis, grosse granulatis; prothorace quam longiori vix latiori, cordato, lateribus ante medium fortiter rotundatis, margine antico nonnihil elevato ad latera subangulato; elytris lineis subelevatis 4 (his postice abbreviatis) instructis, interspatiis et parte apicali crebrius subfortiter punctulatis; femoribus posticis subtus (sicut *P. Lacordairei*) armatis, tarsi sat brevibus (quam *P. Ericksoni* paullo brevioribus); corpore fere glabro. Long., 6 l.; lat., 2½ l.

This species is of very robust build, even more so than *P. Ericksoni*, Germ.; its antennæ and tarsi, moreover, are distinctly shorter than in that species. When both sexes of the species now attributed to *Polyoptilus* are known I cannot but think it probable that *Lacordairei* and *Ericksoni* will be found to be generically distinct from each other, and if so I suspect that the present species will have to be placed in a third genus. It has the nitid glabrous undersurface as well as the robust build and short antennæ and tarsi of the *Ericksoni* type, but its eyes are of the *Lacordairei* type. If it should be found that the female of *Ericksoni* has short elytra and unarmed hind femora (as in *Lacordairei*) no doubt the two might stand as extreme forms of a single genus, but I am of opinion that I have both sexes of *Ericksoni* and that the female differs very little from the male externally, being however] somewhat larger and having the front tarsi more slender. I can, however, find no satisfactory character to separate the present insect from *Polyoptilus* regarded as including both *Lacordairei* and *Ericksoni*.

N. Queensland.

EDUSA.

E. puberula, Bohem. In Tr. Roy. Soc., S.A., 1891, I furnished a paper on *Edusa* containing a tabulation of the species known to me. In that paper I mentioned *E. puberula* as one that I had not been able to identify. Since that time I have collected in the Blue Mountains, and also received from Mr. Froggatt, an *Edusa* which I have no doubt is that insect. In my tabulation

it would stand (*loc. cit.*, p. 143) beside *bella*, Blackb., from which it differs *inter alia* by its considerably larger size and more robust legs, and by its head not having a well marked longitudinal impression on the vertex (as *bella* has) but only a very fine (almost scratch-like) frontal stria.

E. viridicollis, Lef. Since writing the above-mentioned paper I have collected this species also, and have received it from Mr. Jacoby and from the Chapuis collection. In my tabulation of *Edusa* (*loc. cit.*) it would stand beside *E. lineata*, Blackb., from which it is distinguishable *inter alia* by its much larger size, very different colouring, and its hind tibiæ in the male strongly curved at the apex.

PSEUDOPAROPSIS (gen. nov. *Chrysomelidarum*).

Palpi maxillares breves, articulo ultimo subovali apice angustato quam præcedens sublongiori; oculi oblongo-ovales, subtilius granulati; antennæ breves (speciei typicæ articulis 7—10 sat fortiter transversis); prothorax brevis; elytra conjuncta quam longiora sat latiora, epipleuris (ut *Paropsidarum* normalium, e.g. *punctata*, Marsh) altera parte alte erecta altera (antice latissime) horizontali; prosternum inter coxas minus angustatum, postice dilatatum, in medio inter coxas carinatum utrinque sulcatum (sicut *Paropsidarum* plurimarum, e.g. *minor*, Marsh); pedes modici, tarsorum (sicut *Paropsidis*) articulo 2° quam 1^{us} 3^{us} que multo minori multo angustiori, unguiculis simplicibus; corpus (speciei typicæ) modice convexum, fere circularis, glabrum, *Coccinellam* simulans.

The species for which I propose this new generic name may be characterised as a *Paropsis* with the palpi and claws of a *Plagioderia*. From the latter genus it may at once be known by the small second joint of its tarsi (not more than half as wide as the third joint), and especially by the epipleuræ of its elytra, which consist of two distinct planes nearly at right angles to each other (except close to the apex of the elytra), the height of the erect part and the width of the horizontal part being in the front half of their length each about equal to the length of the second ventral segment. It seems not improbable that *Plagioderia Lownei*, Baly. (of which I have not seen an example) is a member of this genus.

P. nitidipennis, Boisd. Fere circularis, minus convexa; glabra; nitida; flavo-fulva, elytris cupreis nonnihil aureo-micantibus antice et ad latera viridi-marginatis; capite brevi subtilissime punctulato, antice transversim (postice in medio longitudinaliter) sulcato; antennis brevibus, apicem versus fortiter incrassatis; prothorace quam longiori ut 7 ad 3

latiori, æquali, sparsius dupliciter (subtiliter et minus subtiliter) punctulato, angulis omnibus rotundatis; elytris sparsim punctulatis (horum puncturis prothoracis puncturis majoribus similibus). Long., $2\frac{1}{2}$ l.; lat., $2\frac{2}{5}$ l.

The very brief description of *Chrysomela nitidipennis*, Boisd., reads as if it might well have been founded on this species, especially in consideration of Boisd. referring to the small size of the insect before him in comparison with the other Australian *Chrysomela* that he described. In describing *Plagioderia Lownei* Mr. Baly does not refer to that insect as differing structurally from typical species of *Plagioderia*,—so that very likely the present insect has nothing to do with it; nevertheless his description (apart from that obstacle) reads much like that of a species resembling that I am now describing. If it should be generically identical Mr. Baly's species differs specifically from mine by the black apex of its antennæ and back of its head, the dark colouring of part of its under-surface, the (implied) absence of green margin on its elytra, its prothorax more than three times as wide as long, and bearing fovea-like impressions, and the lateral portion of its elytra "dilated and separated from the disc by a shallow depression."

Queensland; sent to me by Mr. Froggatt.

MONOLEPTA.

M. fasciatipennis, Blackb. I have recently taken near the original locality some more examples of this species which prove it to be variable to the extent of invalidating the character on which in my tabulation of *Monolepta* (Tr. R. Soc., S.A., 1896, pp. 100, &c.), I distinguished it from *M. picticollis*, as the elytral fascia is now found to be liable to much abbreviation at both ends. I therefore substitute the following for the distinction that was printed (*loc. cit.*, p. 100) in the tabulation:—

- | | | |
|-----|--|---------------------------------|
| E. | Sulcus between the eyes (looked at obliquely from behind) strongly curved (with its convexity directed forward) | <i>fasciatipennis</i> , Blackb. |
| EE. | Sulcus between the eyes (looked at obliquely from behind) straight | <i>picticollis</i> , Blackb. |

From whatever point of view the frontal sulcus is looked at it is seen to be quite different in the above two species, but as its shape looks a little different in each according to the point of observation, I have selected a particular point of view for characterising it,—viz., that from which its hind edge is most conspicuous. It is also to be noted that looked at from the above-mentioned point of view the space in front of the sulcus is seen to be in *fasciatipennis* (but not in *picticollis*) broken up into about three quasi-tubercles. In my description of *P. picticollis* I

have called the head "arcuatim" sulcato (which it is when regarded obliquely *from in front*),—but from a similar point of view the *sulcus* in *fasciatipennis* is seen to be *very much more strongly* arched still. The two species, moreover, are very different in colour and markings, although the particular marking I emphasised in my tabulation now proves to be unreliable as a sharp distinction.



ON SOME OLDER TERTIARY FOSSILS OF UNCERTAIN AGE FROM THE MURRAY DESERT.

By PROFESSOR RALPH TATE.

[Read June 6. 1899.]

PLATE I.

A small collection of fossils in an excellent state of preservation, though more or less bleached, was submitted to me in 1886; of the species which were in duplicate I was permitted to retain an example. The list of species, then compiled, has since been lost, so that now I have only actual knowledge of those retained for the University Museum. Some of these species are referred to in my Monographs as coming from a deep well on Cooke's Plains or Murray Desert. It is only recently, though, after many futile attempts, that I have received authentic information of the locality whence the fossils were obtained. My informant, Mr. L. Salter, of Angaston, writes me, March 3, 1899—"Mr. Smith says that the fossils came from the bottom of a deep well at a place called Tareena, on the Murray, in New South Wales, just across the Victorian border."

To add to my perplexity, I recognised in the Museum of Way College an identical set of fossils, both in regard to species and condition of fossilization. Through the kind services of Dr. Torr, these fossils have been traced to their source. Firstly it was stated "that they were dug up at Nildottie, somewhere near the Wow-Wow Plains, about 25 years ago, by his (the pupil's) grandfather. The well was sunk afterwards to a thousand feet in depth." In a later communication, January 4, 1899, Dr. Torr writes—"The well from which the fossils were taken is at Mindarie, about 80 miles south-east of Swan Reach." And since then Dr. Torr has submitted to me a further batch of the same sort of fossils.

The two localities must be at least eighty miles to the eastward of the easterly scarp of the Eocene Plateau at Overland Corner. There is nothing improbable that the topographic positions are

correct, though I am still unconvinced that the two set of fossils did not come from the same place or within reasonable contiguity; so much alike are they, that it may be said that they are duplicates.

The remarkable diversity of composition and mechanical condition of the Older Tertiary rocks make it possible in the majority of cases to refer specimens to their original site. Table Cape fossils are distinctive; so also are those from Spring Creek, River Murray Cliffs, Aldinga Bay, and so on. It is only in the case of the fossils of the soft clays, or those of the friable polyzoal limestones that localities cannot safely be assigned. The fossils from the Murray Desert do not resemble those of any known locality yielding Older Tertiary fossils. But they do resemble those of the Pliocene beds in the Dry Creek and Croydon bores, near Adelaide; the similitude being heightened by the common occurrence in the Murray Desert horizon of some of the most abundant fossils in the Pliocene beds obtained from the bores just named. However, the Tareena collection from the Murray Desert was in my hands four years before the bore at Dry Creek revealed the concealed fossiliferous bed of Pliocene age, which fact dispels any doubt as to such being a source of supply; moreover, the white calcareous sand forming the matrices of the Murray Desert fossils is so largely admixed with grains of glauconite as to impart a pepper-and-salt coloration to the whole. This is distinctive.

The main point of interest about these fossils is the uncertain data they afford as to their horizon; and the interest therein has been increased through certain correlative discoveries made of late, such as the occurrence of certain so-called Eocene fossils in the Pliocene of the Dry Creek bore, that of characteristic Miocene species in Eocene beds, and the indications at the Murray Desert and some other localities in Victoria and Tasmania of a fauna intermediate between typical Eocene, such as Muddy Creek, and typical Miocene, such as around the Gippsland Lakes.

Though the age of the Murray Desert fossils is not actually assigned in my earlier Monographs, yet Eocene is implied; but in my last one, Part IV., Gasteropoda, 1893, I remark under *Natica gibbosa*, "the age is doubtfully Miocene." The additional material brought to my notice by Dr. Torr raises the total of species from 27 to 40, and the number is sufficiently great to permit of an attempt to correlate the fauna with those of other localities and horizons:

LIST OF MURRAY DESERT FOSSILS.

Index to Locality-numbers.—1. Aldinga Bay; 2. River Murray Cliffs; 3. Muddy Creek; 4. Gippsland Lakes; 10. Beaumaris (Cheltenham and Mordialloc); 11. Spring Creek; 12. Table Cape; 13. River Murray Cliffs; 15. Muddy Creek; 19. Geelong; 20. Mitchell River; 21. Camperdown.

Species.	Tarcena.	Mindarie.	Other Occurrences.
* <i>Oculina, n. sp.</i>	*		Nil.
<i>Pecten yahlensis, Woods</i>	-	*	Eoc., <i>passim</i> , 10, 12
<i>Hinnites corioensis, McCoy</i>	-	*	Eoc., 12, 13, 19, 20
<i>Axinæa convexa, Tate</i>	*	*	Eoc., 13; Mioc., 1, 2, 3; O. Plioc.
<i>Cucullæa corioensis, McCoy</i>	-	*	Eoc., <i>passim</i> ; 10, 11, 12; Mioc., 1, 2, 3, 4; O. Plioc.
<i>Crassatella oblonga, Woods</i>	*	*	10, 12; Mioc., 1, 2, 4
<i>Mytilicardia compta, Tate</i>	*	*	Eoc., 12, 15; Mioc., 2, 3
<i>Cardita calva, Tate</i>	*	-	10; Mioc., 2, 3
<i>Trigonia intersitans, Tate</i>	*	-	Maude
“ <i>acuticostata, McCoy</i>	-	*	10; Mioc., 1, 2, 3, 4
<i>Protocardium hemimeris, Tate</i>	*	-	Eoc., <i>passim</i> ; 12
<i>Chione dimorphophylla, Tate</i>	-	*	Eoc., 13, 15; 10
<i>Meretrix submultistriata, Tate</i>	*	-	10, 12; Mioc., 3, 4
<i>Dentalium Mantelli, Zittel</i>	-	*	Eoc., <i>passim</i> ; 11, 12
* <i>Murex biconicus, Tate</i>	*	-	Nil.
<i>Lampusia armata, Tate</i>	*	*	Older Pliocene
* <i>Fusus trivialis, n. sp.</i>	-	*	Nil.
<i>Columbarium craspedotus, Tate</i>	*	*	Eoc., <i>passim</i> ; 12
* <i>Tudicula costata, Tate</i>	*	-	Nil.
* <i>Voluta capitata, Tate</i>	*	*	Nil.
* “ <i>tabulata, Tate</i>	*	*	Nil.
“ <i>uncifera, Tate</i>	-	*	Eoc., 13
“ <i>strophodon, McCoy</i>	*	*	Eoc., <i>passim</i> ; 12
* <i>Volutilithes antispinosus, n. sp.</i>	*	*	Nil.
* <i>Mitra diductua, n. sp.</i>	*	*	Nil.
<i>Ancilla hebera, Hutton</i>	*	*	Eoc., <i>passim</i> , 10, 11, 12; O. Plic.
* <i>Harpa cassinoides, Tate</i>	*	*	Nil.
* <i>Terebra angulosa, Tate</i>	*	*	Nil.
* <i>Cassis contusus, n. sp.</i>	-	*	Nil.
* <i>Semicassis radiatus, Tate</i>	*	-	Nil.
“ <i>transennus, Tate</i>	-	*	Eoc., <i>passim</i> ; 12
<i>Pellicaria coronata, Tate</i>	*	*	12; Mioc., 2, 3, 4; O. Plioc.
* <i>Cypræa amygdalina, Tate</i>	*	*	Nil.
* <i>Surcula Vardonii, n. sp.</i>	*	*	Nil.
<i>Bathytoma Pritchardi, Tate</i>	*	*	Mioc., 4
<i>Natica gibbosa, Hutton</i>	*	*	O. Pliocene
<i>Turritella tristira, Tate</i>	*	*	Eoc., 19, 21; 10, 12; Mioc., 4
“ <i>acricula, Tate</i>	-	*	Eoc., <i>passim</i> ; 10, 11, 12; Mioc., 4
⊕ <i>erithium Torrii, n. sp.</i>	*	*	Nil.
“ <i>Pritchardi, Harris</i>	*	-	12
Total species, 40	28	30	18 in common

Fifteen species are peculiar. These are indicated by a prefixed asterisk in the foregoing list. Of the twenty-five common to other localities and horizons, ten are Eocene, not passing into undoubted Miocene. *Axincea convexa*, *Crassatella oblonga*, and *Pellicaria coronata* are characteristic Miocene species, the first and third passing to Older Pliocene. *Lampusia armata* and *Natica gibbosa* are common shells in O. Pliocene. *Cuculllea Corioensis* is equally common at Eocene and Miocene horizons, and passes to Older Pliocene. *Ancilla hebera* is Eocene and Pliocene. *Mytilocardia compta*, *Turritella tristira*, and *T. acricula* are Eocene and Miocene, the first uncommon in both. *Meretrix submultistriata* is a somewhat characteristic Miocene species, but is not known at undoubted Eocene horizons. *Bathytoma Pritchardi*, *Trigonia acuticostata*, and *Cardita calva* are Miocene only. *Trigonia intersitans* was previously only known from Maude in the Moorabool Valley.

It is noteworthy that *Crassatella oblonga*, *Cardita calva*, *Trigonia acuticostata*, *Meretrix submultistriata*, and *Pellicaria coronata*, which are characteristically Miocene, have been quoted as Eocene from their occurrence at Beaumaris (Cheltenham), Spring Creek, or Table Cape; and, also, that others having a wide geographic range and passing up from the Older to Newer Tertiary are met with at one or more of the three named localities.

The collection of Murray Desert fossils includes several Eocene species which are not known at higher levels, and a fair number of Miocene species which do not occur at lower horizons, except the horizon represented by localities 10, 11, and 12, but some of which are also Pliocene shells. As a whole, the collection has considerable affinity with the faunas at Beaumaris and Table Cape, which with that of Spring Creek indicate a higher horizon than that of the typical Eocene localities. The Beaumaris fauna is not typical Miocene, despite Messrs. Hall & Pritchard's (*) endeavors to prove it so; I have knowledge of a much fuller record of species than they have given, and an analysis of the evidences they afford may eventually be submitted; however, I have always admitted that the fauna is a passage one from Eocene to Miocene. At present the stratigraphical relations of the beds yielding this intermediate fauna at these localities to the Eocene are not yet defined, though there is good ground for the opinion that the Beaumaris beds are superior to the Eocene.

In the case of the two Murray Desert localities, the position is paradoxical; the fossils indicate a younger age than the Eocene deposits which prevail along the line of the River Murray from

*Trans. R. Soc., Vict., IX. (N.S.), 1896.

Lake Alexandrina to Overland Corner, and form the southern boundary of the Desert, which is more or less delimited by the railway line from Murray Bridge to Tintinarra. Several deep wells on this route reveal at depths, corresponding with those at which the fossil beds were reached at Tareena and Mindarie, either the prevailing calciferous sandstone of the River Murray cliffs, or an earlier, more or less argillaceous formation corresponding with the basal beds of the Aldinga section.* Whilst further deep-seated Eocene strata extend into New South Wales, as proved by the occurrence of *Trigonia semiundulata* at a depth of 647 feet in the Arumpo bore, situate in the angle formed by the junction of the Darling and Murray rivers.†

Tareena and Mindarie are situated at about fifty miles to the eastward of the meridian of Overland Corner, which so far as known demarks the eastern escarpment of the River Murray plateau, composed above the river-way of Eocene calciferous sandstone capped by Miocene sands and oyster-banks. Between Overland Corner and the confines of South Australian territory, Newer Tertiary lacustrine beds occupy the surface. Therefore, the fossiliferous beds beneath these at Tareena and Mindarie should be older than the River Murray Eocene-limestones (on the assumption that surface levels are approximately the same, and that the Eocene beds have little or no inclination, which I believe to be the case), or it may be that extensive erosion has removed the Eocene strata, which have been replaced by a younger deposit, similar to the Tintinarra section, where a Pleistocene deposit (containing a great variety of recent species) fills a north and south trough in the Eocene beds to a depth beneath the surface of 154 feet.‡ The rejection of this latter explanation will involve the acceptance of a very prolonged vertical range for a considerable number of species, and thus do violence to the evidence of a restricted range for the vast majority of the Eocene mollusca.

The opinion that our Pre-Miocene deposits are not all synchronous may be gathered from the "Correlation" papers contributed by myself in collaboration with Mr. Dennant, though as yet no scheme of succession had been submitted. Aided since by extended palæontological studies, I have ventured to submit, perhaps prematurely, the following schedule showing the chronological sequence of the chief fossiliferous developments.

*Clark, Tr. Roy. Soc., S. Aust., vol. XX., p. 110, 1896; Tate, id., vol. XXII., p. 197, 1898.

†Etheridge, Records Geol. Surv., N.S.W., vol. III., p. 115, 1893. (On examination of the fossil I have confirmed the specific determination.—R.T.)

‡Tate, T., Roy. Soc., S.A., vol. XXII, p. 65, 1898.

SUCCESSION TABLE OF PRE-MIOCENE TERTIARY BEDS.

POST EOCENE (? *Oligocene*).

Beaumaris (Cheltenham), Murray Desert, Table Cape, and Spring Creek.

UPPER EOCENE.

Muddy Creek, Gippsland Rivers, River Murray, around Port Philip, Gelibrand River, and upper part of Lower Aldingian Series.

MIDDLE EOCENE.

Cape Otway and middle section of Lower Aldingian.

LOWER EOCENE.

Chalk of the Great Australian Bight, lower part of Lower Aldingian Series, and Croydon Bore.

PALÆONTOLOGICAL NOTES.

Fusus trivialis, *spec. nov.* Plate i., fig. 4.

This species is represented by an imperfect specimen, wanting the greater part of the spire. It resembles *Fusus Johnstoni*, as illustrated in my "Gasteropods," Part I., t. 12, fig. 4a (a young shell), and indicates a total length of 44 mm., and a width of body-whorl of 20 mm. It differs by fewer and stouter spiral threads, three or four on the antesutural slope, the whorls not so angulated, the peripheral tuberculations more dentiform and larger, and the snout much more robust.

Volutilithes antispinosus, *spec. nov.* Plate i., figs. 5 a, b.

It resembles the short-spined form of *V. antiscalaris*, but has not the antesutural corona, and the adjacent whorls are flush, the spinous tubercles are fewer (eleven on the body-whorl), and more prominent. Its shape is more pyriform, and by reason of the more precipitous post-peripheral slope and the relatively wider periphery the aperture is more markedly trapezoidal. The posterior half of the anteperipheral area of the body-whorl is smooth. In this and some other respects this new species is the analogue of *V. spinosus*, Lamarck, but it is larger and less acute.

In my "Gasteropods," Part II., p. 134, *V. anticingulatus* is recorded from Murray Desert; the specimen which served for that determination is not accessible to me, but, it is probable, it belongs to *V. antispinosus*.

Dimensions.—Length, 48 mm.; width, 24 mm.

Mitra diductua, *spec. nov.*

M. dictua, Tate, Trans. Roy. Soc., S. Aust., vol. XI., p. 138, t. 4, 9, 1889 (non. Ten.-Woods.)

The fossil figured by me, as quoted above, is from Murray Desert, though the description was drawn-up from a Muddy Creek authentic example of *M. dictua*, Ten-Woods. A re-examination of the Tareena specimen, aided by others since acquired from Mindarie, satisfies me that my original determination is wrong; that the Murray Desert shell is distinct from *M. dictua*, from which it differs by more cylindrical shape and by the earlier whorls being without ornament.

A similar species to the foregoing occurs in the Pliocene of the Dry Creek and Croydon bores, near Adelaide; which is distinguished from *M. diductua* by an antesutural sulcus, more or less punctuated, posterior to which there may be one or two linear sulcations (5 exs.); I name it *M. fodinalis*.

M. uniplica, *M. dictua*, *M. diductua*, and *M. fodinalis* are typical Mitræ, constituting a group characterized by ill-developed or obsolete anterior columella-plications.

***Ancilla hebera*, Hutton.**

The fossil referred to as *A. pseudaustralis*, var., in Trans. Roy. Soc., S. Aust., vol. XI., p. 148, t. 6, f. 13., I now consider to be an extremely large senile form of *A. hebera* (Three senile examples of varying size from Murray Desert).

***Cassis contusus*, spec. nov.** Plate i, fig. 1 a, b.

This fossil is of the same shape as *C. exiguus*, though the apex is more slender and apiculate. The last whorl has three rows of nodulations, the posterior one is continuous to the labrum, the middle row does not reach so far, whilst the anterior row fades away at about the half distance between the last varix and the labrum. The posterior row of nodulations are fewer (fourteen) than in *C. exiguus*, and the antesutural crenatures are much wider than in that species. Whilst in the allied species the ornamentation consists of strong axial threads crossed by revolving striæ; in *C. contusus* the axial ornament consists of irregular wrinklins, whilst the middle line of the interspaces between the nodulate rows is occupied by two or three spiral rows of impressions varying in outline from circular to rhombic; a similar ornate band is anterior to the third nodulate row, and again around the base posterior to the snout.

Dimensions.—Total length, 53 mm.; length of spire, 7 mm. peripheral diameter, 40 mm. Type unique. University Museum.

***Sureula Vardonii*, spec. nov.** Plate i., fig. 3 a, b.

Fusiform; spire pyramidal, acute, nearly as long as the aperture, terminating in a small obtuse pullus of two smooth whorls, the tip of which is laterally immersed. Ordinary spire-whorls six, separated by a linear suture, flatly convex; the earlier whorls medially carinated or bicarinated coincident with the

fascia, and with fine spiral threads, more or less squamose by intersection with the growth striæ, above and below the fascia.

Body-whorl flatly convex, somewhat abruptly contracted into a moderately short, wide, shortly upturned canal. The fascia is 1.5 mm. wide, and is post-peripheral, but widely separated from the suture; the post-fascial area is nearly smooth, the spiral and axial ornament of the earlier whorls being almost obliterated; the anteperipheral area is furnished with about five stout subacute spiral ribs, the interspaces spirally lined; the same kind of ornament, with weaker spiral ribs, but with more pronounced squamose spiral striæ, is continued on to the base and snout.

Aperture narrowly pyriform, outer lip thin, sinus apparently broad and short.

The species would appear to be common at both localities.

Dimensions.—Length, 38.5 mm.; width, 16 mm.; length of aperture, 24.5 mm.; and width, 6 mm.

The species-name is a compliment to Mr. Joseph Vardon, J.P., whose invaluable aid to the Council in his capacity of printer of the Transactions since 1879, is hereby personally acknowledged by me.

Remarks.—Among described species of the Australian Tertiary, this new form makes a near approach to *P. paracantha*, Ten.-Woods, from which it differs by more conoidal shape, the absence of tubercles on the keel, and by having strong spiral ribs on the body-whorl. I consider the two species to be congeneric; they both have the aspect of *Bathytoma*—indeed, I had referred last year* *P. paracantha* to *Bathytoma*—but the columella-plication is not developed, though there is a faint twist of the pillar. Whatever may be more correct generic location, there is no doubt that these two species abbreviate the differences which separate the one genus from the other.

***Cerithium Torrii*, spec. nov.** Plate i., fig. 2.

Shell cylindroid-turreted, fully five times as long as wide. Whorls flat, slightly imbricating at the suture, ornamented by stout, subacute, subflexuose axial ribs about twenty-four on each of the six anterior whorls; the ribs are interrupted at about one-fifth the breadth of the whorl from the posterior suture by a linear series of contusions in the interspaces, and the more anterior whorls are crossed by two or three slightly elevated spiral threads, which are feebly tuberculated at the intercrossing with the axial costæ. The whole surface of each whorl is closely and minutely reticulate-lined.

Dimensions.—The two examples under observation are imperfect, both are wanting the apical part of the spire and the body

* Proc. Roy. Soc., N.S.W., p. 398.

whorl. The less incomplete specimen has ten whorls in a length of 130 mm., and a maximum width of 31 mm., by estimate the total length is 160 mm. The other specimen has five and a-half turns in a length of 82 mm., including canal, with a breadth of 32 mm.

Remarks.—I do not know of any species of Cerithoid shell, recent or fossil, with which to compare *C. Torrii*; the imperfection of the anterior part of the shell does not permit of an exact generic reference, though probably it may be to *Potamides*.

The species name is in compliment to my malacological confrere, Dr. Torr, whose assistance has so ably and heartily been given in furtherance of the present communication.

Crassatella oblonga, Ten.-Woods.

The Murray Desert fossil, of which several examples have been under observation, is absolutely identical with the type shapes of the species so common at Table Cape, but the application of this name to specimens of *Crassatella* from the Pliocene of the Dry Creek Bore is wrong.

Chione dimorphophylla, Tate, or *sp. n.*

A unique example of a right valve of a *Chione*, though it much resembles *C. dimorphophylla* yet differs from that species sufficiently to suggest the probability of its specific distinctness; but the possibility that the differences may represent extreme individual variation induces me to a non-committal course.

As compared with the type, the ventral margin is more arched. the radial threads coarser and the concentric frills somewhat fewer (those of the medial region thick and obtuse, not thin and retroverted).

SUPPLEMENTAL NOTE ON THE FORAMINIFERA.

By WALTER HOWCHIN, F.G.S.

Triloculina trigonula, Lamk.

Miliolina cuvieriana, d'Orb.

“ *oblonga*, Montag.

“ *seminulum*, Linn.

“ *venusta*, Kar.

Planispirina agglutinans, d'Orb (sp.)

Reophax, sp.

Clavulina angularis, d'Orb.

Lagena lævis, Mont.

“ *striata*, d'Orb.

“ *sulcata*, W. & J.

Nodosaria scalaris, Balsch.

- Cristellaria, sp.
 Polymorphina communis, *d'Orb.*
 " elegantissima, *P. & J.*
 Discorbina orbicularis, *Terq.*
 Truncatulina margaritifera, *Br.*
 " ungeriana, *d'Orb.*
 Pulvinulina elegans, *d'Orb.*
 Polystomella crispa, *Linn.*
 " macella, *F. & M.*

The commonest species in the material is *Polystomella macella*, but the examples exhibit feeble development which may have been caused by unfavourable conditions. The list is not in any way distinctive, the occurrences being of species which have a wide distribution, but has perhaps a closer affinity to the Older rather than the Newer Tertiaries. Of the ten species of Foraminifera observed from the Dry Creek Bore (Older Pliocene), only two are represented in the above lists. The material was, however, widely different in each case, that from Dry Creek being somewhat coarse quartzose sand, whilst that now reported upon was fine and calcareous.—W.H.

The paucity of numbers of species may be accounted for by the very small quantity (a thimbleful) of material submitted for examination.

EXPLANATIONS TO PLATE I.

Figs.

- 1, *a. b.* *Cassis contusus*; two views, nat. size.
 2. *Cerithium Torrii*, nat. size.
 3. *Surcula Vardonii*; *a.*, nat. size; *b.*, enlarged view of protoconch.
 4. *Fusus trivialis*, nat. size.
 - 5, *a. b.* *Volutilithes antispinosus*; two views, nat. size.
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DESCRIPTIONS OF NEW SPECIES OF CORALS FROM THE AUSTRALIAN TERTIARIES.

By J. DENNANT, F.G.S., Hon. Fellow.

PART I.

WITH PLATES II., III.

[Read June 6, 1899.]

It will, I think, be ultimately found that the Australian Tertiaries are specially rich in corals. So far nearly 60 species have been described, almost solely by Professor M. Duncan and the Rev. J. T. Woods, but the unnamed ones in collectors' hands are still numerous.

In addition to my own gatherings, the material available includes contributions from Professor Tate and Mr. J. Mulder, who have generously allowed me to select what I chose from their cabinets.

A revision of the forms described by previous authors is also desirable, and will be undertaken when further examples of the various genera represented have been discussed.

In the present paper I deal with seven species, which are included under five genera and two families.

FAMILY TURBINOLIDÆ.

GENUS FLABELLUM.

Flabellum Gippslandicum, *spec. nov.* Pl. ii., figs. 1 a, b.

The corallum is compact in substance, of varying height, sometimes tall in relation to its breadth, straight, much compressed, and wedge-shaped. The sides are rounded and slightly inclined to the base, the angle subtended being about 10°. The anterior and posterior surfaces are flattened, and also inclined to each other at a similar angle. The base is crescent-shaped and much eroded; not unusually the horns of the crescent are slightly prolonged outward.

The calice is shallow and elliptical, with the plane of the shorter axis somewhat higher than that of the longer; the two axes of the ellipse are as 100 to 44. There are five cycles of septa with six systems, of which only the two central ones are complete; in the figured calice the septa number 76. The first three orders are stout and equal; the higher orders diminish both

in length and thickness, the fifth being very short and thin. All the orders are wavy, and, with the exception of the highest, show several radiating rows of granules on their sides.

The fossa is long, narrow, and abruptly descending. Most specimens have the wall of the corallum broken off level with the columella, which is formed by the fused ends of the principal septa; but in more perfect examples the columella is either not visible or can be just seen deep down in the fossa.

The costæ are subequal in size, closely-set, and correspond to the septa. As a rule, they are almost concealed by the epitheca, but when this has been worn off by fossilization they are distinct on the sides of the corallum. In well-preserved examples the epitheca is dense, and shows chevron-marked ridges running parallel with the convex calicular margin.

Height of corallum (figured example), 31 mm.; length of calice, 16 mm.; breadth of calice, 7 mm.

Locality.—Abundant in the Miocene beds of the Gippsland Lakes area, Victoria.

This coral is allied to *F. Victoriae*, Duncan, but is more compressed and much larger. It has besides an extra cycle of septa.

***Flabellum fastigatum*, spec. nov.** Pl. ii., figs. 2 a, b.

The corallum is elliptico-conical in shape, and tapers regularly from the summit to a very small pedicel at the base. The angle subtended by the lateral borders of the corallum is about 30°, and that by the middle line of the faces about 18°. The calice is elliptical and deeply excavated. The two axes of the ellipse are as 100 to 56.

The septa are slender and straight; they have dentated edges, and their sides are ornamented with rows of small rounded granules. They are in six systems, with four cycles. The two central systems only are complete, those at the ends wanting either a secondary or tertiary, and also one or more of the quaternary septa. The primaries, secondaries, and tertiaries are well developed and equal; the quaternaries are nearly as long, but thinner and less prominent from the wall. The inner borders of the principal septa are perpendicular, and enclose a narrow, deep, and elongate fossa, at the bottom of which is the columella; this is formed by the thickened and fused ends of the septa of all four orders. Only one of my examples shows a deep central fossula in the calice, the others, as is frequently the case with fossil *Flabella*, having the corallum broken off or worn to the level of the columella. The wall is thin towards the calicular margin, but becomes stout inferiorly.

The principal costæ are prominent on the surface of the corallum as medially furrowed and slightly raised ridges, which

correspond to the three first orders of septa. There are no costæ of the fourth order. The ridges which constitute the lateral costæ are larger than the others, and can be traced almost to the terminal pedicel; two or three of those on the middle of the faces reach as far, but the remainder are successively cut off by the lateral slope of the cone. All become less conspicuous as they approach the base.

The epitheca is strong and continuous on the surface of the corallum; it forms a transverse ornament of wavy lines both on the costæ and their interspaces.

Height, 30 mm.; length of calice, 18 mm.; breadth of calice, 10 mm.

Locality.—Rare in the Eocene cliffs at Spring Creek, 13 miles south of Geelong, Victoria.

Flabellum curtum, *spec. nov.* Pl. iii., fig. 3 a, b.

The corallum is compressed, especially inferiorly, and in outline almost an equilateral triangle, of which the upper margin represents the base, and the short swollen pedicel the apex; its lateral borders are gently rounded. The calice is shallow and elliptical, the ratio of the axes of the ellipse being as 100 to 52; the plane of the shorter axis is considerably higher than that of the longer, and the summits of the faces are consequently much arched.

The septa are granulated, slightly curved, and faintly waved on their upper margins. They are in six systems, with five cycles, four only of which are developed in the end systems. Each of the latter contains two principal septa, viz., the primary and either the secondary or one of the tertiaries; the higher orders are present, but correspondingly few in number. The half calice figured shows only two quaternaries in the end systems instead of four, none being developed on either side of the quaternaries which flank the middle system. In other calices examined the quaternaries are present in these spaces, but are wanting on the sides of the adjoining quaternaries at the extremities of the middle system. For the three systems figured there are 28 septa, or 56 for the entire calice. The primaries, secondaries, and tertiaries are stout and equal, and bound a moderately broad and deep axial fossa; the quaternaries are nearly as long, but much thinner, while the quaternaries are still smaller and very short. The inner margins of the principal septa are vertical in the fossa and strongly wrinkled; they are free for a considerable distance down, and then unite by stoutish, twisted processes to form a rudimentary columella.

The costæ are marked on the surface by broad rugose bands with narrow interspaces, and radiate from the pedicel to the arched margin. They are of equal width for their inferior two-

thirds, when the more central ones divide into pairs up to the margin, the division line between each pair being faint. The costæ visible superiorly correspond to the septa. The epitheca is rough, dense, and persistent; it forms broad convex bands here and there on the surface, running parallel with the calicular margin, and most distinct in the interspaces of the costæ.

Height, including pedicel, 11 mm.; length of calice, 10·5 mm.; breadth of calice, 5·5 mm. All the examples found are practically uniform in size.

Locality.—Tolerably numerous in the Miocene beds of the Gippsland Lakes area.

GENUS PLACOTROCHUS.

Placotrochus corniculatus, *spec. nov.* Pl. ii., figs. 3 a, b.

The corallum is horn-shaped, smooth, and finely pedicellate. In young specimens there is a slight constriction just above the pedicel. The wall is thin at the summit, but becomes stouter inferiorly. The epitheca is strong, and is marked by transverse wavy ridges and lines, which are most numerous in the upper half of the coral, and reach the calicular margin. The calice is shallow and elliptical, but the relative lengths of the major and minor axes of the ellipse are not constant in the species. Thus in three examples measured the axes are respectively as 100 to 64, 100 to 72, and 100 to 82.

The septa are slightly exsert and most symmetrically disposed. They are in six systems, with four complete cycles; the primaries and secondaries are moderately stout and equal, the remaining orders becoming successively smaller. Though straight as regards their main direction, the septa are strongly waved and wrinkled, especially the primaries and secondaries for the inner two-thirds of their course. Perpendicular rows of moderate-sized, pointed granules are alternately placed on either side of the septa of the first and second orders, the summit of each successive fold carrying, as a rule, a single row of granules. Occasional granules also occur on the septa of higher order.

The columella is a straight, thin, and short lamella with rounded margins, and projects distinctly from the bottom of the fossa.

The costæ correspond to the septa. The primary lateral costa on the convex curve of the corallum forms a strong well-marked ridge, which in some specimens is nodose. Other less prominent ridges mark the secondary and the remaining five primary costæ. In the spaces between the ridges, which are barely concave, the tertiaries and quaternaries are indicated by faint lines.

Height, 20 mm.; longer axis of calice (type), 9 mm.; shorter axis, 6·5 mm.

Locality.—Eocene clays of the Adelaide bore, South Australia. Collected by Professor Tate.

GENUS PARACYATHUS.

Paracyathus Tasmanicus, *spec. nov.* Pl. ii., figs. 4 a, b.

The corallum is almost, occasionally quite, straight, and cylindro-conical in shape, with an expanded calice and a very broad flat base, which affords evidence of having been attached to a foreign substance. The calice is elliptical and concave, with a deep central fossa. The relative lengths of the major and minor axes of the ellipse are as 100 to 86.

The costæ are continuous with the septa, and more conspicuous in the superior than in the inferior portion of the corallum. The epitheca is pellicular and thin.

The septa have rounded upper margins, and are thickest at the wall, above which they rise to varying heights, according to cyclical order. They are in six systems, with four cycles. In the example figured the quaternaries are wanting for half of one system; another example shows the systems all complete. The primaries and secondaries are sub-equal in size, and the higher orders become successively both smaller and shorter. All the septa have numerous pointed granules on their sides. There are distinct pali before all the orders except the last, the youngest reaching higher in the calice than the secondaries, and these again than the primaries. Several smaller pali towards the base of the fossa are hardly distinguishable from the papilli of the columella. Both the pali and the columella are well preserved in the figured calice, which belongs to an aged example, but the septa are worn and largely connected by growth rings. In fact, the outer portion of the septal area is much filled up by calcareous matter, to which Lindström has applied the term *stereoplasma*. That the presence of this in such a position in the calice is not of classificatory importance is insisted upon by Duncan,* and its occurrence in the fossil coral here described fully supports his views. Two other examples (one of which is the corallum figured) have the septa perfect, and the calices entirely free from any such growth; but as in both cases the pali were partly broken down in clearing the fossa from sediment, their calices would not serve so well for illustrating the characteristic features of the species. Other poorly preserved specimens are also to hand, several of which are free from *stereoplasma*, while one or two of them show its presence to some extent.

* Revision of the Families and Genera of the Madreporaria. Journal Linn. Soc., Zoology, vol. XVIII., p. 27, 1884.

Height of corallum figured (young example), 9 mm.; diameters of its calice, 7 and 6 mm. respectively; diameters of calice figured (aged example), longest 10·5 mm., shortest 9 mm. In the corallum of the latter the base is broken off, but the remaining portion is still 11 mm. high.

Locality.—Table Cape, Tasmania (Eocene). Fairly common, but usually worn. Collected by Professor Tate and J. Dennant.

This coral much resembles *P. supracostatus*, mihi. Its more exsert septa and difference in shape entitle it, I think, to specific rank.

GENUS STEPHANOTROCHUS, *Moseley*, 1881.

Corallum dense and compact in substance, cup-shaped or saucer-shaped, with trace of early attachment, usually with well-developed costæ, bearing a succession of small spines, with widely open capacious fossa. Septa usually extremely exsert, the exsert quinaries, or quaternaries, where these are not present, lying next to the primaries, higher than the tertiaries or equal to them. Columella absent or little prominent.

Four species of corals dredged by the Challenger Expedition, viz., three in the Atlantic and one off the coast of New South Wales, were at first referred by Professor Moseley to the genus *Ceratotrochus*. In his later special Monograph, however, he instituted the above genus for their reception. I have now to draw attention to a fossil coral from the Australian Eocene, which exhibits the essential characteristics of Moseley's genus.

Stephanotrochus Tatei, *spec. nov.* Pl. iii., figs. 1 a, b, c.

The corallum is saucer-shaped, but so shallow as to be almost discoid. Adult examples are compact in substance and free, but younger ones, besides being much thinner, show a small, rounded, and slightly depressed scar of former attachment.

The base is flat and roughly hexagonal in outline. The hexagonal angles are opposite the primary costæ, from each of which a long, stout, but gradually tapering spine projects obliquely downward (approximate angle with base, 145°), so that the coral when placed upon a flat surface rests on the points of six equidistant spiny processes. The basal edges bend gently round to form the wall of the corallum at an angle which varies in different individuals from 45° to about 60°. The costæ, which are continuations of the septa, are prominent on the sides of the corallum, and covered with transverse rows of granules, which give them a serrated appearance. On the base they are either obsolete or just traceable as slightly raised lines, the primaries and secondaries being more persistent than the rest. (It should be noted that the parallel bars shown in the centre of the base figured have no significance, and are absent in similarly worn

specimens). In full grown individuals the base, costæ, and spines are covered by a dense epitheca; younger ones have the epitheca thin and delicate. The calice is large, open, and scarcely concave; like the base it is hexagonal in outline, each angle being marked by the strong projection of a primary, and its two adjacent quinary septa. From the latter, the wall curves inwards towards the secondaries, where there is another, but much smaller projection.

The septa are in six systems, with five cycles; all extend beyond the wall in varying degrees, the primaries the most. In plan they exhibit the same peculiarities as were noted by Moseley in the case of the recent *S. nobilis*. The diagram given by him in the Challenger Report of a complete system in the recent form can, in fact, be cited as almost exactly representing the septal scheme of the fossil one. Of the four quaternaries in each system, the two nearest the primaries, besides being slightly thicker than the others, bend towards and join the tertiaries at from half to two-thirds from the wall; each half system is, in fact, trisected by these two connected septa, so that the tertiaries are, according to the theoretical order of cyclical development, unsymmetrically placed. The quaternaries adjoining the secondaries are straight and free, and approximately equal to the quinaries. Only four of the latter are present in each system instead of eight, viz., between each pair of connected septa, and flanking the primaries; on either side of the free quaternaries they are absent. In the type calice, the bent quaternary and the quinary between it and the adjoining tertiary are wanting for half of one of the systems. The principal septa increase gradually in thickness according to order as they approach the wall, especially the primaries, which become very stout; beyond it they taper off rapidly. The higher orders are just slightly thickened at the wall. The primaries and the quinaries next them are very exsert at the margin of the calice, where, also, the latter are joined to the former by a prolongation of the wall. A similar union of the free quaternaries with the secondary septa is also noticeable.

The costal tubercles proceeding from the base are really lateral continuations of the exsert primaries, and mark as it were the framework on which the coral is built; together they give it a most characteristic appearance. For the most part the superior portions of the septa are broken off in the specimens, but from occasional intact ones still left, it is apparent that in life all of them rose as fan-shaped structures of varying height near the wall. The primaries, secondaries, tertiaries, and bent quaternaries are hollowed out, and deeply notched in their middle portions, and then rise again in one or more smaller elevations,

also fan-shaped, nearer the centre of the fossa. The more central of these elevations are subequal in height, and might, perhaps, in a choked calice be mistaken for pali. It is only necessary to examine a specimen free from adhering sediment to see that they are integral parts of the septa, and not pali. All the septa have granules on their sides, which, especially on the surface of the fans, are arranged in a radiating manner; their upper edges are rendered very irregular from the presence here and there of little knobs and excrescences.

The primary, secondary, and tertiary septa extend to the centre of the calice, but before reaching it, they are twisted, often fused together, and all connected by much tortuous calcareous matter, having raised papilli on its surface. The columella so formed is therefore parietal only, but it occupies a large space in the calice.

The type specimen, which is an exceptionally well-preserved one, measures 18 mm. across the primary septa, and 14·5 mm. where narrowest; diameter of base midway between the hexagonal angles, 13 mm.; thickness through the centre of coral, 3·5 mm. A spine with point broken off is 5 mm. long.

The dimensions of a larger but worn specimen are:—Diameter of calice, 24 and 21 mm.; and of base, 15 mm.; length of spine, also broken, 8 mm.

Locality.—Tolerably abundant in the Eocene cliffs at Spring Creek, 13 miles south of Geelong, Victoria.

This elegant coral is quite unlike any other in the Australian tertiaries, but is closely allied to one from New Zealand, which was doubtfully identified by Ten-Woods with *Trochocyathus* (?) *Mantelli*, Milne-Edwards. The latter has also basal tubercles, while the quinarie which respectively flank the stout primary and secondary septa are fused to them at the wall. A drawing of its base only was published by Mantell in 1850, and the above tentative name was added by Milne-Edwards. Woods' species is probably the same, but in the fragment described and figured by him pali were supposed to be present. An example, however, from the Waitaki River, in the Museum of the University of Adelaide, which has been placed in my hands, shows no pali, but only raised structures on the upper central margin of the septa just as in *S. Tatei*, and I therefore conclude that it should also be referred to Moseley's genus *Stephanotrochus*.

FAMILY EUPSAMMIDÆ.

Before describing the next species, a few preliminary remarks upon the characteristics of the genus *Trematotrochus*, in which I place it, are necessary.

In the original diagnosis of this genus by Ten.-Woods,* pali were supposed to be present, but the structures observed are merely the lobed or thickened ends of some of the principal septa. By Duncan they are called paliform lobes or dentations around the axial space. An amendment of the genus proposed by the latter author† was based upon Woods' drawings and description of *T. fenestratus*, the only species then known. To him is due the recognition of a third cycle of rudimentary septa answering to the third cycle of well developed costæ, but in some other respects his description is incorrect and misleading. The perforated wall, which is questioned by him, is, nevertheless, undoubted, and forms an essential characteristic of the genus. In regard to this I entirely concur with Woods, who remarks—“The pores go right through the wall; in fact, as the pores are very large, the portion of the wall which separates them becomes little more than a flat transverse bar.” I may add as confirmatory of his conclusion, that a longitudinal section of the coral, prepared so as to leave a portion of the wall intact, admits light freely through the pores. Duncan follows Woods in stating that there is no columella. As further detail, he adds—“The septa, which are large and equal, extend close to the axial space, and form a tube-like space.” The equality of the septa is evident enough from Woods drawings, his assertion to the contrary in the accompanying description being a mistake. The tube-like space is, however, not vacant, as might perhaps be inferred, but filled with hard nodular tissue, which, uniting with the septal ends, forms a columella. This is visible also in transverse sections of the corallum, cut either near the upper surface or close to the base. As to which of the two principal orders of septa should be considered the primary is not easily decided. I am inclined to reverse the order of development assigned to them by both the authorities quoted. In the new species described below, the lobed septa are, I judge, those of the second order.

Notwithstanding its perforated wall, the genus was placed by its author among the Turbinolidae on account of its supposed analogies with certain genera in that family. The second species referred to shows, however, in addition to a distinctly perforated wall, a regular fusing together of certain septa in each system at some distance from the margin, as in the genera of the Eupsammidae. I can, in fact, see no reason for the retention of the genus in the Aporosa Section of the Madreporaria, and place it instead under the Perforata. The regular perforations in the

* Proc. Royal Soc., New South Wales, vol. XII., 1878, p. 59, fig. 2.

† Revision of Madreporaria. Jour. Linn. Soc., Zoology, vol. XVIII., pp. 20, 21.

wall of *Trematotrochus* are well-represented by the radial pores on the base of *Stephanophyllia*.

In the following revised diagnosis of the genus I have noted what appear to be its essential attributes.

GENUS TREMATOTROCHUS, *T. Woods* (emend).

Corallum simple, conical, free. Calice circular or elliptical with distinct margin. Costæ prominent. Septa in six systems, solid, and continuous with costæ. The inner ends of some are lobed and united to hard nodular tissue, which occupies the axial space and constitutes the columella. The highest cycle of septa is small or even rudimentary and corresponds to well developed costæ. Wall incomplete in the intercostal spaces, which are regularly fenestrated. Neither endotheca nor synapticulæ present. No epitheca.

Trematotrochus Clarkii *spec. nov.* Pl. iii., figs. 2 a, b.

The corallum is small and roundly conical in shape. It is slightly contracted at the calice, which is circular, with a sub-plane surface.

The septa are in six systems with four cycles. The primaries are free and of nearly the same thickness throughout. I select these as primary because they are continued on the wall by costæ which evidently constitute the original framework of the coral. Usually there is but one tertiary developed in each system and this joins the secondary at from one-third to a half from the wall. A single one of my specimens shows two tertiaries in four of the systems, the additional one present also joining the neighbouring secondary. Before uniting, the tertiaries and secondaries equal the primaries in thickness, but their fused portions are much stouter. In most examples, as in the one figured, there are thus 18 equal septa at the margin of the calice, but in the exceptional one mentioned there are 22. In all cases, however, the inter-spaces are approximately equal. Each of these is at the circumference medially divided by a cycle of rudimentary septa just as in *T. fenestratus*. These are very small, and, in fact, only occasionally visible in the calice as extremely short needle-like spikes. The septa of the three first orders are solid, exsert, and minutely granular on their sides; the secondaries are much lobed and indented in their thickened portions.

The columella is formed by hard nodular tissue, which occupies a small but well marked area between the opposite ends of the principal septa at the centre of the calice. The secondaries, and the primaries also in well preserved examples, unite with it, the thickened and lobed ends of the former rising slightly above its upper surface. It is continuous downward nearly, if not quite,

to the base of the corallum. In a young example lately collected, about two-thirds of the upper portion of the fossil has been worn away by fossilization, and at the bottom there is still a prominent columella.

The costæ are continuous with the septa, and thus vary in number exactly as these do. Including the quaternaries the total number of costæ is normally 36, but in the example mentioned with four extra tertiary septa, 44 separate costæ were counted at the upper margin of the wall, there being a quaternary in every interspace of the other cycles. The primaries are distinct and free right to the base; the tertiaries unite with the secondaries at varying heights on the wall from about two-thirds below the summit to quite close to the base. These three orders of costæ are stout and subequal in size, the primaries becoming, perhaps, slightly the stouter towards the base. The costæ of the fourth order are always well developed, and about half as thick as the others; they meet either the secondaries or the tertiaries at heights on the wall which vary considerably in the several systems. The intercostal spaces, which towards the upper margin of the corallum equal the costæ, are crossed by thin transverse bars, between which there is a series of regular pores similar to those in *T. fenestratus*; they are, of course, most conspicuous in the upper part of the corallum, where the intercostal spaces are widest. In the young example referred to above with worn and excavated calice, the pores are visible on the inner as well as the outer surface of the wall. Towards the margin of the calice also in most examples the complete perforation of the wall is plainly seen.

Altitude, 5 mm.; greatest diameter of corallum, 4 mm.; diameter of calice, 3 mm.

Locality.—Tolerably abundant in Miocene beds at Mississippi Creek, Gippsland Lakes area. Twelve examples. The species name is in compliment to Mr. Donald Clark, from whom I received my first specimen.

EXPLANATION OF PLATES.

PLATE II.

Fig.

1. *Flabellum Gippslandicum*—*a*, corallum, nat. size; *b*, calice, 3 diam.
2. *Flabellum fastigiatum*—*a*, corallum, nat. size; *b*, calice, 2 diam.
3. *Placotrochus corniculatus*—*a*, corallum, 1.5 diam.; *b*, calice, 4 diam.
4. *Paracyathus Tasmanicus*—*a*, corallum, 2.5 diam.; *b*, calice, 5 diam.

PLATE III.

1. *Stephanotrochus Tatei*—*a*, corallum, 2 diam.; *b*, base, 2 diam.; *c*, calice, 3 diam.
2. *Trematotrochus Clarkii*—*a*, corallum, 6 diam.; *b*, calice, 10 diam.
3. *Flabellum curtum*—*a*, corallum, 2 diam.; *b*, calice, 3 diam., showing three systems.

PRELIMINARY NOTES ON PHASCOLONUS GIGAS,
Owen [PHASCOLOMYS (PHASCOLONUS) GIGAS,
Owen], AND ITS IDENTITY WITH SCEPARNODON
RAMSAYI, Owen.

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and

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[Read July 4. 1899.]

INTRODUCTION.

In 1872 Sir Richard Owen described, under the designation of *Phascolomys gigas*,* certain fragments of mandibles of a large extinct wombat-like animal. At the same time he suggested for it the name *Phascolonus* if, thereafter, it should be found necessary to confer on it generic or subgeneric distinction.†

In 1883 the same writer ascribed certain peculiar adze-like teeth to *Sceparnodon ramsayi*,‡ the generic name having been suggested by Dr. Ramsay, then Curator of the Australian Museum, Sydney, who had transmitted casts of the teeth in question.

In the following notes we desire to show—

(1) That the teeth, in question, ascribed to *Sceparnodon ramsayi* are the upper incisors of *Phascolonus (Phascolomys) gigas*; and

(2) That Owen's anticipation, that a more extended examination of the remains of the animal to which his fossils belonged might prove to be generically distinct from *Phascolomys*, is fulfilled.

We shall therefore adopt definitely the name *Phascolonus* which Owen's prevision led him to suggest and which thus caused him to bracket it with that of *Phascolomys* in the index to his volumes on the Extinct Mammals of Australia. The probable correctness of this anticipation has already been to some extent recognised for, in the British Museum Catalogue of Fossil Mam-

* Phil. Trans. R. Soc. of London, vol. CLXII. (1872), pp. 248—258. Extinct Mamm. of Australia, pp. 346—355.

† Vide footnote to above papers, pp. 251 and 348 respectively.

‡ Phil. Trans., vol. CLXXV. (1884), pp. 245—248.

malia, Part V. (Lydekker, 1887), p. 157, *Sceparnodon* appears as a synonym of the definitely established genus *Phascolonus*; so also a similar view has been adopted in *Mammals Living and Extinct* (Flower and Lydekker) p. 146.

Elsewhere* Lydekker has stated the reasons on which he bases his conclusions as to the generic identity of the two forms.

On the other hand their identity has been disputed by DeVis,† who, in the latter of the two communications referred to, describes and figures, as the real incisor of *Phascolonus*, a tooth of a form very different to that ascribed by Owen to *Sceparnodon*; but whatever this tooth may be, it is certainly not that of Owen's *Phascolonus*.

In the light of DeVis' statements, Lydekker expresses himself more doubtfully on the subject in his later work, "Marsupials and Monotremes," 1894, p. 266.

The very complete evidence afforded by the Callabonna remains will, now however, finally decide the point in favour of identity.‡

As regards the first proposition the assertion rests on the clear evidence afforded by the Callabonna discovery.§ Amongst these remains, and associated with others of the same animal, were two mandibles, nearly complete except as to the upper two-thirds of the ascending ramus, which corresponded exactly to those of Owen's *Phascolomys* (*Phascolonus*) *gigas*. One of these mandibles belongs to other fragments which, together, make up a large portion of the cranium. Fortunately the maxillary portion is included and in this are implanted a nearly perfect pair of the adze-like teeth in question, these having precisely the same characters as, though they are rather larger than, those ascribed to *Sceparnodon* by Owen. Of this pair the left allows its length to be taken from the chisel edge for a length of 160 mm. along its convexity to its broken implanted end. The right tooth has lost one inch of its anterior extremity but has preserved about that amount more of the implanted end than its fellow. Thus we may be sure that the whole length of the perfect tooth must have been at least 180 mm. but it was probably not much more, as the considerable amount of pulp cavity exposed at the broken implanted end of the right tooth indicates that its posterior limits had been nearly reached. This limit corresponds to a vertical drawn through the upper premolar. The width of these teeth

* Proc. R. Soc. vol. XLIX., 1891, p. 60.

† Proc. Linn. Soc. of N.S.W., 1891, vol. VI. (2), pt. 2, p. 258, and vol. VIII., 1893 (2), pt. 1, p. 11.

‡ For a review of various opinions that have been expressed on this question *vide* an article by Dun in the Records Geol. Survey of New South Wales, vol. III., 1892, p. 25.

§ Nature, vol. L., 1894, pp. 184 and 206.

is 38 mm. both at their anterior and posterior ends. An apparently nearly perfect isolated tooth from the same locality has the very similar dimensions of 182 mm. and 39 mm. for its length and breadth, respectively, and in this it can be seen that the width is preserved, with almost absolute uniformity, throughout its whole extent. The thickness in the mid-longitudinal line of the tooth, just posterior to the bevel of the cutting edge, is 8 mm. which, at the somewhat thickened lateral borders, is increased to 10 mm. These measurements, also, apply along the whole length of the tooth.

Thus it will be seen that the Callabonna teeth are somewhat larger than those that came under the notice of Owen. No other incisors exist in the upper jaw.

The restoration of the skull has not been completed, but the large fragment which contains the pair of upper incisors contains also on each side a complete molar series of phascalomydian type. Of this the antero-posterior length, measured along the grinding surfaces, is 114 mm. In an old *Phascalomys mitchelli* and a young adult *P. latifrons* the corresponding lengths are 53 mm. and 49 mm. respectively.

In *Phascalomys mitchelli* the section of the upper premolar is sub-triangular and its inner side is indented by a distinct longitudinal groove which imperfectly defines a small anterior lobe from a larger posterior; in *P. latifrons* scarcely a trace of such a groove exists and the section approximates to a quadrate figure.

In *Phascalonus gigas* the bilobate character of this tooth is more distinctly evident both by the sharper definition of the groove and by the greater relative size of the anterior lobe, the transverse width of which, however, still falls considerably short of that of the posterior. On the outer side of the tooth there is a barely evident longitudinal depression which can barely be called a groove. The antero-posterior length of the premolar grinding surface is to the succeeding molar as 19 to 24.

Of the true molars *M.* 1 and *M.* 2 are the largest of the series and approximately equal in size; *M.* 3 is distinctly smaller both in length and breadth and in all three the lobes are approximately equal. The posterior, or fourth, molar is unequally bilobed and is still more reduced in size—it is in fact smaller than the premolar. The reduction chiefly affects the posterior lobe but it is also shared by the anterior. The inferiority of size of the last molar is, also, a character in both *Phascalomys mitchelli* and *P. latifrons*, but in the latter the two lobes are more nearly of equal size than in the former, where the anterior division has remained relatively larger.

Of the two specimens of lower jaw which are included amongst the remains one comprises the united horizontal rami with the

dental series complete, but nearly the whole of the ascending rami are missing; the other is a similar, though somewhat less complete, fragment having lost, in addition to the ascending rami, that part of the symphysis in advance of the premolars, in which the incisors were implanted.

Of these fragments it is sufficient, for the object of this communication, to state that they correspond *pro tanto* to Owen's descriptions and they thus indicate a rather closer resemblance, on the whole, to the latifront than to the platyrrhine species of living wombat.

We must postpone our remarks upon the remainder of the skull until it shall have been more completely restored.

Passing now to a brief notice of the bones of the appendicular skeleton, in which we shall dwell rather upon departures from than upon agreements with the phascalomydian type, we may say that they are without exception of an extraordinarily massive character, as will be more particularly indicated by the length and breadth dimensions to be subsequently given.

SCAPULA.

Length* (from tip of coracoid process to base at junction of spine, 295 mm.; the breadth owing to mutilation cannot be given. Length of glenoid cavity, 85 mm.; the breadth cannot be stated.

Phascalomys latifrons:—Length of Scapula, 116 mm.; of glenoid cavity, 25 mm.

In the one specimen of this bone which we possess there have been preserved the whole length of that portion of the body from which springs the spine, the greater part of the spine itself (exclusive of the acromion), the neck, glenoid cavity (somewhat damaged) and coracoid process.

Such parts of this bone as permit of comparison reveal phascalomydian features, the chief noticeable difference being that, in the fossil, the coracoid process, on to the base of which the glenoid surface extends as it does in the wombat, is not as in the latter deflected in the direction of the subscapular fossa.

HUMERUS.

Maximum length, 238 mm.; maximum breadth (between epicondyles), 126 mm.

Wombat:—Length, 105 mm.; breadth, 48 mm.

* In each case the length given is the distance between the transverse parallels of the two extreme points. The breadth is that of the widest part of the bone, the position of which will be indicated. For comparison the corresponding measurements in a young but fully grown *Phascalomys latifrons* will be also stated.

This bone is represented by one almost perfect specimen ; another lacking only the ect-epicondyle and the corresponding part of the distal articular surface, and a third comprising the ent-epicondylar moiety. While preserving many typical phascolomydian characters, it nevertheless does not possess an ent-epicondylar foramen ; a very shallow emargination of the internal border, however, exists at the level of the lower end of the deltoid ridge. The ent-epicondyle itself is relatively less internally produced than in the wombat, so that there is less asymmetry in the disposition of the two sides of the distal extremity.

The insertional line of the pectoralis, which in the wombat forms a low, almost linear, ridge, is, in *Phascolonus*, a prominent angular crest the presence of which confers a distinct angularity upon the section of the bone in this region ; the lower end of this crest, moreover, where it meets the deltoid ridge, forms a somewhat swollen tuberosity in place of, as in the wombat, a simple angle of meeting.

Though we can only refer to Owen's plate of the humerus of *Nototherium*,* the prominence of the pectoral ridge in *Phascolonus* suggests an approximation to this conspicuous feature in the former fossil. The angular ridge, which in the wombat extends obliquely from the angle of junction of the pectoral and deltoid ridges to become continuous with the proximal end of the ent-epicondylar bridge, is, in *Phascolonus*, represented by its upper part only, which soon subsides upon the general thenal surface of the shaft, and its direction, moreover, in the latter case, is vertical or in a line with the middle of the gap between the radial and ulnar moities of the inferior articular surface.

RADIUS.

[Represented by one complete bone and the proximal half of another.]

Length, 174 mm.; breadth (at widest part of distal end), 44 mm.

Wombat :—Length, 100 mm.; breadth, 21 mm.

The contour of the head more nearly approaches a circular figure in *Phascolonus* than in *Phascolomys*, which feature is partly due to a somewhat less degree of flattening of its anconal aspect. In the wombat the proximal border of that part of the head which is applied to the lesser sigmoid cavity reaches to a slightly higher level than does that of the opposite side ; in *Phascolonus* the conditions are reversed. The interosseous ridge, the top limit of which in the fossil reaches to the level of the lower edge of the bicipital tuberosity, is very prominent and rough so that the shaft of the bone is at its broadest at a point

* *Extinct Mamm. of Australia*, Pl. cxxvii., Text p. 517.

about half an inch below the tuberosity. From this point the width gradually declines until the shaft begins to broaden again into the distal expansion. In the wombat, on the other hand, the shaft is at its narrowest just below the tuberosity, thence gradually widening towards the lower end. In the fossil the bicipital tuberosity is proportionately smaller but more prominent and relatively more distant from the head than in the wombat.

ULNA.

[One specimen which lacks the lesser sigmoid cavity and (excepting its upper lip) that part of the greater cavity which is applied to the radial division of the distal humeral articulation. The styloid process, also, is not quite complete, but this is perfect in a second fragment comprising the lower half of the bone.]

Length, 250 mm.; breadth (across thenal surface at level of inner division of humeral articular surface), 95 mm.

Wombat:—Length, 135 mm.; breadth, 29 mm.

To an immense olecranon process, which is proportionately larger than that of *Phascolumys*, is added, in *Phascolonus*, a marked production thenad of the proximo-thenal angle, the effect being to produce, in the region lying between the tip of the olecranon and the thenal side of the sigmoid cavity, a much more marked depression than exists in the corresponding part of the ulna of the wombat. The anconal surface both of the olecranon and shaft is traversed for nearly their whole length by a distinct, broad but shallow groove which, in the wombat, is scarcely apparent. The styloid process in the fossil is very distinctly semi-oviform with a marked inflection thenad; in the wombat it is nearly circular in contour and obtusely conical in form.

CARPUS.

[Of the Carpus the cuneiform (one specimen), pisiform (two specimens), and unciform (two complete and three fragmentary specimens), only, are represented.]

The first named combines phascologydian and diprotodontoid features;* the pisiform almost exactly repeats on an enlarged scale the characters of this bone in the wombat, and is thus unlike that of *Diprotodon*; the unciform, which possesses a large unciform process, is also chiefly phascologydian in its characters.

The carpal bones reveal an even greater proportionate size, when compared to those of the wombat, than do the long bones.

* A description of the manus and pes of *Diprotodon australis*, forming part I. of vol. I. of the Memoirs of the Royal Society of South Australia, is now in the press.

Thus, in a pisiform of *Phascolonus*, the length and breadth are 52 mm. and 33 mm. respectively as against 16 mm. and 10 mm. in the latifront species.

FEMUR.

[One nearly complete bone and a fragment comprising the lower end.]

Length, 338 mm.; breadth (transverse width of upper end between head and great trochanter), 152 mm.

Wombat:—Length, 133 mm.; breadth, 43 mm.

Diprotodontoid features are conspicuous in this bone. They are to be seen in the width of the upper extremity; the egg- or pear-shaped outline of the head (when viewed proximally) owing to the production of its articular surface on to the neck; the elevation of the head to a considerably higher level than the summit of great trochanter, though not to the degree that obtains in *Macropus*; want of elevation of the lesser trochanter; the marked fore-and-aft flattening of the shaft and upper end, particularly of the great trochanter; absence of the popliteal depression, the plane of the hinder surface of the shaft being continued into the intercondyloid groove, and the anterior production of the fore part of the inner condyle.

In the wombat the contour of the head, from the proximal point of view, is much more nearly circular, though there is here, too, some slight extension of its articular surface on to the neck; the height of the great trochanter barely exceeds that of the head and it is less compressed; the small trochanter forms a prominent and compressed ridge, and the shaft is nearly cylindrical at its middle; the forepart of the inner condyle, though more prominent than that of the outer, is not produced, as in *Phascolonus*, into a sub-conical prominence.

One feature common to both *Phascolonus* and *Phascolomys* is a shallow but distinct transverse groove which crosses the outer condyle at its junction with the rotular surface. In *Diprotodon* it is the inner condyle which is traversed by a similar groove.

The third trochanter in *Phascolonus* seems to be represented by a rough oval tract situated on the post-axial side of the a little proximad of its middle.

TIBIA.

[Two almost perfect specimens of opposite sides and slightly varying size.]

Length, 207 mm. and 198 mm. respectively; breadth (of proximal end), 104 mm. and 101 mm.

Wombat:—Length, 103 mm.; breadth, 30 mm.

The tibia exhibits, among other phascolomyidian features, a very marked lateral compression but, in place of the deflection, fibulad,

of the middle portion of the sharp anterior edge, there is, in *Phascolonus*, a conspicuous twist in the continuity of the bone of such a kind as would arise from a similar inflection of both the anterior border of the lower end and of the posterior border of the upper. From the combined effect of the twist, as affecting the upper end, and of the considerable actual production, postero-internally, of the latter it arises that the proximal surface is not only of great superficial extent but also asymmetrically disposed by reason of its extension in conformity with that of the head. The condylar depressions of this surface show a similar asymmetry in size as well as in position, and both are thrown far back upon it, so that a large area of non-articular surface lies in front of them, the latter feature being also present in the wombat. The inner condylar depression, considerably the larger of the two, is ovoid in shape and deeply concave, the depth of the concavity being contributed to by the encroachment of its articular surface on the inner and higher of the two antero-posteriorly disposed ridges which, together, form the spine of the tibia. The surface for the outer condyle is sub-polygonal in shape and generally flat except for that portion of it which rises on to the outer of the two spinous ridges. In the wombat there is less inequality of size between the condylar surfaces and the outer is distinctly convex though the inner is concave.

In *Phascolomys* the superior tibio-fibular articulation, which is nearly flat antero-posteriorly, to a large extent underlies the the outer condylar surface, the two articular tracts making an acute angle with one another. In the fossil this angle is less acute and a distinct degree of fore-and-aft concavity of the fibular articular surface is expressed.

The internal malleolus of the lower end of the fossil tibia is very broad antero-posteriorly; it is not, as in the wombat, produced, inferiorly, into a compressed conical process; and the articular surface for the astragalus, instead of extending, as in the latter, on to the whole of the external face of the malleolus, encroaches upon it but to a very limited extent. It is with this latter part that is articulated the inner surface of a low prominence that will be afterwards described as rising from the inner border of the tibial surface of the astragalus.

A depression on the articular surface of the distal end of the tibia, just external to the malleolus, receives the summit of the projection itself.

A distinct triangular facet for the *os pyramidalis* exists which makes an obtuse angle both with the astragalus surface and with the plane of the hinder region of the extreme lower part of the external surface of the shaft.

FIBULA.

The mutilation of both ends of the only bone obtained of this kind precludes satisfactory measurement or description.

ASTRAGALUS.

[One complete specimen.]

The Astragalus presents a combination of phascolomydian and diprotodontoid features with a preponderance of the latter.

It shares the generally depressed characters of the head of this bone in the wombat, but whereas, in the latter, the anterior articular convexity for the navicular is coincident with the whole anterior transverse width of the bone, there is, in *Phascolonus* as in *Diprotodon*, a non-articular tract to the outside of that part which represents the head. Though less conspicuously than in *Diprotodon* the internal border of the superior surface is, in the same kind of way, elevated into a low pyramidal or conical projection but, unlike the condition which obtains in *Diprotodon*, the inner side of this is partly articular, being in opposition with the limited portion of the astragalar surface of the tibia that has been mentioned as extending on to the outer surface of the internal malleolus. This small tract on the inner side of the projection is the only representative of the extensive surface that, in the wombat, articulates extensively with the internal malleolus.

In both *Diprotodon* and *Phascolomys latifrons* the articular surface of the head of the astragalus and of its tibial surface are discontinuous by the intervention of a non-articular tract but in *Phascolonus* the two are continuous by an extension of the latter which meets the former.

A feature of the astragalus of *Phascolonus*, not found in *Diprotodon* in which the tibial surface is remarkably flat, is a certain amount of elevation of the border of its antero-external region; thus the slope, inwards, from this raised edge and the opposing slope, outwards, from the previously described pyramidal elevation of the inner border produce a marked concavity between these two elevations.

The continuous articular tract on the external aspect for the fibula and pyramidalis is, as in the wombat, also directly continuous, though at a less acute angle, with the calcaneal surface of the bone; in *Diprotodon* the two are separated by an intervening non-articular strip.

On the under side the features of the astragalus present a considerable resemblance to those of the corresponding surface in *Diprotodon*, the principal difference being in respect of the relatively large non-articular tract which, in *Phascolonus*, is left in the postero-internal region.

METATARSALS (METACARPALS ?).

The remains of *Phascolonus* include four bones of a form very similar, on a proportionately reduced scale, to that of the fifth metacarpal and metatarsal of *Diprotodon*. In all of these the characteristic production of the outer border is repeated in much the same way. One of them, slightly longer than the others, also has its postero-external angle produced backwards as well as outwards as a somewhat laterally compressed conical process, the tip of which reaches a point considerably to the rear of the proximal articular surface. In two others, probably a pair, the production of the proximal part of the outer border is outwards rather than backwards, so that the tip of the production does not reach to the rear of the proximal articular surface of the bone. In both of these latter, moreover, the outer border is emarginate—a feature which accentuates the prominence of the production; whereas in the one previously mentioned the outer margin is even. We should have been confident in attributing the first mentioned single bone to the metatarsus and the pair to the metacarpus but that, in a fourth specimen, the production of the postero-external angle is of an intermediate character, being both backwardly and outwardly directed. The outer margin of this is also emarginate, though to a less extent than in the supposed pair. Thus it is quite possible that they may be all of one denomination. Assuming, however, the correctness of our supposition that the first mentioned single bone is, in all probability, a metatarsal, it may be said of it that in the general production, to a greater or less extent, of the whole outer border it bears a close resemblance to the corresponding bone of *Diprotodon*, while the special extension, backwards, of the postero-external angle forms a feature common to this bone in both *Diprotodon*, *Phascolomys*, and *Phalangista*.

There are a few other bones and fragments of bones which belong either to the metacarpus or metatarsus, but as we are not quite sure of their exact position we will not for the present take them into consideration except to remark that, in their general characters, they resemble certain of the bones of these segments in *Diprotodon* rather than in the *wombat*.

PHALANGES.

Two consecutive phalanges—of the proximal and middle series—which, there is reason to believe, belong either to the supposed fifth metatarsal (though they might also belong to one of the bones considered as the corresponding metacarpal) show a great diminution of size when compared to the precedent segment. The proximal is a small compressed element with a conspicuous production, postero-externally, of its corresponding angle and, to a

greater or less extent, of its outer border. The middle phalanx is a still smaller compressed sub-quadrate bone. In the above features and in the depression of their articular surfaces both show a resemblance, on a small scale, to the proximal and middle segments of the fifth digit of the pes of *Diprotodon*.

The unguinal phalanges, of which four are represented, repeat, on a scale of about twice the size, the features of these elements in the wombat being considerably depressed and only slightly curved.

ATLAS.

[One specimen in which the transverse processes have suffered considerable abrasion.]

Transverse width, measured anterior to, but exclusive of, the transverse processes, 110 mm.

Wombat, similarly measured 43 mm.

In the atlas of *Phascolonus* the continuity of the anterior bony arch is interrupted by a vacuity as in *Diprotodon*, in the wombats and in some other marsupials, and the gap is of greater relative width (45 mm.) than in the forms specifically mentioned. In the atlas of a latifront wombat the interspace measures 10 mm. and in that of a *Diprotodon* only 26 mm.

The neural arch is distinctly more flattened than in the wombat and the transverse process is grooved for the vertebral artery, but to a slight extent only. The neurapophysis is perforated, for the passage of the first cervical nerve, in much the same way as in the wombat.

AXIS.

[A fragment comprising the body and odontoid process—the greater part of the neural arch being absent.]

Such parts as are preserved, present, generally, the features found in the axis of *Phascolomys* but the odontoid process, which in *P. latifrons* is somewhat antero-posteriorly compressed, would appear to have been more conical in form though it is possible that the abrasion to which it has to some degree been subjected may have modified its original shape.

Besides the bones that have been specifically mentioned above there exists also amongst the Callabonna remains about a dozen ribs, a few vertebral centra and two or three fragments of the pelvis. For the present we defer consideration of these.

REMARKS.

The preceding notes, which we hope may shortly be followed by a more complete, as well as adequately illustrated, description, will at least indicate the more conspicuous features of a large part of the skeleton of *Phascolonus gigas*. It has





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VOL. XXIII *Part 2*

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INCLUDING PROCEEDINGS AND REPORTS.

EDITED BY PROFESSOR R. TATE.

ISSUED DECEMBER, 1899.



Adelaide :

W. C. RIGBY, 74, KING WILLIAM STREET.



DESCRIPTIONS OF AUSTRALIAN CURCULIONIDÆ,
WITH NOTES ON PREVIOUSLY DESCRIBED
SPECIES.

By ARTHUR M. LEA.

[Read September 5, 1899.]

PART I.

The Australian CURCULIONIDÆ are comparatively little known. Including the SCOLYTIDÆ, BRENTHIDÆ, and ANTHRIBIDÆ, scarcely 1,900 species have been recorded; and I believe that fully 4,000 species of the allied families occur in Australia and Tasmania.* The BRENTHIDÆ, as might be expected, are better known than the other families, but even now contains a number of undescribed forms. The SCOLYTIDÆ, despite their great economic importance, are little known, scarcely one dozen species having been described; and the ANTHRIBIDÆ are in an almost similar state. Of the true CURCULIONIDÆ, the subfamilies *Hyperides*, *Magdalinides*, *Tychiides*, *Cionides*, *Baridiides*, and several others are almost untouched. Some of the larger subfamilies are in great confusion. No attempt has ever been made to systematically arrange the genera; in consequence, many of them remain in the positions to which they were originally consigned, and which are often erroneous. It seems to me, for instance, that to strictly attach subfamily importance to the presence or absence of ocular lobes, and as to whether the scrobes are directed straight towards or slightly below the eyes, are mistakes. In this and succeeding papers, however, I do not propose to attempt a classification of the family, but simply to describe such new forms as I can find time to work up, and to give new or exact localities for previously described species, together with remarks on variation, synonymy, &c.

The present paper is confined to members of the *Erirhinides* (a subfamily, of which large numbers of genera and species have already been described by the Rev. Thomas Blackburn, in the Transactions of this Society for 1893 and 1894). Altogether 83 species are described, and are referred to the following genera:—*Desiantha* (6), *Anorthorhinus* (3), *Cydmæa* (17), *Enochroma* (1), *Misophrice* (9), *Storeus* (34), *Cyttalia* (8), *Glaucopela* (2), and *Myositta* (3).

* Only 95 species have been expressly stated to occur in Tasmania.

Unless expressly stated to the contrary, specimens of all the new species have been taken by myself, and the localities (and food-plants where given) may be depended upon.

DESIANTHA MALEVOLENS, n. sp.

Piceous, legs and antennæ piceous - red. Upper-surface moderately closely covered with obscure ochreous and brown scales, the ochreous scales clothing sides of prothorax, and forming a distinct median line; scutellum with greyish scales; elytra with a wide dark sutural patch, the sides with paler scales, extreme margins with greyish and sooty-brown scales; a small distinct suboblong whitish spot on each elytron just before summit of posterior declivity. Under-surface and legs densely clothed with ashen scales, in which a few short stout pale setæ are mixed.

Head and rostrum densely punctate; a feeble depression between eyes. Rostrum arcuate, stout, rather short. Club elongate. *Prothorax* transverse, sides and base rounded, apex widely emarginate, and almost the width of base. *Elytra* widely emarginate at base, apex conjointly rounded, shoulders oblique; punctate-striate, punctures concealed; interstices feebly convex, wide, and regular. *Under-surface* densely punctate, punctures concealed. Prosternum feebly and widely emarginate in front. Intermediate intercoxal process descending at an angle of about 45°. Metasternum depressed in middle, the depression continued on to abdomen. Two basal segments of abdomen very large, third and fourth very short (their combined length being only about half that of the second or fifth), and arcuate at sides. *Legs* rather long; femora thick, subpedunculate; tibiæ falcate (the anterior very decidedly so), with numerous small teeth beneath; apex thin, terminal hook unusually long and sharp; tarsi with fourth joint shorter than the rest combined. Length (from apex of prothorax), 4 $\frac{3}{4}$ mm.; rostrum, 1 mm.; width, 2 mm.

Hab.—Swan River (Hon. J. G. H. Amherst).

This species, in the characters of its rostrum, abdomen, tibiæ, and tarsi, is somewhat at variance with the majority of species in *Desiantha*; and it may be eventually considered necessary to erect a new genus to receive both it and the following species; but as the genera closely allied to *Desiantha* are already so numerous, and some of them are founded on such trivial characters, I am strongly adverse at present to adding to their number. The species is reported to be very destructive to the young shoots of the vine, its work being much the same as that of *D. maculata*.

DESIANTHA VEGRANDIS, n. sp.

Piceous, legs and antennæ piceous-red. Upper-surface closely covered with muddy-brown scales, prothorax with the sides and

median line obscurely marked with paler scales ; scutellum with greyish scales ; elytra with greyish scales at sides and apex, and a small spot on each side beyond the middle. Under-surface more densely clothed with paler and longer scales ; tibiæ, especially the posterior, fringed beneath with long hair.

Structure as in the preceding species, but the elytra shorter and wider ; femora less thickened, anterior tibiæ less decidedly falcate, and claw joint the length of the other joints of each of the tarsi. Length, 3 mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{1}{2}$ mm.

Hab.—N.S.W.: Tamworth.

Closely allied to the preceding species, but may be at once distinguished by its smaller size and different clothing (especially of the under-surface).

DESANTHA PRÆMORSA, *n. sp.*

Piceous, legs piceous-red ; sterna, abdomen, and antennæ dull-red. Head closely covered with yellowish-brown setæ, at sides of eyes and of rostrum with whitish setæ ; muzzle fringed with long hairs ; prothorax and elytra densely covered with overlapping scales, more or less greyish in colour ; prothorax with a very distinct median line of whitish scales (tinged with green or gold), continued on to scutellum ; elytra with palest scales about posterior callosities, a feeble (but sufficiently distinct) oblique spot on each side beyond the middle, and not quite extending to suture. Above, in addition to the scales, with numerous setæ, darker on prothorax than on elytra, on the latter confined to the interstices, but not in single file ; below moderately densely setose.

Head finely punctate, a feeble depression between eyes. Rostrum stout, shorter than prothorax, wider at apex than at base ; with three moderately distinct costæ, and which are separated by double rows of punctures ; scrobe terminating abruptly at one-third its length from eye.* Scape the length of funicle, first joint of the latter longer than the two following combined ; club elongate-ovate, free. *Prothorax* transverse, very feebly convex, sides and base rounded, sides gradually enlarging from base to near apex, and then suddenly lessened, extreme apex scarcely the width of base ; apex somewhat raised in middle, and with a feeble semicircular depression immediately behind ; densely punctate, punctures concealed. *Elytra* wider than prothorax, base widely emarginate, apex conjointly rounded, shoulders rounded, sides almost parallel to near apex ; punctate-

* The rostrum, when viewed directly from above, appears as if each side had been quadrately excised immediately in front of the eyes ; when viewed from beneath there appears to be a strong tooth-like projection on each side. I know of nothing similar in any weevil.

striate, punctures almost concealed; interstices convex and regular, except that there is a strong and almost conical pre-apical callus on the fifth. *Under-surface* finely punctate. Prosternum rather deeply emarginate in front. Intermediate intercoxal process flat between coxæ, perpendicular in front. Abdomen with straight sutures, third and fourth segments conjointly longer than second or fifth. *Legs* rather stout; tibiæ as wide at apex as at base, somewhat curved at apex; claw joint as long as the rest combined. Length, $6\frac{1}{2}$ mm.; rostrum, 1 mm.; width, 3 mm.

Hab.—Sydney.

A peculiar species, which might be separated from *Desiantha* on account of the unique structure of the rostrum. Nine specimens were obtained in company under a rotting log.

DESANTHA IRRASA, *n. sp.*

Male. Black, claws and base of scapes piceous-red. Upper-surface moderately densely clothed with short reddish-brown setæ, denser on elytral interstices than elsewhere: below with shorter and sparser setæ than above.

Head densely punctate, a small fovea between eyes. Rostrum the length of prothorax, dilated at apex, base slightly gibbous; densely punctate; sides feebly tricostate, costæ not visible from above. Antennæ slender; two basal joints of funicle elongate; club ovate, free. *Prothorax* scarcely transverse, slightly convex, base and sides rounded; densely punctate, punctures more or less confluent. *Scutellum* small, transverse, punctate. *Elytra* somewhat flattened, subovate, wider than prothorax, widest about middle, arcuate towards apex; base widely emarginate, each feebly produced at apex; striate-punctate, punctures large, oblong, comparatively shallow; interstices wide, granulate-punctate, slightly convex, suture, third, fifth, and seventh feebly raised; without preapical callosities. *Prosternum* rather deeply emarginate. Intermediate intercoxal process narrow, slightly raised in front. *Metasternum* coarsely punctate at sides, punctate and transversely wrinkled across middle. Abdomen densely and irregularly punctate, punctures smaller about middle of first and second segments than elsewhere, suture between these segments slightly curved; the other sutures deep and straight, third and fourth conjointly slightly longer than second or fifth; fifth concave, except at base. *Legs* moderately long; femora stout, the posterior subpedunculate; tibiæ somewhat curved, wider at apex than at base, with numerous small teeth beneath; claw joint as long as the rest combined. Length, 7 mm.; rostrum, 2 mm.; width, $3\frac{1}{4}$ mm.

Female. Differs in having the elytra conjointly rounded at apex, the abdomen with a depression on first and second

segments, the apical segment slightly convex, and the elytra comparatively longer and thinner.

Hab.—N.S.W.: Forest Reefs.

Numerous specimens were obtained under rotting logs. The rostrum in profile somewhat resembles that of *Nemestra incerta* from Western Australia. On an occasional specimen may be seen feeble pale lines at the sides of prothorax. I know of no closely allied species.

DESIANTHA MECASPIS, *n. sp.*

Piceous, legs and antennæ piceous-red. Upper-surface (except of head and rostrum, which are sparsely clothed) very densely clothed with grey or muddy-grey scales, not quite uniform in colour, and intermingled with moderately long recurved setæ. Under-surface densely clothed at sides, more sparingly along middle. Legs with setose scales; each of the femora with a feeble ring of whitish scales.

Head densely punctate, a feeble longitudinal impression between eyes. *Rostrum* the length of prothorax, curved, slightly dilated at apex; densely punctate, with five feeble costæ. *Antennæ* comparatively slender; first joint of funicle moderately long; club ovate, subadnate to funicle. *Prothorax* feebly transverse, sides rounded, base feebly rounded, and but slightly wider than apex; densely punctate, punctures concealed. *Scutellum* oblong. *Elytra* wider than prothorax, widest across shoulders, apex conjointly rounded; punctate striate, punctures concealed; interstices slightly convex and regular, except that the fifth terminates in a distinct preapical callus. *Under-surface* moderately densely punctate. *Prosternum* rather deeply emarginate in front. *Intermediate intercoxal process* narrow throughout. *Abdomen* with third and fourth segments conjointly the length of second, and slightly longer than apical. *Legs* moderately long; femora stout, subpedunculate; anterior tibiæ bisinuate, and feebly dentate beneath; claw joint the length of the rest combined. Length, 5 mm.; rostrum, 1½ mm.; width, 2 mm.

Hab.—Sydney.

Somewhat resembles *sericea* in appearance, but may be distinguished from that species by its narrower shape, differently coloured antennæ (in *sericea* the club is black), dentition of anterior tibiæ, &c.

DESIANTHA INCONTAMINATA, *n. sp.*

Piceous, legs and antennæ obscure piceous-red. Rather sparsely clothed with obscure ochreous or brownish scales. Under-surface with scales set in punctures—those on the sterna scarcely rising to the general level, and whitish; those on the

abdomen longer, subsetose, and yellowish—coxæ densely clothed; femora and tibiæ with yellowish setæ.

Head densely punctate, a narrow impression between eyes. Rostrum curved, the length of prothorax; densely punctate except at apex, with five costæ, of which the two outer on each side become conjoined beyond antennæ, and are continued (but feebly so) almost to apex. Antennæ slender; two basal joints of funicle elongate; club elliptic-ovate, free. *Prothorax* slightly longer than wide, sides equally rounded, base feebly rounded and slightly wider than apex; densely punctate, punctures round, and nowhere confluent. *Elytra* wider than prothorax, widest about shoulders, apex conjointly rounded; striate-punctate, punctures oblong, narrow, deep; interstices convex and regular, except that the fifth terminates in a very slight preapical callus. *Under-surface* densely punctate. Prosternum moderately deeply emarginate in front. Slope of intermediate intercoxal process rounded. Abdomen with third and fourth segments conjointly the length of fifth and slightly shorter than second. *Legs* moderately long; femora stout, subpedunculate; anterior tibiæ feebly bisinuate beneath, longer and thinner than the others, none dentate beneath; claw joint of all the tarsi shorter than the rest of the joints combined. Length, 8 mm.; rostrum, $2\frac{1}{2}$ mm.; width, $3\frac{1}{5}$ mm.

Hab.—N.S.W.: Burrawang (Mr. T. G. Sloane).

The claw-joint is shorter than usual, but not so short as in *Aoplocnemis*.

DESIANTHA MACULATA, *Blkb.*

I have this species from all the Australian Colonies. In Western Australia (including Rottneet Garden and Pelsart Islands) it is exceedingly abundant and destructive to various fruit-trees, but especially to the vine. It is variable, both as regards marking and size.

D. MAJOR, *Blkb.* *Hab.*—N.S.W.: Wilcannia.

D. SERICEA, *Blkb.* *Hab.*—N.S.W.; W.A.

D. OBSCURA, *Blkb.* *Hab.*—N.S.W.: Cootamundra, Queanbeyan, Sydney.

D. PARVA, *Blkb.* *Hab.*—Sydney.

D. VITTATA, *Blkb.* *Hab.*—N.S.W.: Forest Reefs.

D. PUSILLA, *Blkb.* *Hab.*—N.S.W.: Windsor.

D. CAUDATA, *Pasc.* *Hab.*—N.S.W.; V.

D. (BREXIIUS) MURINA, *Pasc.* *Hab.*—Forest Reefs, Sydney.

ANORTHORHINUS* APICALIS, *n. sp.*

Black, subopaque; tarsi and apex of tibiæ pale-red; antennæ reddish-piceous. Sparsely clothed with sooty and grey scales, the latter feebly transversely arranged on elytra, and forming three feeble longitudinal lines on prothorax. Under-surface and legs with sparse pale scales, snowy on apex of tibiæ.

Head densely punctate. Rostrum with five costæ, three of which are placed on a median elevation. Antennæ moderately elongate. *Prothorax* longer than wide, apex the width of base, sides gently rounded; densely and coarsely punctate. *Elytra* twice the width of prothorax, shoulders square; striate-punctate, punctures quadrate and subapproximate, the third, fifth, and seventh interstices wider than the others, and raised especially near base; a preapical callus on each side. *Under-surface* densely and strongly punctate, punctures on metasternum perfectly circular. Prosternum feebly emarginate. Length, 4 mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{3}{4}$ mm.

Hab.—Tasmania (Mr. A. Simson, No. 2,925). N.S.W.: Galston (Lea).

May be readily distinguished by the colour of the apex of tibiæ and the coarse punctures of the under-surface.

ANORTHORHINUS ABJECTUS, *n. sp.*

Black, subopaque; tibiæ and tarsi of a pale-red, base of femora dark-red, antennæ piceous. Head and rostrum to eyes with whitish setose scales, a moderately dense stripe of similar scales on each side of prothorax; elytra with smaller scales rather evenly distributed. Under-surface and legs with whitish setæ.

Head densely punctate. Rostrum the length of prothorax, with five narrow costæ, which terminate at antennæ. Scape comparatively slender. *Prothorax* as in *apicalis*, but less coarsely punctate. *Elytra* twice the width of prothorax, shoulders somewhat oblique; striate-punctate, punctures rather large and subapproximate; interstices punctate, the third, fifth, and seventh very feebly raised, each side with a preapical callus. *Under-surface* rather finely punctate. Prosternum semicircularly emarginate in front. Length, $3\frac{1}{2}$ mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{1}{3}$ mm.

Hab.—Swan River.

Compared with the description of *Phrenozeria lyproides*, Pascoe, this species differs in having the scales without a pearly lustre, and the antennæ much darker than tibiæ.

* I think it highly probable that this genus (possibly synonymous with *Phrenozeria*) will eventually be merged in *Desiantha*.

ANORTHORHINUS BREVICORNIS, *n. sp.*

Black, subopaque; antennæ and legs (middle of femora excepted) of a rather dark-red. Clothed with blackish setose scales; head with a small spot of whitish scales between eyes; prothorax with a few whitish ones about base; scutellum with white scales; elytra with numerous small distinct whitish spots—less numerous towards base than elsewhere. Under-surface with whitish setose scales. Femora with a ring of white scales at apex, the tibiæ with rings at base and apex.

Head and rostrum as in *apicalis*. Antennæ, especially the scape, short and thick. *Prothorax* scarcely longer than wide, sides feebly rounded, base and apex equal; densely and coarsely punctate. *Elytra* twice the width of prothorax, sides parallel to near apex, shoulders square; striate-punctate, punctures elongate, approximate; interstices flat, equal; without preapical callosities. *Under-surface* densely and rather coarsely punctate. Prosternum rather deeply emarginate in front. Length, $3\frac{3}{4}$ mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{1}{2}$ mm.

Hab.—W.A.: Rottneest Island.

The legs are prettily variegated, as in *pictipes*, but the rostrum and elytra are very different.

A. PICTIPES, *Blkb.* *Hab.*—N.S.W.: Tamworth, Forest Reefs.

Elytra with a preapical callus on each side.

Tibiæ with only the apex red *apicalis*, *n. sp.*

Tibiæ red.

Elytra with pale scales condensed at apex,
shoulders square *pictipes*, *Blkb.*

Elytra almost uniformly clothed, shoulders oblique *abjectus*, *n. sp.*

Elytra without preapical callosities *brevicornis*, *n. sp.*

CYDMÆA RUFIPES, *n. sp.*

Black; rostrum, antennæ, and legs red. Upper-surface almost uniformly clothed with pale-ochreous or dark stramineous scales, feebly mixed with darker scales on elytra, in some specimens with a coppery or fiery gloss, and on the elytra occasionally tinged with green. Undersurface with white scales, occasionally tinged with green or having a coppery gloss.

Rostrum comparatively short; parallel-sided; rather strongly punctate at base; feebly elsewhere. Antennæ inserted considerably nearer apex than base of rostrum; funicle the length of scape, first joint as long as second-third combined, second considerably longer than third. *Prothorax* feebly transverse, apex about one-fourth less than base. *Elytra* short, cordate; rather strongly seriate-punctate; interstices flat, $\frac{1}{2}$ wide, finely punctate. Length 2 mm., rostrum $\frac{2}{3}$ mm.; width 1 mm.

Hab.—Swan River.

The shape and clothing are much as in *mixta* (Blackburn), but the rostrum is differently coloured, and the whole insect is smaller.

CYDMÆA TERAMOCERA, *n. sp.*

Black; antennæ, legs, and elytra dull-red. Prothorax with brownish scales, with others of a dull pale ochreous condensed at base and sides, elytra with reddish-brown scales becoming ochreous towards apex, and mixed with feeble transverse patches of whitish scales. Under-surface with white scales having a feeble purplish-green iridescence.

Rostrum long and thin, sides feebly but noticeably incurved between antennæ and apex; punctate to apex. Antennæ long and thin, inserted considerably nearer apex than base; funicle as long as scape, two basal joints together, first as long as second-third combined. Prothorax moderately transverse, considerably narrowed at apex. Elytra considerably wider than prothorax, short, cordate; striate-punctate, striæ very feeble, punctures moderately strong and distant. Length, $3\frac{1}{3}$ mm.; rostrum, $1\frac{1}{3}$ mm.; width, $1\frac{1}{2}$ mm.

Hab.—N.S.W.: Galston.

Considerably above the average size. The curvature of the sides of the rostrum between antennæ and apex exists perhaps in most of the species of *Cydmæa*, but in most it is so very feeble as to be scarcely noticeable.

CYDMÆA FILIROSTRIS, *n. sp.*

Black; antennæ pale, tibiæ dark-red. Upper-surface clothed with pale stramineous scales, having a greenish or coppery gloss, and with a few brownish scales scattered about. Under-surface with white scales, having a greenish gloss or a feeble purplish-green iridescence. Head and base of rostrum densely squamose.

Rostrum long and very thin, sides noticeably incurved between antennæ and apex. Antennæ moderately stout, inserted nearer apex than base of rostrum, funicle longer than scape, first joint longer than second-third combined. Prothorax moderately transverse, apex not much narrower than base. Elytra oblong-cordate; seriate-punctate; each interstice feebly seriate-punctate. Length, $2\frac{1}{3}$ mm.; rostrum, 1 mm.; width, $1\frac{1}{8}$ mm.

Hab.—Swan River.

CYDMÆA BINOTATA, *n. sp.*

Black; scape dull-reddish-brown, funicle and club piceous-black. Above with dingy-white and blackish-brown scales irregularly distributed on prothorax, a feeble dark longitudinal stripe and four dark spots across apex, and two across base, but none of them distinct; each elytron with a moderately large,

rounded, distinct white spot (at about the apical third), surrounded by blackish scales, and which are continued across suture. Under-surface with white scales feebly tinged with green.

Rostrum moderately stout, slightly longer than prothorax, very feebly decreasing from base to apex. *Antennæ* comparatively stout, inserted slightly nearer apex than base of rostrum; funicle slightly longer than scape, first joint as long as second-third combined. *Prothorax* distinctly transverse, apex feebly but rather suddenly lessened; ocular lobes more prominent than usual. *Elytra* oblong-cordate, seriate-oblong-punctate; interstices not very wide. Length, 2 mm.; rostrum, $\frac{3}{4}$ mm.; width, 1 (vix) mm.

Hab.—Sydney.

A much smaller species than *bimaculata* (Pascoe), the elytral spots white, and nearer apex than base.

CYDMÆA MÆRENS, n. sp.

Black. Scales of upper-surface entirely black, except for a very few whitish scales (invisible to the naked eye). Clothing of under-surface dull-white, in an occasional specimen feebly tinged with green, or with a faint coppery lustre; legs with whitish scales.

Rostrum slightly longer than prothorax in female, in male as long; very feebly decreasing in width from base to apex. *Antennæ* inserted almost in exact middle of rostrum; scape rather short, first joint of funicle longer than the following combined. *Prothorax* moderately transverse, apex narrowed. *Elytra* about once and one-fourth wider than prothorax; seriate-punctate; interstices wide, flat, feebly punctate. Length, $2\frac{1}{6}$ mm.; rostrum, $\frac{4}{5}$ mm.; width, 1 mm.

Hab.—W.A.: Swan River, Darling Ranges, Bridgetown, Geraldton.

Of the build of *luctuosa* and *diversa*, but very differently coloured.

CYDMÆA INCONSPICUA, n. sp.

Black. Clothed with brown and greenish-white scales, more rounded than is usual in the genus; on the prothorax the brown scales prevail on the disc, and the white scales at the sides; on the elytra the white scales almost run in lines from base to apex. Under-surface with white scales.

Rostrum longer than prothorax, thin and subcylindrical. *Antennæ* elongate, inserted in exact middle of rostrum; funicle the length of club, first joint longer than second-third combined. *Prothorax* as long as wide, apex rounded and much narrower

than base. *Elytra* cordate, indistinctly seriate-punctate. Length, 2 mm.; rostrum, $\frac{4}{5}$ mm.; width, $1\frac{1}{8}$ mm.

Hab.—Swan River.

Close to *diversa*, but the front coxæ separated.

CYDMÆA DORSALIS, *n. sp.*

Black; tibiæ and tarsi reddish-piceous. Prothorax with chocolate-brown scales on disc, feebly interrupted by lines of pale scales, sides with pale scales; elytra with whitish scales, tinged with brown along suture and towards apex; each with a large dark chocolate-brown patch covering the second-eighth interstices, its posterior end well-defined and just before middle, its anterior margin not sharply defined. Under-surface and legs with white scales.

Rostrum longer than prothorax, thin and parallel-sided; the sides, even beyond antennæ, punctate. Antennæ moderately long, inserted nearer apex than base of rostrum; funicle the length of scape, first joint as long as second-third combined, second scarcely longer than third. *Prothorax* moderately transverse, apex about one-fourth less than base. *Elytra* cordate, feebly striate-punctate, interstices wide and very feebly convex. Length, $2\frac{1}{2}$ mm.; rostrum, 1; width, $1\frac{1}{3}$ mm.

Hab.—W.A.; Mount Barker.

A well-marked species, above the average size. In this and all the following species the anterior coxæ are contiguous, in all the preceding they are separated.

CYDMÆA FASCIATA, *n. sp.*

Black. Scales of upper surface black, with white (sometimes tinged with green) scales between eyes, forming a distinct patch on each side of prothorax at base, a feeble cluster in middle of apex, moderately densely clothing base of elytra or condensed into four rather feeble patches continued along suture to apex, and forming a distinct transverse fascia (slightly irregular about suture) just behind middle. Under-surface with white scales, either tinged with green or having a feeble coppery lustre.

Rostrum slightly longer than prothorax, thin, and parallel-sided. Antennæ inserted almost in exact middle of rostrum; funicle slightly longer than club, first joint as long as three following combined. *Prothorax* distinctly transverse, apex about one-third less than base. *Elytra* short, oblong cordate; indistinctly seriate-punctate, punctures strong but almost concealed. Length, $1\frac{3}{4}$ mm.; rostrum, $\frac{3}{4}$ mm.; width, $\frac{5}{8}$ mm.

Hab.—W.A.: Swan River, Darling Ranges.

Allied to *luctuosa* (Pascoe) but somewhat shorter and broader, prothorax more transverse, &c. The white scales are somewhat

differently disposed, and the elytra are without the pale-brown scales along suture and towards base, which, though varying in extent, appear to be constant in *luctuosa*.

CYDMÆA UNIFORMIS, *n. sp.*

Black; antennæ piceous-brown. Upper-surface regularly clothed with white scales, more or less tinged with green. Scales of under-surface and legs bright pale-green.

Rostrum no longer than prothorax, comparatively stout, parallel-sided. Antennæ moderate, inserted slightly nearer base than apex of rostrum; funicle larger than club, first joint longer than second-third combined. *Prothorax* moderately transverse, apex about one-third less than base. *Elytra* longer than is usual in the genus, subcylindrical, very little wider than prothorax. Length, 2 mm.; rostrum, $\frac{2}{3}$ mm.; width, $\frac{7}{8}$ mm.

Hab.—W.A.: Bunbury, Bridgetown.

The elytra appear to be multi-striate, owing to the colour and disposition of the scales, setæ, and punctures. The species is allied to *viridula* (Pascoe), but differs in the prothorax being shorter, distinctly broader at the base, and but little narrower than the elytra, the latter subcylindrical, &c. The clothing, also, is much denser.

CYDMÆA CARA, *n. sp.*

Black; apical half of rostrum and tibiæ dark-red, antennæ dull-red, scape paler. Prothorax with blackish-brown scales, a few white ones on disc, and dense (tinged with yellowish-brown) at the sides; elytra with blackish and white scales irregularly mixed; the black scales prevailing, except near apex and base; a distinct and moderately wide, straight, transverse white fascia behind the middle. Under-surface and legs with glossy silvery scales.

Rostrum long and thin, almost imperceptibly incurved between antennæ and apex; punctate to apex. Antennæ long and thin, inserted very little nearer apex than base; funicle the length of scape, first joint longer than second-third combined. *Prothorax* feebly transverse, apex rather suddenly lessened and subtuberculate. *Elytra* cordate, distinctly seriate-punctate; interstices not very wide. Length, $2\frac{1}{2}$ mm.; rostrum, 1 mm.; width, $1\frac{1}{4}$ mm.

Hab.—W.A.: Geraldton.

A well-marked species, slightly above the average size.

CYDMÆA ROSTRALIS, *n. sp.*

Black; apical two-fifths of rostrum reddish, tibiæ darker; antennæ pale red, club darker. Head and base of rostrum densely squamose. Prothorax and elytra with pale yellow, or greenish white, or coppery scales, or even with a feebly rosy

gloss; on the prothorax three feeble (often obliterated) lines of darker scales; on the elytra usually with moderately distinct small patches of brown scales, more distinct to the naked eye than under a lens. Under-surface seldom with pure white scales; frequently they are of a vivid green, occasionally even blue, and often with a coppery-green or purplish iridescence.

Rostrum considerably longer than prothorax, and very thin; very distinctly incurved between antennæ and apex. Antennæ elongate, inserted slightly nearer apex than base of rostrum; funicle longer than scape, first joint as long as second-third combined, second almost twice the length of third. *Prothorax* moderately transverse, apex about one-fourth less than base. *Elytra* oblong-cordate, moderately strongly seriate-punctate. Length, $2\frac{1}{2}$ mm.; rostrum, 1 mm.; width, $1\frac{1}{4}$ mm.; variation in length, $2\frac{1}{4}$ — $2\frac{3}{4}$ mm.

Hab.—Swan River.

CYDMÆA HAKEÆ, *n. sp.*

Black; apical half of rostrum of a rather bright red, antennæ paler, tibiæ darker. Clothing much as in the preceding species, but less glossy.

Rostrum moderately long and thin, parallel-sided, rather strongly punctate to apex. Antennæ comparatively stout, inserted at one-third from apex of rostrum; funicle as long as club, first joint longer than second-third combined, second and third subequal. *Prothorax* moderately transverse, apex about one-fourth less than base. *Elytra* oblong-cordate; rather strongly seriate-punctate. Length, $2\frac{1}{3}$ mm.; rostrum, $\frac{4}{5}$ mm.; width, $1\frac{1}{6}$ mm.; variation in length, $2\frac{1}{4}$ — $2\frac{1}{2}$ mm.

Hab.—Swan River (on *Hakea trifurcata*).

CYDMÆA MODESTA, *n. sp.*

Black; apical half of rostrum and tibiæ dark-red, antennæ of a dingy-red, club darker. Upper-surface almost uniformly clothed with whitish scales, having a feeble greenish tinge, and in places feebly mixed with brown scales. Beneath and legs with white scales, distinctly tinged with green.

Rostrum long, moderately thin, parallel-sided, punctate to apex. Antennæ long, inserted slightly nearer apex than base of rostrum; funicle the length of scape, first joint longer than second-third combined, second almost twice the length of third. *Prothorax* rather strongly transverse, subcylindrical, apex very little narrower than base. *Elytra* oblong-cordate, moderately distinctly seriate-punctate, interstices feebly convex, not very wide. Length, $2\frac{1}{4}$ mm.; rostrum, 1; width, $1\frac{1}{8}$ mm.

Hab.—Swan River.

Close to *uniformis* (*ante*), but the rostrum not entirely black!

CYDMÆA GRISEA, *n. sp.*

Black; apical two-fifths of rostrum and the tibiæ dark-red, antennæ (including club) paler. Above with whitish scales, which on the elytra are feebly mixed with brown scales, placed in small transverse series, but which scarcely interfere with the prevailing colour. Scales of under- of a more pure white than of upper- surface.

Rostrum long, moderately thin, parallel-sided; strongly punctate to apex. *Antennæ* long, inserted nearer apex than base of rostrum; funicle slightly longer than club, first joint as long as second-third combined, second considerably longer than third. *Prothorax* feebly transverse, apex strongly lessened and sub-tubular, base almost perfectly straight. *Elytra* briefly oblong-cordate; indistinctly seriate-punctate. Length, $2\frac{2}{3}$ mm.; rostrum, $1\frac{1}{8}$ mm.; width, $1\frac{1}{3}$ mm.

Hab.—Swan River.

CYDMÆA BREVICORNIS, *n. sp.*

Black; rostrum piceous-brown, apical half paler, legs and antennæ red. Upper-surface with coppery-yellow scales, feebly interrupted by small spots or stripes of darker scales. Under-surface with pale coppery-green scales.

Rostrum long, thin, sides very feebly decreasing from base to apex. *Antennæ* comparatively short, inserted distinctly closer to apex than base of rostrum; funicle noticeably longer than scape (which is rather short), first joint as long as second-fourth combined. *Prothorax* slightly transverse, apex about one-third less than base. *Elytra* briefly cordate, distinctly seriate-punctate. Length, $2\frac{1}{5}$ mm.; rostrum, $\frac{3}{4}$ mm.; width, 1 mm.

Hab.—W.A.: Darling Ranges.

CYDMÆA EUCALYPTI, *n. sp.*

Piceous; elytra dark-reddish-brown, rostrum red, becoming slightly darker towards base; legs and antennæ red. *Prothorax* with chocolate-brown scales, forming a large rounded discal patch (usually well-defined), and a small spot on each side at apex; greenish-white or yellowish scales elsewhere; elytra with chocolate-brown (much darker in some specimens than in others) scales occupying the greater part of their surface, and condensed into irregular patches, especially towards base; elsewhere with whitish scales, more or less tinged with yellow or pale-brown. Under-surface with white scales.

Rostrum long, thin, parallel-sided. *Antennæ* long, thin, inserted at about one-third from apex of rostrum; funicle the length of or very slightly shorter than club, first joint as long as second-fourth, second as long as third-fourth. *Prothorax* rather

strongly transverse, apex about one-fourth less than base. *Elytra* cordate; rather strongly seriate-punctate, interstices not very wide, and very feebly convex. Length, $2\frac{2}{5}$ mm.; rostrum, $1\frac{1}{5}$ mm.; width, $1\frac{1}{4}$ mm.; variation in length, $2-2\frac{3}{4}$ mm.

Hab.—Swan River, Bridgetown (on young *Eucalypti*).

The scales of the under-surface in all the specimens (eight) under examination are uniformly white, not at all tinged with green or other colour, as is so frequently the case; the size is variable, and the disposition and extent of the dark scales on the elytra are very much so. The species to a certain extent agrees with the description of *selligera* (Pascoe), but the rostrum of that species is described as “nigra.”

CYDMÆA NYMPHOIDES, *n. sp.*

Piceous; elytra reddish-brown, rostrum brownish-red, antennæ pale-red, legs slightly darker. Prothorax with coppery-yellow scales, feebly mixed with chocolate on the disc; elytra with pale scales, a few snowy ones about suture, brownish scales towards apex and sides, and a moderately well-defined chocolate brown patch on each side towards base.

Rostrum long and very thin, very feebly dilated from antennæ to apex. Antennæ as in preceding. *Prothorax* feebly transverse, apex about one-third less than base. *Elytra* oblong-cordate, rather longer than is usual in the genus; feebly striate, interstices narrow. Length, $2\frac{2}{3}$ mm.; rostrum, 1; width, $1\frac{1}{4}$ mm.

Hab.—W.A.: Pinjarrah.

The disposition of the scales on the elytra gives this species a strong resemblance to the pupæ of many small bugs, especially of the family LYGÆIDÆ.

- ✓ C. BIMACULATA, *Pasc.*; Mast. Cat. Sp., No. 5,134. *Hab.*—Sydney: Blackheath.
- ✓ C. VIRIDULA, *Pasc.*; *l.c.*, 5,139. *Hab.*—Swan River: Donnybrook.
- ✓ C. LUCTUOSA, *Pasc.*; *l.c.*, 5,135. *Hab.*—W.A.; N.S.W.
- ✓ C. NOTATICOLLIS, *Pasc.*; *l.c.*, 5,136. *Hab.*—Geraldton.
- ✓ C. PUSILLA, *Pasc.*; *l.c.*, 5,137. *Hab.*—N.S.W.; W.A.
- ✓ C. OBSCURA, *Blkb.*; P.L.S., N.S.W., 1890, p. 339. *Hab.*—Adelaide.
- ✓ C. DIVERSA, *Blkb.*; *l.c.*, p. 340. *Hab.*—N.S.W.; W.A.
- ✓ C. LINEATA, *Blkb.*; *l.c.*, 584. *Hab.*—Galston.
- ✓ C. MAJOR, *Blkb.*; *l.c.*, 1893, p. 189. *Hab.*—Galston.
- ✓ C. MIXTA, *Blkb.*; T.R.S., S.A., 1894, p. 158. *Hab.*—Sydney: Como

I append a tabulation of the species herein described, using for convenience' sake Mr. Blackburn's main divisions when tabulating the species known to him.*

Front coxæ separated.					
Rostrum red	...	...	...	...	<i>rufipes.</i>
Rostrum black.					
Antennæ red.					
Derm of elytra red	...	...	...	...	<i>teramocera.</i>
Derm of elytra black	...	...	...	...	<i>filirostris.</i>
Antennæ with reddish-brown scape and blackish funicle					
Antennæ black.					
Clothing of upper-surface almost entirely black	...	...	...	...	<i>marens.</i>
Clothing less dark	...	...	...	...	<i>inconspicua.</i>
Front coxæ contiguous.					
Rostrum entirely black.					
Upper-surface with well-defined spots or stripes.					
Elytra with two chocolate brown spots	...	...	...	...	<i>dorsalis.</i>
Elytra fasciate	...	...	...	...	<i>fasciata.</i>
Upper-surface uniform					
Rostrum red or piceous-black, and more or less diluted with red towards apex.					
Femora piceous, or at least considerably darker than tibiæ.					
Elytra with a transverse post-median fascia	...	...	...	...	<i>cara.</i>
Elytra not fasciate.					
Funicle with second and third joints subequal	...	...	...	...	<i>hakeæ.</i>
Funicle with second joint considerably longer than third.					
Sides of rostrum distinctly incurved between antennæ and apex					
Sides of rostrum straight.	...	...	...	...	<i>rostralis.</i>
Prothorax subcylindrical					
Prothorax much wider at base than at apex	...	...	...	...	<i>modesta.</i>
Femora and tibiæ uniformly red.					
Scape shorter than funicle	...	...	...	...	<i>brevicornis.</i>
Scape the length of funicle.					
Eyes touching rostrum	...	...	...	...	<i>eucalypti.</i>
Eyes not touching rostrum	...	...	...	...	<i>nymphoides.</i>

ENOCHROMA TRIQUETRA, *n. sp.*

Reddish-castaneous; prothorax piceous-brown; sterna slightly darker than abdomen. Each elytron with ten spots of pale orange-coloured scales; of these four are lateral and somewhat angular, two are sutural, of which one at one-third from base is round, and the other near apex suboblong; three round humeral spots, of which one is just within the shoulder; the tenth spot is on the fourth-sixth interstices at about the apical third; a few yellowish scales scattered about. Under-surface with orange-coloured setose scales, more or less condensed at sides of meso- and metasternum, and between anterior and intermediate coxæ.

* In P. L. S., N. S. W., 1890, p. 341.

Head feebly punctate. Rostrum long, rather feebly punctate. *Prothorax* longer than wide, sides equally rounded; densely and rather strongly granulate. *Elytra* subtriangular; sides and shoulders feebly rounded, base about once and one-half wider than prothorax; punctate-striate, punctures rather large, subcontiguous, partially concealed; interstices feebly convex, slightly wider than punctures; densely and rather minutely granulate. *Under-surface* rather sparsely punctate, a feeble depression in middle of and common to first and second abdominal segments, and a rather more distinct impression on apical. Length, $4\frac{2}{3}$ mm.; rostrum, $1\frac{2}{3}$ mm.; width, 2 mm.

Hab.—N.S.W.: Richmond River.

Differs from *rubeta* (Pascoe) in the colour of the prothorax and under-surface (in that species the meso- and metasternum are black), the shape of the elytra (in *rubeta* the sides are subparallel to about the apical third, in the above they decrease in width from the shoulders), and in the number, colour, and disposition of the spots. The shape of the head, rostrum, prothorax, and legs are much alike in both species.

MISOPHRICE.

Of the Australian *Erirehinidæ*, three genera (*Misophrice*, *Thechia*, and *Anarciarthrum*) are noted by Mr. Blackburn as having triarticulate tarsi. *Anarciarthrum*, as it appears to me, can scarcely be maintained; it differs from *Misophrice* in having the funicle composed of five joints only. I think the genus, of which only one species is known, should be regarded as forming a section of *Misophrice*. *Thechia*,* apparently unknown to Mr. Blackburn, (as it is to me), is described as having a seven-jointed funicle; the impression left on my mind after examining Mr. Pascoe's description of *T. pygmea* is that it is an insect strongly resembling *dispar*, *munda*, and other species of *Misophrice*. I hardly think it desirable to establish several genera on species having such a very strong character as the absence (or apparent absence rather) of the claw-joint in common; at least without other and very strongly marked peculiarities, and the species of a number of genera are known to vary in the number of joints in the funicle.

MISOPHRICE ALTERNATA, *n. sp.*

Piceous-black; scape and first joint of funicle red; elytra, abdomen, and legs dull dark-red. Clothed with dull whitish scales, comparatively dense on prothorax, moderately dense on third, fifth, and seventh interstices of the elytra, but feeble,

* In Master's Catalogue, as *Trechia*, to *T. pygmea* (No. 5,204) add Plate iii., fig. 16.

except for a few spots, on the others; lateral and transverse margins of the sterna rather densely clothed; almost tufted between eyes. Clothed, in addition, with long, erect, brownish setæ.

Rostrum longer than prothorax, feebly incurved between antennæ and apex; grooved and densely punctate at base, subseriately punctate at sides. Scape inserted slightly nearer base than apex of rostrum, the length of five basal joints of funicle; first and second joints of funicle* subequal in length, but the first much thicker than second. *Prothorax* transverse, convex, sides rounded and increasing to base; densely and strongly punctate. *Elytra* slightly wider than prothorax, sides subparallel to near apex; seriate-punctate, punctures moderately large, subquadrate; interstices scarcely convex, wider than punctures, very feebly punctate. *Prosternum* rather strongly emarginate at apex. Abdomen convex. Front *coxæ* as widely separated as intermediate; third tarsal joint more than twice as wide as long. Length (from apex of prothorax), $3\frac{1}{3}$ mm.; rostrum, 1 mm.

Hab.—Sydney.

Appears to be closer to *hispidæ* (Pascoe) than to any other species, but it must be very distinct from that one, judging from both the generic and specific diagnoses. In Mr. Blackburn's tabulation it would fall besides *argentata* (Blackburn), from which it differs in shape, colour, clothing, punctures, setæ, &c.

MISOPHRICE SQUAMIBUNDA, *n. sp.*

Dull-red; under-surface (abdomen excepted) darker; rostrum red, club and tarsi piceous. Densely clothed with soft whitish scales, the elytral suture with denser and almost snowy scales; under-surface more sparsely clothed than upper; rostrum glabrous. Clothed in addition with short decumbent setæ.

Rostrum but little (if at all) longer than prothorax; punctate and grooved at base, rather feebly punctate elsewhere. Scape inserted nearer base than apex of rostrum, shorter than funicle; first joint of funicle large and thick, slightly longer than two following combined, third-sixth subglobular. *Prothorax* transverse, sides feebly incurved to apex, and increasing to base; densely punctate. *Elytra* very little wider than prothorax, sides parallel to apical fourth, thence cordate to apex; apex wide; striate-punctate, punctures concealed. *Prosternum* strongly emarginate in front. Abdomen feebly concave in middle. Separation of front and middle *coxæ* equal. Length, 2 (vix) mm. rostrum, $\frac{1}{3}$ mm.

Hab.—N.S.W.: Tamworth.

* In this and all the following species the funicle is six-jointed.

The clothing is so dense that the colour and sculpture, except of the rostrum, can only be seen by disarranging the scales. The species would fall besides *parallela* in Mr. Blackburn's tabulation. With it, however, it has very little in common.

MISOPHRICE VIRIDISQUAMA, *n. sp.*

Black; abdomen piceous-red, antennæ piceous; rather sparsely clothed with vivid green scales, the elytral interstices each with a single line of scales, rostrum glabrous; under-surface with green scales at the sides behind the mesosternum; elsewhere irregularly clothed.

Rostrum considerably longer than prothorax, parallel-sided towards apex, base grooved; towards apex with oblong, distant, seriate punctures. Scape inserted distinctly nearer base than apex of rostrum, much shorter than funicle; first joint of funicle large, obconic, longer than second-third combined, second-sixth subcylindrical, feebly decreasing in length. *Prothorax* transverse, apex about one-fifth narrower than base; densely and strongly punctate. *Elytra* considerably wider than prothorax, shoulders square, sides feebly increasing to beyond the middle, apex emarginate; striate-punctate, punctures large, subquadrate, subapproximate; interstices convex, as wide, wider, or narrower than punctures according to position, rather densely punctate. *Prosternum* scarcely visibly emarginate. Basal segments of abdomen flattened in middle or very feebly concave. Front *coxæ* less distinctly separated than the middle pair. Length, $1\frac{4}{5}$ mm.; rostrum, $\frac{5}{8}$ mm.

Hab.—Sydney.

Differs from *Anarciarthrum viride* (which it resembles to a remarkable degree both as regards sculpture and clothing), in having thinner legs, slightly sparser clothing, shorter rostrum, decidedly shorter scape (and which is inserted nearer the base of rostrum), longer and different punctures of rostrum, and in the number of joints in the funicle. I can by no means regard the two species as belonging to different genera. The head of each species, *when removed from the prothorax**, is exactly of the same shape, and (except in the other species of *Misophrice* having the apex of prothorax wide) is different to that of any other species with which I am acquainted in the subfamily.

MISOPHRICE VITIATA, *n. sp.*

Reddish; head, meso- and mesosternum, scutellum and club black; rostrum dark-red, antennæ pale red, apical joints of club infusate; elytra blotched with piceous beyond the middle, the

* The head (except as to the eyes) resembles to a certain extent that of *Moyssitta cirrifera* and other species of that genus, *when in position*.

blotch not extending to apex. Clothed with yellowish setose scales, moderately dense on head and extreme base of rostrum, sparser on prothorax, and forming longitudinal and more or less distinct spots at the base, middle and near apex of third and fifth elytral interstices, sides of elytra very sparsely clothed; under-surface with whiter and rather denser scales than above, but very sparse in middle of metasternum and two basal segments of abdomen.

Rostrum considerably longer than head, slightly dilated at apex; grooved and punctate at base, subseriately punctate elsewhere. Scape slightly nearer base than apex of rostrum, fully the length of funicle; first joint of funicle as long as three following combined, at its apex almost the width of apex of scape. *Prothorax* transverse, sides decreasing towards apex, parallel beyond middle; densely punctate. *Elytra* not much wider than prothorax at base, shoulders rounded, widest about one-third from apex; interstices convex, wider or narrower than punctures, feebly punctate. *Prosternum* scarcely emarginate in front. Basal segments of abdomen feebly concave. Length, $2\frac{1}{8}$ mm.; rostrum, 1 (vix) mm.

Hab.—Sydney.

A very distinct species.

MISOPHRICE CYLINDRICA, *n. sp.*

Black; rostrum piceous-black, elytra dark-red, base and suture black; abdomen and legs piceous-red, tarsi darker. Sparsely clothed with whitish setose scales, having a golden or coppery lustre.

Rostrum extending to posterior coxæ, cylindrical, rather less strongly curved than is usual in the genus; rather feebly punctate, scarcely grooved at base. Scape inserted distinctly nearer base than apex of rostrum, shorter than funicle; first joint of the latter as long as three following combined, second-sixth subcylindrical. *Prothorax* subquadrate, apex almost exactly the width of base, sides very feebly rounded; densely and strongly punctate; with a very feeble median line. *Elytra* subcylindrical, very little wider than prothorax, sides subparallel to near apex, shoulders rounded, apex entire; striate-punctate, punctures quadrate, approximate; interstices moderately strongly convex, narrower than punctures, finely punctate. *Prosternum* widely and feebly emarginate in front. Abdomen slightly concave. Length, $1\frac{1}{2}$ mm.; rostrum, $\frac{1}{2}$ mm.

Hab.—W.A.: Geraldton.

In general appearance, except as to colour, strongly resembles *parallela*.

MISOPHRICE NIGRIVENTRIS, *n. sp.*

Black; elytra dark-red, a large basal portion and the suture black; scape, first joint of funicle and femora (knees excepted) red. Very sparsely (moderately at sides, both of upper and under-surfaces) clothed with dingy greenish white scales.

Rostrum slightly longer than prothorax, grooved throughout. Scape inserted slightly nearer base than apex of rostrum, subequal in length with funicle; first joint of the latter large, thick, longer than two following combined, fourth-sixth transverse. *Prothorax* transverse, sides increasing to near base; densely punctate. *Elytra* wider than prothorax, dilated posteriorly, apex entire; punctate as in preceding species. *Prosternum* very feebly emarginate. Abdomen feebly concave. Length, $1\frac{1}{4}$ mm.; rostrum, $\frac{1}{3}$ mm.

Hab.—Swan River, Rottneet Island.

The black abdomen will serve to distinguish this species from most of its congeners; in colour (except of abdomen) and sculpture it much resembles *oblonga*.

MISOPHRICE CLATHRATA, *n. sp.*

Coloured as the preceding, except that the abdomen is of a rather bright piceous-red. Sparsely clothed (very sparsely on elytra, except at base and sides) with bright metallic scales, sometimes green, sometimes coppery-green or golden.

Rostrum longer than prothorax, grooved throughout. Scape slightly nearer base than apex of rostrum, the length of funicle; first joint of funicle thick, as long as two following combined, fifth-sixth strongly transverse. *Prothorax* slightly transverse, feebly decreasing at apex, sides very feebly rounded towards base; densely punctate. *Elytra* considerably wider than prothorax, shoulders almost square, sides parallel (or almost so) to near apex; striate-punctate, punctures (especially at the base) very large, considerably wider than interstices; these slightly convex and finely punctate. *Prosternum* scarcely visibly emarginate. Abdomen very feebly convex. Length, 1 mm.; rostrum, $\frac{1}{3}$ (vix) mm.

Hab.—Geraldton, Swan River.

The smallest species hitherto described, and very distinct amongst those of similar clothing and colour.

MISOPHRICE DISSIDENTANEA, *n. sp.*

Dark piceous-brown; elytra red, a sub-triangular basal patch and the suture dark; antennæ (club infuscate), legs (knees and tarsi infuscate) and abdomen of a rather bright red. Head with dull-whitish scales, scales of similar appearance elsewhere but extremely sparse.

Rostrum the length of prothorax, grooved throughout. Scape inserted slightly nearer apex than base of rostrum, first joint of funicle large, thick, the length of second-third combined. *Prothorax* transverse, sides rounded, base but little wider than apex; densely and strongly punctate. *Elytra* wider than prothorax, feebly dilating posteriorly, shoulders somewhat rounded; striate-punctate, punctures large, sub-quadrate and wider than interstices at base, towards apex much feebler and much narrower than interstices. *Prosternum* scarcely visibly emarginate; metasternum strongly punctate, a very distinct depression in its middle and which is continued on to abdomen. Length, $1\frac{1}{2}$ mm.; rostrum, $\frac{1}{3}$ mm.

Hab.—Swan River.

The punctures almost disappear at the apex of elytra, the striæ there being very distinct.

MISOPHRICE FENESTRATA, *n. sp.*

Colour much as in the preceding, except that the dark parts are black and the elytra are more testaceous than red. Moderately clothed with dull white (in an occasional specimen feebly tinged with green) scales and forming feeble lines on elytra; under-surface (except at sides) very sparsely clothed, the scales having a feeble greenish or coppery lustre.

Rostrum slightly longer than prothorax, grooved behind and slightly in front of antennæ. Scape nearer base than apex of rostrum, the length of funicle; first joint of the latter large and thick, slightly longer than the second-third combined. *Prothorax* transverse, sides almost straight, base but little wider than apex. *Elytra* wider than prothorax, sides very feebly dilating posteriorly; striate-punctate, punctures very large, quadrate, sub-approximate; interstices convex, narrower than punctures, densely punctate. *Prosternum* scarcely visibly emarginate. Basal segments of abdomen feebly concave. Length, $1\frac{1}{2}$ mm. (*vix*); rostrum, $\frac{1}{3}$ mm.

Hab.—Swan River.

Resembling the preceding to a certain extent, but with paler elytra, the punctures of which are much larger and more regular, insertion of scape different, &c.

M. QUADRATICOLLIS, *Blkb.* *Hab.*—Swan River.

M. MUNDA, *Blkb.* *Hab.*—Beverley.

M. ARGENTATA, *Blkb.* *Hab.*—S.A.

M. VARIABILIS, *Blkb.* *Hab.*—S.A.

M. SUBMETALLICA, *Blkb.* *Hab.*—S.A.

M. PARALLELA, *Blkb.* *Hab.*—N.S.W., T., W.A.

M. OBLONGA, *Blkb.* *Hab.*—Sydney.

M. DISPAR, *Blkb.* *Hab.*—Sydney, Tamworth, Forest Reefs.

M. SPILOTA, *Blkb.* *Hab.*—Tweed River.

ANARCIARTHURUM VIRIDE, *Blkb.* *Hab.*—Swan River.

As Mr. Blackburn has tabulated the species described by him, I have not considered it necessary to include his species in the following table:—

First and second joints of funicle subequal in length	...	<i>alternata.</i>
First joint of funicle twice the length of second.		
Derm almost concealed beneath scales and setæ	...	<i>squamibunda.</i>
Derm but slightly clothed.		
Prothorax and elytra black	... ..	<i>viridisquama.</i>
Prothorax and elytra reddish	... ..	<i>vitiata.</i>
Prothorax black, elytra more or less red.		
Elytra scarcely wider than prothorax, body sub-cylindrical	... ..	<i>cylindrica.</i>
Elytra distinctly wider than prothorax, body sub-ovate.		
Abdomen black	... ..	<i>nigriventris.</i>
Abdomen more or less red.		
Prothoracic scales metallic, size very small	...	<i>clathrata.</i>
Prothoracic scales dull, size larger.		
Scape inserted nearer apex than base of rostrum	... ..	<i>dissentanea.</i>
Scape nearer base than apex	... ..	<i>fenestrata.</i>

STOREUS.*

In describing this genus, Schönherr evidently regarded the dentition of the femora as of secondary importance, as, of the two species referred to it, *variegatus* has dentate, and *signatus*† edentate, femora. Apparently, also, he was only acquainted with the male sex, as the rostrum is described as being the length of the head and prothorax combined, not, as it certainly is in the female of *variegatus*, considerably longer.

No species have been referred to the genus since it was first characterised, but subsequently‡ Mr. Pascoe proposed the genus *Emplexis*, to which he referred five species in all; to these Herr J. Faust has added one, and the Rev. T. Blackburn eleven species. Of these I know *filirostris* (Pascoe), *monticola*, *munda*, *gravis*, *majuscula*, and *assimilis* (Blackburn).

* Schön. Gen. Curc., VII. (2), p. 293; Lacord. Gen. Col. VI., p. 494.

† This species does not appear to be known to Australian entomologists. I have not been enabled to identify it from amongst the numerous species of Eirrhinidæ in my possession, although I have repeatedly searched for it; the majority of the species, however, appear to me to be very local in distribution. Judging by the description, it appears to be allied to *Emplexis majuscula*, or possibly *E. monticola*. In size it is stated to be a little larger than *Eirrhinus pectoralis*.

‡ Trans. Ent. Soc., 1870, p. 194.

Of *Storeus* and *Emplexis*, Mr. Blackburn remarks* :—"The two genera appear to me to be very close to each other, and I cannot find any more exact structural difference than that the form of *Emplexis* is much more narrow and oblong, and that its second ventral segment is evidently less abbreviated than in *Storeus*." In his tabulation of the Eirrhinid genera,† the two are separated by the femora of *Storeus* being dentate, and edentate in *Emplexis*.

An examination of extensive material (over 60 species, of the majority of which I know both sexes) has convinced me that *Emplexis* cannot be maintained as a genus apart from *Storeus*.

An extraordinary feature, more or less noticeable in almost all the species, is the apparent doubling of several or all of the joints of the funicle.‡ This apparent doubling is not caused (though usually rendered more pronounced) by dark rings, but by actual constriction of the joints themselves, usually, but not always, in front of the middle. In some species the joints are so strongly constricted that it is actually difficult to tell to which joint a part belongs.

Neither Mr. Pascoe nor Mr. Blackburn have referred to the costæ on the male rostra. These, however, are scarcely noticeable under a Coddington lens, being usually acute and more or less obscured by scales. They are seven in number (sometimes the median or three median ones are almost obsolete), are narrow and acutely raised, and terminate at, just before or just behind, the antennæ. Frequently the median costa is feebly continued to the apex.

The sexual differences in the majority of the species are usually very pronounced. The rostrum of the male is always shorter, and usually much shorter, than that of the female, but is longer than the prothorax,|| is nearly always much more noticeably costate, is frequently bent only near the apex (arcuate throughout in the female), is usually squamose to the antennæ, instead of at the extreme base only, as in the female, and is always more distinctly punctate in front of the antennæ. The antennæ are stouter in the male, the scape is inserted nearer to the apex of rostrum, and a much greater portion passes the apex. The relative length of the scape to the funicle and club is sometimes different. The club is generally much more elongate in the female than in the male. The metasternum and abdomen of the

* P.L.S., N.S.W., 1892, p. 142.

† T.R.S., S.A., p. 150 *et seq.*

‡ This appearance can only be seen under a compound power, and appears to be confined to the males.

|| With the exception of *E. notata* (Blackburn), which is described as having the rostrum of the male "prothorace paullo breviori."

male are frequently longitudinally depressed, and the depression more or less setose; the females are never depressed there (though occasionally flat), and the scales are but little different in appearance from those at the sides.

As Mr. Blackburn has remarked, in Lacordaire's classification, *Emplesis*, on account of the excavated prosternum, would come out of the *Erirhinides* altogether; but it does not appear to me to be desirable that it should. The only other subfamily to which at present it could be referred is the *Cryptorhynchides*, but from that group it is excluded by two characters in combination (not noticing the partial contiguity of the anterior coxæ, seen to a certain extent in *Melanterius* and a few others). These are the termination of the tibiæ, and the intercoxal process of the mesosternum. In the *Cryptorhynchides* each tibia is almost invariably terminated by a strong curved hook, which appears as a continuation of the tibia itself; whilst in *Emplesis* there is a small subtriangular apical tooth, which can only be regarded as a supplementary process.* The intercoxal process is either plane or convex. In the former case it is usually subquadrate, and slopes down at an angle of about 45°; in the latter it is longer, and almost level with the coxæ. In the *Cryptorhynchides* it appears as a cavernous receptacle for the apex of the rostrum, or in default is turned up at the sides, so as to be more or less concave.

The majority of the species are to be taken under the loose bark of living trees, sometimes in considerable numbers. Of *filirostris* I have seen many thousands of specimens under the bark of an Eucalyptus at Walkaway. A piece of bark four or five inches square would sometimes cover hundreds.

I do not think that the majority of the species can be satisfactorily described without taking into consideration features which are usually considered to be generic. In the tabulation supplied herewith a number of allied species are separated some distance. All of the following in appearance (especially as regards the "tesselation" of the upper-surface) more or less closely resemble each other:—*assimilis*, *mundus*, *gravis*, *filirostris*, *lithostrotus*, *femoralis*, *ignobilis*, *tuberculifrons*, *parvulus*, *impotens*, *brachyderes*, *macrostylus*, *arcuatus*, *ellipticus*, *dispar*, *tesselatus*, *consuetus*, *invidiosus*, *indistinctus*, *mediocris*, and *occidentalis*. Of the others, *canaliculatus*, *cryptorhynchus*, *inamænus*, *pauperculus*, *epphipiger*, *multiarticulatus*, and *niveiceps* would appear to form a natural group; whilst *bellulus*, *cyphirhinus*,

* Mr. Pascoe describes the tibiæ of *Emplesis* as being "apice inermes." In *filirostris* (of the identification of which I have no doubt whatever) the tibiæ certainly are armed at the apex, but (as in most of the other species) the terminal process is almost entirely concealed by the clothing.

nigrofasciatus, *dorsalis*, and *indistinctus* would appear to form another. *Falsus* and *setosus* are isolated species. *Monticola* in appearance somewhat resembles *majusculus*.

In the species in which I have broken a few specimens for examination (including *variegatus* and *filirostris*) it can be noticed that that portion of the mesothorax which is received into the prothorax has numerous large round, shallow punctures, besides many small ones, which give it a granulate (sometimes transversely granulate) appearance. Each side also is marked by an oblique slightly curved sulcus.

The third and fourth abdominal segments are usually slightly arcuate throughout. They are, however, often drawn (sometimes angularly) rather suddenly backwards at the sides; but there are so many intermediate species that this character cannot be employed other than specifically. I have seen no species in which they are perfectly straight.

I have many species which (as their antennal club is red) I have deferred describing owing to paucity of material. A tabulation of those here described will be found farther on.

STOREUS AMENUS, *n. sp.*

Male. Elliptic, moderately robust. Black, tarsi and antennæ dull-red. Head with blackish scales, a feeble line of whitish scales down middle and on each side; a distinct semi-erect, whitish tuft between eyes; rostrum with white scales. Prothorax with black scales, except for a very distinct white patch on each side at the base. Elytra with white scales, intermingled in small patches amongst pale-ochreous ones; a very distinct black fascia just behind the middle, dilating to the sides, and usually (but not always) continued across suture; a few small patches of black scales elsewhere. Legs and under-surface with whitish scales, becoming setose along the middle.

Rostrum rather stout, not much longer than prothorax, moderately strongly curved, subparallel; basal two-thirds with seven fine costæ, of which the median one is most distinct; apical third punctate, and with a very feeble median carina. Antennæ inserted about one-fourth from apex of rostrum; scape distinctly passing apex, shorter than funicle; funicle with first joint as long as second-third, second slightly longer than third, sixth-seventh transverse; club the length of three preceding joints. *Prothorax* transverse, suddenly narrowed in front, sides rounded in middle and feebly decreasing to base, base scarcely bisinuate; not very coarsely punctate, punctures somewhat irregular along middle. *Elytra* wider than prothorax, scarcely parallel to beyond the middle; seriate-punctate, punctures moderately large; interstices feebly convex towards the apex. *Prosternum* deeply and rather widely emarginate in front;

anterior coxæ completely, but at base very narrowly, separated. Intercostal process of mesosternum subquadrate, flat, densely and finely punctate. Metasternum and abdomen longitudinally depressed, the latter with the third and fourth segments drawn backwards rather angularly at the sides. *Legs* rather robust; femora dentate: the posterior acutely, the intermediate slightly, the anterior scarcely visibly; anterior tibiæ feebly bisinuate beneath. Length, $3\frac{1}{6}$ mm.; rostrum, $\frac{7}{8}$ mm.

Female. Differs in having the rostrum slightly longer, costæ less pronounced, setose instead of squamose, antennæ inserted two-fifths from apex, and the clothing of the body beneath of stouter scales.

Hab.—N.S.W.: Forest Reefs.

A distinct and very pretty species, numerous specimens of which were obtained under bark of the "white" gum.

STOREUS VARIABILIS, *n. sp.*

Male. Elongate-elliptic. Red; sterna, apex of rostrum, and club darker. Head and basal two-thirds of rostrum almost uniformly clothed with whitish flattened scales; on each side of the latter a feeble row of semi-erect scales. Upper-surface with scales varying on different individuals from snowy to pale-ochreous—regular, or almost regular, in tone; rather sparse on prothorax, and usually sparser on elytra, where the pattern appears to be very variable; they are usually denser at the base and apex; frequently there are three feeble transverse fasciæ; sometimes the scales are placed in feeble elongate spots, and in an occasional specimen there is a broad transverse wide fascia just before the middle, and which is continued backwards along the sides. Under-surface and legs with rather sparse scales, usually less pure than on the prothorax.

Rostrum considerably longer than prothorax, gently curved throughout, almost parallel to insertion of antennæ, but then becoming narrower; each side with two moderately distinct costæ; median costa, if present, not traceable; apex punctate. Antennæ elongate, slender; scape inserted about two-fifths from apex of rostrum, about one-third passing apex, very slightly longer than funicle; funicle with first joint as long as second-third combined, and much stouter, second-fourth subcylindrical, second not noticeably longer than third, sixth-seventh subglobular, not transverse; club elongate-ovate, narrow, but considerably wider than funicle, longer than three preceding joints. *Prothorax* longer than wide, apex not suddenly lessened, base distinctly bisinuate; not very distinctly punctate. *Elytra* very feebly dilated behind the shoulders, shoulders rounded; seriate-punctate, punctures shallow, not approximate. *Prosternum* deeply and narrowly grooved. Abdomen with third and fourth segments arcuate throughout.

Legs not very robust; posterior femora distinctly, intermediate slightly dentate, anterior edentate; tibiæ slightly arcuate. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{3}{4}$ mm.

Female. Differs in having a considerably longer ($1\frac{1}{4}$ mm.) rostrum, with the lateral carinæ very feeble, feebly setose, and (except at extreme base) not at all squamose; the antennæ are inserted almost in middle of rostrum, the scape does not pass the apex, and the sixth-seventh joints of the funicle are scarcely globular.

Hab.—W.A.: Darling Ranges, Swan River, Pinjarrah, Mount Barker.

A distinct but, as regards the clothing, somewhat variable species. I have taken specimens on *Kingia australis*, *Banksia*, and several species of *Eucalyptus*. The second and third joints of the funicle in the male appear each to be double.

STOREUS CONTORTUS, *n. sp.*

Female (?). Moderately elongate. Brownish-red, sterna darker, upper-surface more or less mottled with black. Head uniformly clothed with pale flattened scales, becoming denser between eyes; basal two-thirds of rostrum with sparse setose scales. Prothorax at the sides and base with pale-brown, intermingled with a few whitish scales; scales on elytra in general like those on prothorax, but forming a short longitudinal stripe on each side of scutellum, spots almost forming a fascia beyond the middle and another nearer apex; a distinct triangular black patch on each side, and which do not extend to the suture or sides. Under-surface and legs with whitish scales.

Rostrum the length of prothorax and club combined, arcuate throughout; with seven fine costæ; apical portion punctate, and microscopically punctate. Antennæ elongate, slender, inserted two-fifths from apex of rostrum; scape straight, scarcely thickened towards apex, fully half passing, slightly shorter than funicle and club combined; first joint of funicle almost as long as second-third, second longer than third; club elliptic-ovate, as long as three preceding joints. *Prothorax* scarcely transverse, sides rounded, feebly decreasing to base, and rather more (but not suddenly) to apex; densely punctate. *Elytra* with sides gently arcuate throughout; seriate-punctate, punctures almost concealed. *Prosternum* rather strongly grooved. Abdomen with third and fourth segments gently arcuate. *Legs* moderately robust; femora as in preceding; tibiæ straight. Length, $2\frac{1}{2}$ mm.; rostrum, 1 mm.

Hab.—Swan River.

STOREUS CAPTIOSUS, *n. sp.*

Male. Moderately elongate. Piceous-black, rostrum dark-brown; antennæ, legs, and apex of prothorax red; elytra dark

along suture, dull-red elsewhere. Head closely covered with whitish elongate scales, becoming subfasciculate between eyes; rostrum (except at base) with sparse suberect scales. Upper-surface with white and ochreous scales intermingled, the white scales on the prothorax slightly condensed at the sides and forming two longitudinal stripes (very feebly separated) from the middle of the base; on the elytra forming two scarcely traceable transverse fasciæ; one just beyond the middle, the other between it and apex. Legs and under-surface with white scales.

Rostrum rather stout, slightly longer than prothorax, feebly arcuate; with seven narrow, sharply-raised costæ, partially concealed by clothing; apical third punctate. Antennæ comparatively stout; scape inserted about one-fourth from apex of rostrum, and which it considerably passes, slightly longer than funicle; first joint of funicle longer than second-third, second distinctly longer than third; third-seventh transverse, third shortest of all, its suture with fourth somewhat indistinct; club ovate, almost the length of four preceding joints. *Prothorax* transverse, sides and base gently rounded; densely punctate. *Elytra* with the sides gently rounded; seriate-punctate, punctures rather large and subapproximate. *Prosternal channel* wide and moderately shallow, apex deeply emarginate. Abdomen with third and fourth segments straight, except for a slight angularity at sides. *Legs* moderately stout; posterior femora distinctly, intermediate scarcely, anterior not at all dentate; tibiæ short, feebly bisinuate beneath. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{2}{3}$ mm.

Female. Differs in having a slightly longer rostrum, setose instead of squamose, and with the carinæ feebly marked, scape inserted one-third from apex of rostrum, &c.

Hab.—Forest Reefs.

Allied to, and on first sight apparently identical with, the preceding, but differs in its clothing, legs, and abdominal sutures.

STOREUS LITHOSTROTUS, *n. sp.*

Male. Elongate-elliptic. Dull-red. Head and rostrum to antennæ densely and almost uniformly clothed with pale-ochreous-white scales. Upper-surface with ochreous and pale-ochreous scales, forming a distinctly tessellated pattern. Under-surface with whitish scales.

Rostrum the length of prothorax and scutellum combined, moderately stout, straight to antennæ, and then bent downwards; costæ sharply raised, but almost concealed by scales; apical half strongly punctate, the interspaces densely and finely punctate. Antennæ rather stout; scape inserted one-fourth from apex of rostrum and more than half passing, as long as funicle and first joint of club combined; funicle with first joint obtriangular, equal to first-third combined, second slightly longer than third,

third-seventh transverse, seventh strongly so; club ovate, the length of four preceding joints, and almost continuous with them. *Prothorax* transverse, apex rather suddenly narrowed, basal three-fourths parallel, base bisinuate; with or without trace of a feeble median line. *Elytra* not parallel-sided, shoulders rounded, apex feebly emarginate; seriate-punctate. *Prosternal channel* rather shallow. Intercostal process of mesosternum level, or almost level, with coxæ. Abdomen with the third and fourth segments angularly drawn backwards at sides. Length, 3 mm.; rostrum, $\frac{3}{4}$ mm. (female, $1\frac{1}{8}$ mm.).

Female. Differs in having the rostrum longer, thinner, and feebly curved throughout, basal half rather feebly squamose, costæ and apical punctures much feebler. Antennæ slender, scape inserted slightly in front of middle, club elongate-ovate. The anterior femora are thinner and longer.

Hab.—Swan River, Geraldton, Pinjarrah.

STOREUS FEMORALIS, n. sp.

Male. Elongate-elliptic. Dull reddish-brown, prothorax and sterna darker. Head closely covered with ochreous-grey scales, denser but not fasciculate between eyes, rostrum closely covered to antennæ. Upper-surface with ochreous scales, forming a feeble tessellated pattern; elytra in addition with fine lines of decumbent setæ. Under-surface and legs with whitish or pale-ochreous scales.

Rostrum elongate, rather strongly curved; with sharply raised and slightly waved costæ, which become very feeble in front of antennæ; apical portion subrugosely punctate. Antennæ comparatively stout; scape inserted about one-third from apex of rostrum, not one-third passing apex, almost the length of funicle and club; first joint of funicle equal to second-third, second considerably longer than third, fourth-seventh transverse; club briefly ovate, the length of three preceding joints. *Prothorax* strongly transverse, apex rather suddenly narrowed, sides rounded and decreasing to base; densely punctate. *Elytra* feebly emarginate at apex; seriate-punctate, lightly striate, punctures rather large. *Prosternal channel* not very deep or wide; coxæ just touching at their bases. Intercostal process of mesosternum raised and almost globular. Metasternum and abdomen somewhat concave; third and fourth segments of the latter rather strongly drawn backwards at sides. Length, $3\frac{1}{2}$ mm.; rostrum, 1 mm. (female, $1\frac{1}{2}$ mm.).

Female. Differs in having the rostrum considerably longer, less squamose (though more densely so than is usual in the sex), the costæ much less distinct, apical portion with elongate shallow punctures. Antennæ slender, club rather elongate,

almost continuous with funicle; body beneath not concave, and the anterior femora thinner.

Hab.—N.W.A.: Upper Ord River (Mr. R. Helms).

An abundant species. The four posterior femora are distinctly grooved. In many other species, however, they are grooved, but the grooves are almost concealed. The second and third joints of the funicle in the male are each divided into two unequal portions, of which the anterior is much shorter, and is distinctly considerably narrower than the posterior, the sutures are dark-brown, and the funicle even on a close inspection appears to be nine-jointed.

STOREUS IGNOBILIS, *n. sp.*

Male. Elliptic, moderately elongate. Dull-reddish-brown; antennæ, legs, and three apical segments of abdomen somewhat paler. Head rather closely covered with whitish scales, dense between eyes; rostrum moderately densely clothed at base, but decreasing towards and terminating before antennæ. Scales on body much as in the preceding, but the tessellated pattern still less distinct, and the elytra without lines of setæ.

Rostrum the length of prothorax and scutellum combined, moderately stout, bent at insertion of antennæ; with seven sharply raised costæ, all of which are distinct; apical portion, especially just in front of antennæ, strongly punctate, the interspaces finely punctate. Antennæ rather slender; scape inserted one-third from apex of rostrum, about half passing apex, slightly shorter than funicle and club; first joint of funicle a little longer than second-third combined; club ovate, moderately elongate, almost equal in length to four preceding joints. *Prothorax* strongly transverse, apex rather suddenly narrowed, basal two-thirds subparallel, base bisinuate; densely punctate. *Elytra* scarcely emarginate at apex; seriate-punctate, towards apex lightly striate. *Prosternal channel* rather deep and wide. Intercostal process of mesosternum rather elongate and level with coxæ. Abdomen with third and fourth segments straight, except for a slight angularity at the sides. Length, $3\frac{1}{3}$ mm.; rostrum, 1 mm.

Hab.—N.S.W.: Tamworth.

STOREUS TUBERCULIFRONS, *n. sp.*

Elongate-elliptic. Dull-reddish-brown, rostrum (except apex) and antennæ paler. Head densely clothed with ochreous-brown scales, between the eyes two fasciculate tubercles. Rostrum densely clothed from base to very near apex, denser between antennæ than elsewhere, scales paler than on head, behind the antennæ the scales are directed backwards, in front of them they are directed forwards. Upper-surface densely clothed with dark

ochreous scales, on the prothorax a short black stripe on each side of base, on the elytra with short feeble stripes about the middle, and dark-brown scales commencing on the suture near the base, and forming a moderately large and very irregular sutural patch, which terminates beyond the middle, sides with a few small subquadrate patches of brown scales; scutellum with whitish scales. Under-surface and legs moderately densely clothed with pale-ochreous scales.

Rostrum filiform, feebly curved throughout, almost twice the length of prothorax; apical portion densely punctate, interspaces densely and finely punctate. *Antennæ* rather stout; scape inserted nearer base than apex, terminating considerably before apex, the length of funicle; first joint of funicle the length of second-fourth, second almost twice the length of third, seventh transverse; club elongate-ovate, not much wider than funicle, and scarcely longer than three preceding joints. *Prothorax* strongly transverse, somewhat flat, sides gently rounded, apex rather suddenly narrowed and rather less produced than usual. *Elytra* lightly marginate at apex; seriate-punctate, lightly striate. *Prosternal channel* rather feeble, apex deeply emarginate. Abdomen with third and fourth segments lightly arcuate at sides. Length, $2\frac{3}{4}$ mm.; rostrum, $1\frac{1}{3}$ mm.

Hab.—N.W.A.: Upper Ord River (Mr. R. Helms)

I have seen but one specimen of this extraordinary species, and am very doubtful as to its sex. The clothing of the rostrum appears to be incompatible with a female, but on the other hand the insertion of the antennæ, length of club, clothing of joints of funicle (scales not elongate setæ), apparent absence of costæ, except at the sides of rostrum (the clothing, however, prevents me from being certain on this point) are all apparently feminine. On the whole, therefore, I believe the specimen to be a female. The fascicles between the eyes are very distinct, and are conjoined at their bases; each is supported on a rounded, distinctly elevated tubercle (I have removed one of the fascicles to be sure of this point). The whole strongly reminds one of the head of many of the species of *Ethemaia* and *Rhinaria*. The scales on the elytra can scarcely be said to form a tessellated pattern.

In this and all the following species the intercoxal process of the mesosternum is depressed and slopes downward, usually at an angle of about 45° .

STOREUS PARVULUS, *n. sp.*

Female (?). Elongate-ovate. Red, under darker than upper-surface, antennæ paler than rostrum. Head moderately clothed with pale-ochreous scales, paler and suberect between eyes and extreme base of rostrum; rostrum elsewhere with fine whitish scales. Prothorax with white and ochreous scales, elytra with

similar but sparser scales, the white ones more condensed beyond the middle, beyond which on the suture two small and moderately distinct spots are formed; in addition to the scales with short stout, suberect setæ, moderately distinct when viewed from the sides.

Rostrum moderately stout, feebly curved, very slightly longer than prothorax, slightly enlarged at base; sides distinctly costate, median costæ scarcely visible; apical portion moderately punctate. *Antennæ* rather stout; scape inserted two-fifths from apex of rostrum, not one-fourth passing apex, no longer than funicle; first joint of funicle the length of second-fourth, second twice as long as third, third-seventh transverse; club briefly ovate, considerably wider than funicle, the length of four preceding joints. *Prothorax* transverse, apex not much narrower than base, sides gently rounded. *Elytra* subparallel to near apex; striate-punctate, punctures moderately large, interstices feebly convex. *Prosternal channel* not very deep or wide. *Abdomen* with third and fourth segments very feebly curved at sides. Length, $1\frac{7}{8}$ mm.; rostrum, $\frac{1}{2}$ mm.

Hab.—N.S.W.: Windsor.

A pretty species below the average size. The specimen under examination is probably a female, but as the elytra have suberect setæ in addition to the scales, I have felt no hesitation to describe it.

STOREUS FALSUS, *n. sp.*

Male. Comparatively wide. Brownish-red, prothorax darker, club piceous. Head with blackish scales; rostrum with sparse setose scales from base to antennæ, thence to apex with very fine setæ. Prothorax with blackish-brown scales, a feeble stripe of ochreous scales on each side of base, and a few scattered singly about apex; scutellum with whitish scales; elytra with ochreous and dark-brown scales, the former forming a short stripe on each side (distant two interstices) of suture, with a very feeble and much interrupted fascia of whitish scales beyond the middle; towards the apex with feeble rows of short, stout, suberect, whitish setæ. Under-surface with pale-ochreous scales, except along each side of middle; legs with brown scales, the femora in addition with ochreous ones; apical third of tibiæ fringed beneath with long thin hair.

Rostrum long and thin, bent at insertion of antennæ; three median costæ present, but ill-defined, the others acute; apex rather finely punctate. *Antennæ* slender; scape inserted one-fourth from apex of rostrum, two-thirds passing apex, the length of funicle and club; first joint of funicle as long as second-third, second longer than third, seventh not transverse; club elongate, less than four preceding joints. *Prothorax* strongly

transverse, very strongly and suddenly narrowed in front, base bisinuate; densely punctate. *Elytra* elongate-cordate, shoulders strongly rounded; seriate-punctate, punctures not very large; interstices punctate and somewhat irregular; a slight preapical callus on each side. *Prosternal channel* wide, and not deep. Metasternum and abdomen with a very distinct longitudinal depression; the third and fourth segments of the latter strongly and angularly drawn backwards at the sides. *Legs* longer than usual; femora distinctly grooved. Length, 4 mm.; rostrum, 1½ mm.

Hab.—N.S.W.: Shoalhaven (Mr. J. P. Hill).

A very distinct species, at first sight apparently foreign to the genus; but the antennæ, rostrum, prosternal channel, and abdomen leave no doubt in my mind but that it is correctly placed. The false doubling of the joints of the funicle is very distinct in the second fourth joints, and less so, but still distinct, in the others; it is, perhaps, more pronounced than in any other species of the genus.

STOREUS CANALICULATUS, *n. sp.*

Male. Ovate. Red, sterna and elytral suture darker, club black. Head rather closely covered with pale-ochreous-white scales; rostrum to antennæ with sparser, whiter, and semi-erect scales; apical portion very feebly setose. Upper and under-surface clothed with pale, almost white, scales rather loosely applied, and in addition with short suberect setæ.

Rostrum longer than prothorax and scutellum, straight, except that at antennæ it is slightly turned down; moderately acutely costate; apical portion moderately strongly punctate, the punctures subseriately arranged. Antennæ moderately slender; scape inserted two-sevenths from apex of rostrum, fully half passing apex, as long as funicle and two basal joints of club; first joint of funicle longer than second-third, second equal to third-fourth, seventh feebly transverse; club elongate-ovate, equal to four preceding joints. *Prothorax* subconical, apex considerably narrower than base, but not suddenly lessened. *Elytra* cordate, apex conjointly rounded; seriate-punctate. *Prosternal channel* rather deep and distinct. Abdomen with the third and fourth segments lightly arcuate. Length, 1¾ mm.; rostrum, ½ mm.

Hab.—N.S.W.: Dalmorton.

I have a specimen, which appears to be the female of this species, from the Tweed River. It differs in having the rostrum longer (¾ mm.), median costæ not traceable, basal half with sparse setose scales, apical portion finely punctate; the antennæ slender, scape inserted four-ninths from apex, which it scarcely passes, and the club more elongate.

STOREUS SETOSUS, *n. sp.*

Male. Elongate-elliptic. Red, metasternum and club black. Head moderately clothed with flat, pale, yellowish-white scales, more rounded than is usual; between the eyes the scales are denser and suberect, and from there to the antennæ they become narrower and sparser. Closely covered with white (in some specimens very pale-ochreous) glistening scales (in several specimens there is a trace of a feeble pale-ochreous fascia near the base of the elytra, but the scales are nearly always uniform in colour), with lines of very distinct, stout, white, almost erect setæ, which are directed backwards on the elytra, and forwards on the prothorax. Under-surface with white scales, becoming setose along the middle.

Rostrum slender, considerably longer than prothorax, feebly bent throughout; median costa unmarked; apical portion moderately strongly punctate. Antennæ rather slender; scape inserted two-fifths from apex of rostrum, scarcely one-third passing, slightly longer than funicle; first joint of funicle slightly longer than second-third, second distinctly longer than third, second-fourth feebly doubled, seventh feebly transverse; club ovate. *Prothorax* as long as wide, apex slightly narrower than base, and not suddenly lessened. *Elytra* elongate-cordate, apex conjointly rounded; seriate-punctate. *Prosternal channel* distinct, anterior coxæ rather widely separated. Abdomen with third and fourth segments rather strongly but scarcely angularly drawn backwards at sides. *Legs* rather long; claw joint of anterior tarsi exerted fully as far as the others. Length, 2 mm.; rostrum, $\frac{3}{4}$ mm. (female, $1\frac{1}{4}$ mm.).

Female. Differs in having the rostrum longer, thinner, squamose at base only, lateral costæ very feebly defined; the antennæ thinner, scape inserted almost in middle of rostrum, and not extending to apex, and the club elongate-ovate. The scales beneath are less setose along the middle than in the male.

Hab.—W.A.: Geraldton.

A very distinct species, slightly variable as regards the clothing of the elytra.

STOREUS CRYPTORHYNCHUS, *n. sp.*

Male. Elliptic-ovate. Brownish-red, sterna darker, club piceous. Head and base of rostrum with adpressed white scales, rather more condensed between the eyes than elsewhere. Upper-surface with dark-greyish scales, intermingled with long, almost erect setæ; scales of metasternum and abdomen paler.

Rostrum the length of prothorax and scutellum combined, moderately curved throughout; indistinctly costate; apical portion rather sparsely punctate. Antennæ moderate; scape

inserted two-fifths from apex of rostrum, not half passing, the length of funicle; funicle with first joint stout, slightly longer than second-third combined, second longer than third, seventh transversely triangular; club ovate, about the length of four preceding joints, considerably wider than seventh. *Prothorax* scarcely transverse, apex not much narrower than base, and not suddenly narrowed. ocular lobes not prominent, base bisinuate; densely punctate. *Elytra* elongate-cordate, apex lightly emarginate; seriate-punctate, feebly striate. *Prosternal channel* very distinct, *coxæ* moderately widely separated. Abdomen with third and fourth segments distinctly angular at sides. *Legs* comparatively long. Length, 2 mm.; rostrum, $\frac{2}{3}$ mm. (female, 1 mm.).

Female. Differs in having a longer and entirely glabrous rostrum, scape inserted slightly in advance of middle; and shorter than funicle; the club is also a trifle longer.

Hab.—Sydney.

A small and abundant species, at first sight appearing to belong to the *Cryptorhynchides*, and resembling some of the species of *Acalles*. The rostrum of the female appears to be much redder than the prothorax, but this is entirely due to its absence of clothing.

STOREUS INAMENUS, *n. sp.*

Closely resembles the preceding species, but differs in being considerably larger ($2\frac{1}{2}$ mm.); setæ stouter, more erect, and much more distinct; rostrum acutely costate (the three median ones, however, slightly less distinct than the others), apical portion more coarsely punctate; scape rather longer in proportion to funicle; of the latter the second-fourth joints apparently double (there is no trace of this in the preceding); the third and fourth abdominal segments are less distinctly produced backwards at the sides, and the rostrum of the male is longer and thinner.

Hab.—N.S.W.: Clarence River.

Seven specimens, obtained in flood debris.

STOREUS BELLULUS, *n. sp.*

Male. Ovate. Piceous black, elytra red, except for a sutural stripe (terminating before apex) of piceous; rostrum, antennæ (club excepted), and legs reddish. Head moderately closely covered with whitish scales; rostrum with suberect scales, moderately dense at base, becoming sparser and finer towards, and terminating just before, antennæ; a few whitish setæ in front. Prothorax with patches of snowy scales on each side of base and apex, and forming two feeble stripes in middle of base; elytra with dark scales along suture to beyond the middle, except for three transverse white fasciæ—one near base, one

median, and one subapical; sides and apex with numerous small patches of white scales. Under-surface and legs with rather sparse white scales.

Rostrum filiform, arcuate throughout, longer than prothorax and scutellum combined; acutely costate, the three median slightly feebler than the lateral costæ; apical portion (especially just in front of antennæ) coarsely punctate. Antennæ rather slender; scape inserted two-fifths from apex of rostrum, half passing, the length of funicle and two basal joints of club; funicle with first joint the length of second-fourth, these feebly doubled, second almost twice the length of third, sixth-seventh transverse; club elongate-ovate, the length of four preceding joints. *Prothorax* scarcely transverse, apex considerably narrower than base, but not suddenly lessened, base feebly bisinuate; densely punctate. *Elytra* oblong-cordate, shoulders feebly rounded, apex conjointly rounded; seriate punctate, sides lightly striate. *Prosternal channel* deep and moderately wide. Abdomen with third and fourth sutures somewhat angularly produced backwards at sides. *Legs* moderately long, claw joint of anterior tarsi more strongly exerted than usual. Length, $2\frac{1}{4}$ mm.; rostrum, 1 (vix) mm.

Hab.—W.A.: Swan River, Mount Barker.

Three specimens, all males.

STOREUS IMPOTENS, *n. sp.*

Male. Elliptic. Red; meso-, metasternum, and the club piceous-black. Head and rostrum to antennæ closely covered with whitish scales, denser between eyes than elsewhere; apex of rostrum with whitish setæ. Clothed with pale-ochreous scales, on the upper-surface forming a distinct tessellated pattern.

Rostrum moderately stout, the length of prothorax and scutellum, straight to antennæ, and there feebly bent downwards; slightly dilated between base and antennæ, with sharply raised costæ, of which the median one is less noticeable than those adjoining it, the costæ feebly continued beyond antennæ; apical portion strongly punctate. Antennæ moderately stout; scape inserted one-third from apex of rostrum, about half passing, the length of funicle and club combined; funicle with first joint the length of second-fourth, second almost as long as third-fourth, fourth-seventh transverse; club ovate, equal to four preceding joints. *Prothorax* almost as long as wide, apex not suddenly narrowed; densely punctate. *Elytra* elongate-cordate, apex conjointly rounded; seriate-punctate, punctures subquadrate, lightly striate. *Prosternal channel* rather feeble, apex feebly emarginate. Abdomen with third and fourth segments feebly arcuate. Length, $2\frac{1}{8}$ mm.; width, $\frac{2}{3}$ mm.

Hab.—Sydney.

Two male specimens under examination.

STOREUS BRACHYDERES, *n. sp.*

Male. Elongate-elliptic. Dark-red, under-surface and club piceous. Head densely clothed with ochreous, pale brown, and blackish scales; scales denser, paler, and almost erect between eyes; rostrum moderately densely clothed with suberect pale scales. Upper-surface with ochreous and ochreous-grey scales, forming a moderately distinct tessellated pattern. Under-surface and legs with whitish scales.

Rostrum slightly longer than prothorax and scutellum combined, almost straight to antennæ, and then bent downwards, subparallel to near apex; with acutely raised costæ not passing antennæ; apex coarsely punctate. Antennæ elongate; scape inserted one-fourth from apex of rostrum, and considerably passing apex, longer than funicle; first joint of funicle slightly longer than second-third, second distinctly longer than third, seventh transverse; club elongate-ovate, the length of four preceding joints. *Prothorax* strongly transverse, apex considerably narrower than base, and rather suddenly lessened, base feebly bisinuate; densely punctate. *Elytra* elongate-cordate, apex feebly emarginate, shoulders strongly rounded; seriate punctate, lightly striate. *Prosternal channel* distinct, apex deeply emarginate, separation of anterior coxæ distinct. *Metasternum* and abdomen moderately depressed along middle, the latter with third and fourth segments rather strongly angular at sides. *Legs* rather longer than usual. Length, $3\frac{1}{4}$ mm.; rostrum, 1 mm. (female, $1\frac{1}{2}$ mm.).

Female. Differs in having the rostrum rather strongly arcuate, considerably longer, feebly costate, squamose at base only, very finely setose elsewhere, and very finely punctate towards apex; the scape is inserted not much nearer apex than base of rostrum, and does not extend to apex.

Hab.—N.S.W.: Tamworth, Forest Reefs (Lea); V.: Benalla (Mr. R. Helms).

A comparatively large species, more widely distributed than usual.

STOREUS CYPHIRINUS, *n. sp.*

Female. Elliptic. Brownish-red, under-surface (except apical segment of abdomen) and club piceous-black. Head moderately densely clothed with snowy-white scales, denser and suberect (but scarcely fasciculate) between eyes; rostrum squamose only at extreme base. Clothed with greyish-white scales, which on the upper-surface are rather irregularly distributed, but scarcely form spots or fasciæ.

Rostrum filiform, arcuate, longer than prothorax and scutellum combined; lateral costæ well defined, the others represented by feeble undulations; apical portion with elongate and rather

sparse punctures, intermingled with minute ones; scarcely noticeably incurved between antennæ and apex. Antennæ slender; scape inserted slightly nearer apex than base, the length of funicle and first joint of club; first joint of funicle the length of second-fourth, seventh transverse; club ovate, moderately elongate, shorter than the four preceding joints. *Prothorax* moderately transverse, apex not suddenly narrowed, sides gently rounded; densely punctate. *Elytra* elongate- (almost oblong-) cordate, apex very feebly emarginate; seriate-punctate, punctures rather large and subquadrate, lightly striate. *Prosternal channel* rather distinct, apex deeply emarginate, separation of coxæ distinct. Abdomen with third and fourth segments lightly arcuate throughout. Length, $2\frac{2}{3}$ mm.; rostrum, 1 mm.

Hab.—Forest Reefs.

As the club of the antennæ is black, I have not hesitated to describe this species, although possessing but two females.

STOREUS PAUPERCULUS, *n. sp.*

Male. Elliptic-ovate. Red, metasternum scarcely darker, club black. Head moderately clothed with whitish scales, becoming paler and suberect between eyes and on rostrum; on the latter becoming sparser towards and terminating just before antennæ, a few white setæ towards apex. Clothed with greyish or pale-ochreous scales, having on the upper-surface a very feeble spotted appearance; the elytra in addition with lines of stout yellowish setæ—not visible from the sides.

Rostrum the length of prothorax and scutellum combined, gently curved throughout; acutely costate at sides, median costa not traceable; apex finely punctate. Antennæ moderately slender; scape inserted about one-fourth from apex of rostrum, more than half passing, a little shorter than funicle and club combined; first joint of funicle the length of second-fourth, second equal to third-fourth, seventh rather strongly transverse; club ovate, shorter than four preceding joints. *Prothorax* scarcely transverse, apex not much narrower than base, ocular lobes feeble; densely punctate. *Elytra* oblong-cordate, shoulders feebly rounded; apex scarcely emarginate; seriate-punctate, punctures scarcely traceable. *Prosternal channel* distinct, apex deeply emarginate. Abdomen with third and fourth segments very feebly arcuate throughout. Length, 2 (vix) mm.; rostrum, $\frac{2}{3}$ mm.

Hab.—W.A.: Albany.

The curvature of the third and fourth abdominal segments is less than in any other species with which I am acquainted.

STOREUS NIGROFASCIATUS, *n. sp.*

Male. Ovate. Dull-red, rostrum and metasternum somewhat darker, prothorax brown. Head with rather dense white scales.

which are large, but scarcely as dense between eyes as on vertex; rostrum rather sparsely squamose, the scales terminating before antennæ. Prothorax with pale-ochreous (almost white) scales, forming eight (including the extreme lateral ones) feeble lines; elytra with slightly darker scales, not very evenly distributed, and with a transverse, complete (except that it is not continued to the extreme outer margins) black, somewhat irregular and wide fascia beyond the middle. Under-surface with rather sparse whitish scales.

Rostrum moderately curved throughout, the length of prothorax and scutellum combined; with sharply raised costæ, of which those on each side of the median one are feebler than the others, the median continued to, but very feeble towards, apex; apical portion, especially near antennæ, coarsely punctate. Antennæ rather slender; scape inserted one-fourth from apex of rostrum, fully half passing, the length of funicle and first joint of club; funicle with all the joints apparently doubled, but only the second-fourth distinctly so, first equal to second-third, second longer than third, seventh slightly transverse; club ovate, rather elongate. *Prothorax* transverse, sides rounded, apex not much narrower than base; densely and coarsely punctate. *Elytra* suboblong-cordate, shoulders lightly rounded; apex feebly emarginate; seriate-punctate, punctures rather large and subquadrate, lightly striate. *Prosternal channel* distinct, apex deeply emarginate. Metasternum and abdomen with a feeble depression, third and fourth segments of the latter feebly angular at sides. *Legs* rather long; femora grooved; tibiæ feebly bisinuate beneath; claw joint of anterior tarsi rather strongly exerted. Length, $2\frac{2}{3}$ mm.; rostrum, 1 mm.

Hab.—Forest Reefs.

A very distinct and comparatively robust species.

STOREUS MACROSTYLUS, *n. sp.*

Male. Elongate-elliptic. Dull-red, metasternum slightly darker. Head moderately clothed with narrow scales, denser between and erect at sides of eyes; rostrum squamose its entire length, but the scales near apex sparser and subsetose. Upper-surface with pale-ochreous scales arranged on the prothorax in very feeble lines, the elytra with whitish scales forming feeble elongated spots, and appearing to form a very feeble fascia about the middle, the whole having a slightly tessellated appearance. Under-surface and legs with sparse whitish scales.

Rostrum almost straight, longer than prothorax and scutellum combined; with sharply raised costæ, the median one indistinct, except near apex. Antennæ moderately slender; scape inserted two-sevenths from apex of rostrum, more than half passing, the

length of funicle and club combined; funicle with first joint slightly longer than second-third, second doubled and longer than third, seventh not transverse; club ovate, moderately long, shorter than four preceding joints. *Prothorax* transverse, apex less produced than usual, considerably narrower (though not suddenly lessened) than base, basal two-thirds subparallel, base bisinuate; densely punctate. *Elytra* elliptic-cordate, apex rather distinctly emarginate; seriate-punctate, punctures moderately large and subquadrate, lightly striate. *Prosternal channel* feeble, apex feebly emarginate. Metasternum and abdomen feebly depressed along middle, third and fourth segments of the latter feebly angular at sides. Length, 3 mm.; rostrum, $1\frac{1}{8}$ mm.

Hab.—W.A.: Bridgetown.

STOREUS ARCUATUS, *n. sp.*

Male. Elongate-ovate. Red, elytra with two piceous markings—one an almost circular blotch extending from near the base to the middle, the other a moderately wide semicircle, commencing near each side just beyond the middle. Head not very closely covered with whitish scales, becoming subfasciculate between eyes; rostrum with semierect seriate scales, which terminate just before antennæ. Upper-surface with pale-ochreous or griseous scales, which form feeble lines on the prothorax, and feeble spots on the elytra; on the latter they distinctly margin the dark basal blotch. Under-surface with sparse whitish scales.

Rostrum feebly curved, distinctly longer than prothorax and scutellum combined; with acutely raised subequal costæ, terminating either level with or just before antennæ; apical portion coarsely punctate. Antennæ slender; scape inserted two-sevenths from apex of rostrum, more than half passing, the length of funicle and club; first joint of funicle equal to second-third, seventh feebly transverse; club elliptic, the length of four preceding joints. *Prothorax* strongly transverse, sides rounded, apex very feebly produced, and not much narrower than base. *Elytra* scarcely emarginate at apex; striate-punctate, punctures rather large and subquadrate; interstices convex. *Prosternal channel* scarcely defined, apex widely and very feebly emarginate. Abdomen with third and fourth segments feebly angular at sides. *Legs* moderately long; anterior tibiæ moderately curved throughout. Length, $3\frac{1}{2}$ mm.; rostrum, $1\frac{1}{4}$ mm.

Hab.—W.A.: Swan River, Beverley.

The prosternal channel is scarcely as well defined as it is in *S. variegatus*.

STOREUS ELLIPTICUS, *n. sp.*

Male. Elliptic. Dull-red. Head moderately densely (denser between eyes than elsewhere) clothed with whitish scales; rostrum moderately densely and almost equally clothed from near base almost to antennæ. Upper-surface rather densely clothed with muddy brown and ochreous-grey scales, giving the elytra a feebly tessellated appearance. Under-surface with sparse dingy-whitish scales.

Rostrum almost straight, slightly longer than prothorax; acutely costate, costæ almost concealed; apical portion rather coarsely punctate, interspaces densely and finely punctate. *Antennæ* rather slender; scape inserted one-fourth from apex of rostrum, two-thirds passing, slightly shorter than funicle and club combined; funicle with second-seventh joints apparently doubled, first longer than second-third, second almost twice the length of third, seventh feebly transverse; club elongate-ovate, equal to four preceding joints. *Prothorax* transverse, apex rather suddenly narrowed; densely punctate. *Elytra* elongate-cordate, apex scarcely emarginate; punctures rather feeble and elongate, scarcely traceable unless scales are removed. *Prosternal channel* feeble. Abdomen with third and fourth segments feebly angular at sides. Anterior *tibiæ* very feebly bisinuate beneath. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{3}{4}$ mm.

Hab.—Swan River.

STOREUS DISPAR, *n. sp.*

Male. Elongate-elliptic. Red, metasternum darker, elytral suture narrowly tinged with piceous. Head and base of rostrum densely clothed with ochreous-white scales; rostrum from near base to middle with the scales arranged in lines, elsewhere non-squamose. Upper-surface clothed with pale-ochreous and whitish scales, giving it a distinctly tessellated appearance; the elytra with a transverse brown patch about summit of posterior declivity. Under-surface with whitish scales.

Rostrum thin, almost straight, longer than prothorax and scutellum combined; with seven acutely raised costæ, which, except the extreme lateral ones, terminate just before antennæ; apical portion (especially between antennæ) rather coarsely punctate. *Antennæ* slender; scape inserted one-third from apex of rostrum, rather more than half passing, slightly longer than funicle and club combined; funicle with all the joints apparently feebly doubled, first almost the length of second-fourth, second almost the length of third-fourth, seventh transversely triangular; club ovate. *Prothorax* slightly longer than wide, apex rather suddenly narrowed, ocular lobes acute. *Elytra* elongate- or oblong-cordate, apex rather strongly (for the genus) emarginate;

seriate-punctate, towards the apex lightly striate. *Prosternal channel* distinct, apex deeply emarginate, coxæ feebly separated. Abdomen with third and fourth segments feebly arcuate at sides. *Legs* long; tibiæ almost straight. Length, $3\frac{1}{2}$ mm.; rostrum, $1\frac{1}{4}$ mm. (female, 2 mm.).

Female. Differs in having the rostrum thinner, fully twice the length of prothorax, almost perfectly cylindrical, squamose at base only, only the lateral costæ traceable, and even straighter than in the male; the scape is inserted distinctly nearer base than apex of rostrum, scarcely extends to eye, and terminates considerably before apex of rostrum; the club is scarcely longer than in the male.

Hab.—Swan River.

The insertion of the scape in the female is much as in *filirostris* and a few others, but rather nearer the base. In most of the specimens under examination the outer ring of facets of the eyes are distinctly ochreous; this appearance is doubtless accidental, as in specimens of several other species a similar appearance is seen.

STOREUS TESSELLATUS, *n. sp.*

Male. Elongate-elliptic. Dull-red. Head densely clothed with whitish scales, not much denser between eyes than elsewhere; rostrum less densely clothed to antennæ, in front with sparse whitish setæ. Upper-surface with pale-ochreous and whitish scales, the elytra with a number of dark subquadrate spots (four on the third interstice), the whole having a very distinctly tessellated appearance. Under-surface with ochreous-white scales.

Rostrum moderately stout, lightly curved, scarcely longer than prothorax; with sharply raised costa, of which the median one is almost as strong as the others, but all more or less concealed by clothing; apical portion densely and irregularly punctate. Antennæ moderate; scape inserted one-third from apex of rostrum, about half passing, shorter than funicle and club combined; first joint of funicle equal to second-fourth, second slightly longer than third, seventh not transverse; club briefly ovate, no longer than three preceding joints combined. *Prothorax* transverse, apex feebly but rather suddenly narrowed. *Elytra* elongate-cordate, shoulders rather strongly rounded; seriate-punctate, lightly striate throughout. *Prosternal channel* distinct, apex deeply emarginate. Abdomen with third and fourth segments somewhat angular at sides. Length, $2\frac{1}{3}$ mm.; rostrum, $\frac{2}{3}$ mm. (female, 1 mm.).

Female. Differs in having a longer and more noticeably curved rostrum, squamose only at base, the costæ irregular and but feebly traceable, antennæ thinner, scape inserted three-

sevenths from apex of rostrum, and just passing, and the club elongate-ovate.

Hab.—Forest Reefs.

STOREUS EPPHIPIGER, *n. sp.*

Male. Briefly ovate. Dark-red, rostrum and antennæ paler; elytra stained with piceous, except near base; metasternum piceous. Head moderately clothed with yellowish adpressed scales, denser between eyes than elsewhere, and feebly continued along sides of rostrum. Upper-surface with dingy-greyish or ochreous scales, sparsely and rather evenly distributed; elytra with a very distinct subquadrate patch of white scales, which commences about the middle, and is continued below summit of posterior declivity. Under-surface with sparse whitish scales, legs rather more densely clothed.

Rostrum moderately strongly curved throughout, slightly longer than prothorax, very feebly incurved to middle; with traces of feeble costæ, which are marked by five elongate punctures, and separated by rows of moderately strong ones; apical portion rather strongly punctate. *Antennæ* rather stout; scape inserted two-fifths from apex of rostrum, not one-third passing, the length of funicle; first joint of the latter the length of second-fourth, second almost as long as third-fourth, sixth-seventh transverse; club ovate, almost the length of four preceding joints. *Prothorax* feebly transverse, sides almost equally rounded, apex not much narrower than base, base almost straight. *Elytra* cordate, apex scarcely emarginate; seriate-punctate, punctures moderately large and subquadrate. *Prosternal channel* distinct, apex moderately emarginate. Abdomen with third and fourth segments feebly arcuate throughout. *Legs* moderately long; tibiæ feebly bisinuate beneath. Length, 2 mm.; rostrum, $\frac{2}{3}$ mm.

Hab.—W.A.: Geraldton.

The first and second joints of the funicle are distinctly doubled, and there is a faint trace of doubling in the third-fourth; the rostral costæ are little more than feeble ridges, and had my specimens (four) been judged by this character they would probably have been considered as females.

STOREUS MULTIARTICULATUS, *n. sp.*

Male. Shape, colour, and size much as in preceding. Scales much as in preceding, except that they are rather less evenly distributed, and that the elytra are without a distinct patch.

Rostrum comparatively stout; with seven rather feeble costæ, of which the median one is scarcely traceable, very feebly diminishing in width from base to apex; apical half moderately

strongly punctate. Antennæ moderately stout; scape inserted two-fifths from apex of rostrum, little more than clubbed portion passing apex, shorter than funicle; funicle with all the joints, except the first and seventh, apparently doubled. All else, except that the third and fourth abdominal segments are more angular at the sides, as in the preceding. Length, $2\frac{1}{8}$ mm.; rostrum, $\frac{2}{5}$ mm.

Female. Differs in having the head and rostrum less squamose, the latter with much feebler costæ; antennæ thinner, inserted a little further (though not much) from the apex; funicle simple, and the club more elongate and almost elliptic.

Hab.—Geraldton.

Numerous specimens obtained under bark of *Melaleuca*, sp.

STOREUS NIVEICEPS, *n. sp.*

Male. Elongate-ovate. Dark-red, rostrum and antennæ paler. Head (more densely between eyes than elsewhere) and basal half of rostrum with moderately dense snowy-white scales, rest of rostrum with sparse white setæ. Scales of upper surface (beneath they are purer) of an almost uniform dirty-white.

Rostrum lightly curved, the length of prothorax and scutellum combined; costæ distinct at sides, feeble in middle, median costa feebly longitudinally divided; apical portion moderately strongly punctate. Antennæ moderately slender; scape inserted two-fifths from apex of rostrum, not half passing, the length of funicle and first joint of club; first joint of funicle equal to second-fourth, second equal to third-fourth, seventh scarcely transverse; club ovate, equal to four preceding joints, considerably wider than funicle. *Prothorax* almost quadrate, the sides being very lightly rounded, and the apex almost the exact width of base. *Elytra* elongate-cordate, apex conjointly rounded; striate-punctate, striæ very feeble, punctures almost concealed by clothing. *Prosternal channel* distinct, apex more deeply emarginate than usual, anterior coxæ rather widely separated. Abdomen with third and fourth segments comparatively strongly arcuate throughout. Length, $1\frac{3}{4}$ mm.; rostrum, $\frac{1}{2}$ mm. (female, $\frac{3}{4}$ mm.).

Female. Differs in having the rostrum longer, more noticeably curved, thinner, costæ feebler at sides and absent in middle, feebly squamose at sides, and apical portion rather sparsely punctate; the scape is inserted slightly in advance of the middle of rostrum, and not one-fourth passes apex, and the club is slightly longer.

Hab.—N.S.W.: Gosford, Loftus, Galston, Sydney.

A small soberly-coloured species, on first sight appearing to belong to the *Cryptorhynchides*. At Gosford numerous specimens were beaten from a species of *Melaleuca*.

STOREUS DORSALIS, *n. sp.*

Male. Elliptic-ovate. Piceous-black, apex of prothorax, sides of elytra, apex of abdomen, legs, rostrum, and antennæ reddish. Head moderately clothed with dingy-whitish scales, dense between eyes; rostrum rather sparsely squamose at extreme base, and with fine white setæ from near base to antennæ. Prothorax with a large dorsal patch of blackish scales, the margins with two feeble stripes of ochreous; elytra also with a large dorsal dark patch which commences at the base and is continued to beyond the middle, a few whitish scales—scarcely, however, affecting its appearance—scattered about; its sides are rather uneven, and are bounded by rather pale-ochreous scales; beyond the patch and extending to the apex is a small patch of brownish scales. Under-surface with white, the legs with pale-ochreous scales.

Rostrum feebly curved, scarcely longer than prothorax; with sharply-raised costæ (of which, however, the median one is feeble and somewhat irregular), terminating either level with or just in front of antennæ; apical portion sparsely but moderately strongly punctate. *Antennæ* rather stout; scape inserted three-sevenths from apex of rostrum, just passing apex, shorter than funicle; first joint of funicle slightly longer than second-third, seventh transverse; club ovate, almost the length of four preceding joints. *Prothorax* rather strongly transverse, apex not much narrower than base, but rather suddenly lessened, ocular lobes feeble; densely punctate. *Elytra* oblong-cordate, apex conjointly rounded; striate-punctate, striæ very feeble. *Prosternal channel* distinct, apex moderately emarginate. Abdomen with third and fourth segments strongly drawn backwards at sides. Claw joint of anterior *tarsi* rather strongly exerted. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{2}{3}$ mm.

Hab.—N.S.W.: Tamworth.

Possibly close to *E. umbrosa* (Blkb.), but without "an unusually short robust antennal club;" appears to be close to *ocellata* (Blkb.), but the dark elytral patch is continued to beyond the middle, and the prothorax is without inequalities. I have two specimens, and both are males.

STOREUS INDISTINCTUS, *n. sp.*

Male. Elliptic-ovate. Dark-red, elytra stained with piceous about the middle. Clothing somewhat resembling the preceding, but the dark patches on both prothorax and elytra are rather feebly defined, and are bounded by dingy ochreous scales.

Rostrum with much feebler costæ than in the preceding; prosternal channel not so distinct, apex less deeply emarginate; abdomen with third and fourth segments less angular at sides,

and the anterior claw joint less strongly exerted. All else as in preceding.

Hab.—N.S.W.: Galston.

Very close to the preceding species, but I believe it to be distinct.

STOREUS CONSUETUS, *n. sp.*

Male. Elliptic, moderately robust. Dull-red, metasternum somewhat darker. Head and basal portion of rostrum with ochreous-white and moderately dense scales, denser between eyes than elsewhere. Upper-surface with ochreous and pale-ochreous scales, the elytra with a number of slightly darker subquadrate spots, the whole having a distinctly tessellated appearance.

Rostrum longer than prothorax and scutellum combined, straight to antennæ, and then rather strongly bent downwards; with sharply-raised costæ (more or less concealed by clothing) continued, but feeble and irregular, beyond antennæ. Antennæ moderate; scape inserted one fourth from apex of rostrum, about half passing, the length of funicle and two basal joints of club; first joint of funicle almost the length of second-fourth, second distinctly longer than third, fourth transversely triangular, fifth-seventh strongly transverse; club ovate, longer than three preceding joints. *Prothorax* strongly transverse, sides rounded, apex rather suddenly narrowed; densely punctate. *Elytra* sub-oblong-cordate, apex scarcely emarginate; striate-punctate, striæ very feeble. *Prosternal channel* distinct, apex deeply emarginate. Abdomen with third and fourth segments gently arcuate throughout. Length, $2\frac{2}{3}$ mm.; rostrum, $\frac{3}{4}$ mm. (female, 1 mm.).

Female. Differs in having the rostrum longer and more strongly curved, less densely squamose, and the costæ much feebler; the antennæ inserted almost in middle of rostrum, scape not passing apex, and almost the length of funicle and club combined; club elliptic-ovate.

Hab.—N.S.W.: Forest Reefs, Tamworth, Galston.

It is possible that this species is Mr. Pascoe's *E. lineigera*, but if so the words "capite inter oculos abrupte caloso" are certainly misleading. The tessellation of the elytra is much as in *tessellatus*, but is rather less pronounced.

STOREUS INVIDIOSUS, *n. sp.*

Male. Elliptic-ovate. Dull-red, elytra stained with piceous along suture; prothorax and metasternum brownish. Head closely covered with ochreous-white scales, slightly denser and narrower, and feebly raised between eyes; rostrum rather sparsely squamose to antennæ, from thence to apex the sides very feebly setose. Prothorax with ochreous scales rather sparsely distributed, each side of base with a short stripe of

white scales; elytra with a feeble tessellated appearance, and with whitish scales forming a feeble semicircle about scutellum, a very feeble short fascia across suture at summit of posterior declivity, and a more distinct one across middle. Under-surface and legs with somewhat ochreous scales.

Rostrum rather robust, moderately curved, scarcely longer than prothorax; costæ irregular and not acute, the median one divided from base to antennæ. Antennæ comparatively stout; scape inserted two-fifths from apex, about one-fourth passing, shorter than funicle; funicle with second-fourth joints feebly doubled, first shorter than second-fourth, sixth-seventh transverse; club ovate. *Prothorax* transverse, apex considerably less than base, but not suddenly narrowed; coarsely punctate. *Elytra* elongate-cordate, apex lightly emarginate; seriate-punctate, punctures rather coarse. *Prosternal channel* distinct and rather deep, apex deeply emarginate, separation of anterior coxæ very distinct. Abdomen with third and fourth segments straight, except at sides. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{1}{2}$ mm.

Hab.—N.S.W.: Galston, Sydney, Queanbeyan.

Appears to be close to *E. ocellata* (Blackburn), but the description of the clothing, prothoracic tuberosities, and rostrum of that species will not fit any of my (seven) specimens.

STOREUS JUVENCUS, n. sp.

Male. Elongate-ovate. Red, metasternum somewhat darker. Head not very closely covered with pale ochreous-white scales, between the eyes rounder and paler than on vertex; rostrum (except at extreme base) rather sparsely squamose, a few scales beyond antennæ. Upper-surface with ochreous and pale-ochreous scales, giving it a rather distinctly tessellated appearance. Under-surface and legs with pale-ochreous scales.

Rostrum moderately curved, the length of prothorax and scutellum combined, feebly diminishing from base to antennæ; acutely costate, the median costa narrower than the others; apical portion rather finely punctate. Scape inserted two-sevenths from apex of rostrum, more than half passing, shorter than funicle and club; first joint of funicle shorter than second-fourth, seventh transverse; club ovate. *Prothorax* transverse, apex not much narrower than base. *Elytra* elongate-cordate, apex emarginate; striate-punctate, striæ feeble, punctures rather large and subquadrate. *Prosternal channel* distinct and rather wide, apex not deeply emarginate. Abdomen with third and fourth segments feebly curved. Length, $2\frac{1}{2}$ mm.; rostrum, $\frac{2}{3}$ mm.

Hab.—W.A.: Bunbury.

The scales between the eyes are very peculiar compared with those of all the other species known to me.

STOREUS MEDIOCRIS, *n. sp.*

Male. Elongate-elliptic. Dark-red. Head and rostrum to antennæ moderately densely clothed with dingy-white scales, denser between eyes than elsewhere. Upper-surface clothed with dingy-ochreous or griseous scales, having a feeble tessellated appearance.

Rostrum feebly curved, the length of prothorax and scutellum combined, parallel (except for a very slight increase between base and antennæ); with sharp, somewhat irregular costæ, which are more or less concealed by clothing; the median costa continued to apex, the others continued but feeble beyond antennæ; apex strongly punctate, the interspaces densely and finely punctate. Antennæ comparatively stout; scape inserted one third from apex of rostrum, half passing, the length of funicle and first joint of club; first joint of funicle slightly longer than second-third, second distinctly longer than third, fourth-seventh transversely subtriangular; club ovate, slightly longer than usual in the sex, equal to four preceding joints. *Prothorax* widely transverse, sides strongly rounded, apex slightly narrower than base. *Elytra* elongate-cordate, apex conjointly rounded; seriate-punctate, punctures rather small, sides striate. *Prosternal channel* distinct, apex moderately deeply emarginate. Abdomen with third and fourth segments strongly arcuate throughout, apical segment longer than usual. Anterior *tibiæ* rather distinctly bisinuate beneath; claw joint rather strongly exerted. Length, $2\frac{2}{3}$ mm.; rostrum, $\frac{2}{3}$ mm. (female, $\frac{7}{8}$ mm.).

Female. Differs in having the rostrum thinner (but not much longer), a little more noticeably curved, and without scales or costæ; the position of the median costa is entirely unmarked, and the lateral ones are represented by rows of punctures; the antennæ are slightly thinner, inserted in middle of rostrum, scape not extending to apex, and shorter than funicle, and the club is elongate-ovate.

Hab.—N.S.W.: Hillgrove (Dr. C. Hardcastle), Armidale (McDonald and Lea).

The second-fourth joints of the funicle in the male are apparently feebly doubled.

STOREUS OCCIDENTALIS, *n. sp. or var.*

Male. Close to the preceding, but differs in having the rostrum perfectly parallel between base and antennæ, and very feebly incurved between antennæ and apex, and slightly longer; elytra more coarsely punctate, prosternal channel wider; third and fourth abdominal segments less arcuate, and the apical segment of normal size. Length, $2\frac{2}{3}$ mm.; rostrum, $\frac{7}{8}$ mm.

Hab.—W.A.: Geraldton.

Remarkably close to the preceding, but (leaving out of consideration the great distance apart at which they were obtained) the differences as noted above would appear to denote specific, or at least varietal rank.

STOREUS VARIEGATUS, *Bohem.*

In the male of this species the rostrum is supplied with seven costæ, of which, however, the three median are not sharply defined, though sufficiently distinct; the scape is slightly longer than the funicle and club combined, and the club is ovate. The female differs in having a much longer rostrum, carinate at sides only, feebly squamose at sides of base, and the apex sparsely punctate; the antennæ are thinner, the scape just passes the apex of rostrum, and the club is elongate-ovate.

The size is variable, and the males are usually, but not always, smaller than the females. There is usually to be seen a more or less V-shaped mark beyond the middle of the elytra, but in one specimen under examination the whole upper-surface is uniformly clothed with greyish scales.

STOREUS (EMPLESIS) MAJUSCULUS, *Blkb.*

I have three specimens of this species. One of them, a male, has already been commented upon by Mr. Blackburn. It has the rostrum with six acute costæ and a seventh (median) scarcely defined towards base, but moderately distinct towards apex. The female differs in having the costæ defined only at the sides, the apex of rostrum with sparse elongate punctures and the club reddish (in the male it is blackish). The clothing is slightly variable. The antennæ of both sexes are much as in *S. variegatus*.

STOREUS (EMPLESIS) FILIROSTRIS, *Pasc.*

In the male of this species all the joints of the funicle are apparently doubled (the seventh to a less noticeable extent.) This doubling is caused by an apparent short supplementary joint near the apex of each, except in the third, where it is basal. The rostrum has seven acute costæ, but they are somewhat obscured by scales; the median one terminates before the antennæ, and the extreme lateral ones are continued beyond them. The female differs in having a longer and thinner rostrum, not squamose except at extreme base; carinæ feeble, the three median obsolete, and with scattered small punctures; the antennæ are longer and thinner, the scape terminates before apex of rostrum, and the club is elongate-ovate.

Femora dentate.Prosternum scarcely canaliculate *variegatus*, Boh.

Prosternum distinctly canaliculate.

Rostrum black *amœnus*, n. sp.

Rostrum more or less red.

Upper-surface entirely red *variabilis*, n. sp.

Upper-surface black, more or less variegated with red.

Sutures of third and fourth abdominal segments feebly arcuate throughout. *contortus*, n. sp.Sutures straight, except at the sides *captiosus*, n. sp.**Femora edentate.**

Intercostal process of mesosternum level, or almost level, with coxæ.

Rostrum piceous-black *monticola*, Blkb.

Rostrum red.

Funicle with first joint as long as the three following combined *lithostrotus*, n. sp.

Funicle with first joint shorter than the three following combined.

Club the length of three preceding joints *femoralis*, n. sp.

Club the length of four preceding joints.

Rostrum of male but little longer than prothorax *ignobilis*, n. sp.

Rostrum of male considerably longer than prothorax.

Scape of male extending to apex of rostrum *mundus*, Blkb.

Scape of male considerably passing apex of rostrum.

Funicle with seventh joint transverse *gravis*, Blkb.Funicle with seventh joint as long as wide *flirostris*, Pasc.**Intercostal process depressed.**Head tuberculate between eyes *tuberculifrons*, n. sp.

Head sometimes fasciculate, but never tuberculate, between eyes.

Upper-surface with more or less erect setæ, in addition to the scales.

Club red.

Size very small *parvulus*, n. sp.Size very much larger *majusculus*, Blkb.,

Club black, or piceous-black. female.

Prothorax suddenly lessened in front, size large.

Scales on prothorax much paler at sides than on disc *majusculus*, Blkb.,Scales on prothorax almost uniformly blackish brown *falsus*, n. sp. male.

Prothorax not suddenly lessened in front, size small.

Scales pale.

Body briefly ovate *canaliculatus*, n. sp.Body elongate-elliptic *setosus*, n. sp.

Scales dark.

The white setæ at sides very thin, size very small *cryptorhynchus*, n. sp.The white setæ moderate, size larger *inamœnus*, n. sp.

Upper-surface without erect setæ.

Club black or piceous-black.

Elytra variegated with black and white scales along the suture *bellusus*, n. sp.

Elytral suture not specially variegated.

Club the length of four preceding joints combined.

Scape the length of funicle and club combined *impotens*, n. sp.

Scape shorter *brachyderes*, n. sp.

Club shorter than four preceding joints combined.

Metasternum and abdomen black *cyphirhinus*, n. sp.

Metasternum and abdomen red ... *pauperculus*, n. sp.

Club concolorous with or slightly paler than funicle.

Elytra with scales forming an almost complete transverse black fascia behind the middle

nigrofasciatus, n. sp.

Elytra without a transverse black fascia.

Prosternum very feebly canaliculate.

Club shorter than four preceding joints

macrostylus, n. sp.

Club the length of four preceding joints.

Anterior tibia curved throughout, rostrum of male considerably longer than prothorax

arcuatus, n. sp.

Anterior tibia straight on its outer edge, rostrum of male very little longer than prothorax

ellipticus, n. sp.

Prosternum, at least in front of the anterior coxæ, distinctly canaliculate.*

Scape slightly longer than funicle and club combined

dispar, n. sp.

Scape shorter than funicle and club combined.

Funicle with first joint as long as three following combined.

Scales of elytra forming a tessellated pattern.

Funicle with seventh joint transverse

assimilis, Blkb.

Funicle with seventh joint not transverse

tessellatus, n. sp.

Scales of elytra condensed to form a large whitish patch just beyond the middle

ephipiger, n. sp.

Scales of elytra almost uniform in colour.

Body ovate

multiarticulatus, n. sp.

Body elongate-ovate

niveiceps, n. sp.

Funicle with first joint shorter than three following combined.

* The characters hereafter given refer only to the males.

<p>Scales of elytra condensed to form a large black dorsal patch, commencing at the base.</p> <p>Abdomen, except extreme apex, black</p> <p>Abdomen dull-red</p> <p>Scales of elytra not condensed into a black patch.</p> <p>Metasternum black or piceous.</p> <p>Elytra with tessellated pattern only</p> <p>Elytra with transverse markings in addition</p> <p>Metasternum reddish.</p> <p>Apical portion of rostrum finely punctate</p> <p>Apical portion coarsely punctate.</p> <p>Rostrum slightly dilated between base and antennæ</p> <p>Rostrum perfectly parallel between base and antennæ</p>	<p><i>dorsalis</i>, n. sp.</p> <p><i>indistinctus</i>, n. sp.</p> <p><i>consuetus</i>, n. sp.</p> <p><i>invidiosus</i>, n. sp.</p> <p><i>juvencus</i>, n. sp.</p> <p><i>mediocris</i>, n. sp.</p> <p><i>occidentalis</i>, n. sp.</p>
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CYTTALIA.

The type of this genus (*C. griseipila*) appears to be unknown to Australian entomologists. Mr. Blackburn, at the date* of publishing his tabulation of the Eirrhinid genera, doubtfully describes two species (*tarsalis* and *Sydneyensis*) as congeneric, and associates them with *Diapelmus ventralis* and *Erichsoni* (Pascoe). These four species I know, and they certainly are congeners. I believe with Mr. Blackburn that Mr. Pascoe was wrong in referring the two latter species to *Diapelmus* (Erichson describes the rostrum as "lineare," and the eyes as "haud prominuli"); at the same time it is hardly likely that they can belong to *Cyttalia*.† Mr. Blackburn remarks‡:—"It is, I think, at any rate certain, that if the species I have called *Cyttalia* are not really congeneric with that on which the genus was founded, they cannot be referred to any other characterised genus." I have a species from Western Australia which I believe to be a true *Cyttalia*, but which has appendiculate claws; it is even possible that it is *C. griseipila*, with the description of which it closely agrees, and had my specimens been taken in Sydney I should have had little doubt in referring them to that species. I

* T.R.S., S.A., 1894.

† It seems scarcely probable that Mr. Pascoe would designate a new genus, without at least referring to the species referable to it, and previously described by him.

‡ *L.c.*, p. 147.

think that a new genus is required to receive the four species mentioned, together with a number described below, and some others with which I am acquainted, but do not describe through paucity of material; but until *C. griseipila* becomes better known, it seems advisable to refer them to *Cyttalia*.

In these species I do not think that the scape can be said to pass the eye; it terminates below the eye, and either level with or just beyond a line drawn parallel with the prothorax from the extreme base of the eye, but if it were placed on the eye itself the termination of the scape would be at or just beyond its middle.

The species here described have the following specific details in common:—Head densely punctate; between the eyes in female as wide as rostrum, in male (owing to the enlargement of the eyes) a little narrower. Rostrum stout, densely punctate. Prothorax distinctly transverse, densely punctate, its setæ transversely decumbent, sides increasing in width to near base. Elytra wider than prothorax, parallel-sided, shoulders feebly rounded, striate-punctate. Femora thickened.

The principal differences lie in the colour, length of rostrum, comparative length of the scape, and the elytral clothing and punctures.

CYTTALIA IMPURA, *n. sp.*

Reddish- or testaceous-brown; legs reddish, the femora tinged with piceous in male; scape red, funicle (basal joint excepted) and club infusate. Moderately densely and almost uniformly clothed with whitish setæ.*

Rostrum distinctly longer than prothorax. Scape the length of funicle and club combined. Punctures in elytral striæ moderately large and subquadrate; interstices feebly convex and rather feebly punctate. Anterior femora as thick as posterior, edentate. Length (including rostrum), $2\frac{1}{2}$ — $2\frac{3}{4}$ mm.

Hab.—W.A.: Mount Barker, Albany.

A soberly coloured species.

CYTTALIA PARVA, *n. sp.*

Testaceous-brown, elytra but little paler; sterna and abdomen (the apical segments reddish) black, legs and antennæ testaceous, club (basal joint excepted) blackish. Elytra moderately clothed with whitish setæ, each of the interstices with a line of setæ.

Rostrum shorter than prothorax. Scape slightly longer than funicle. Punctures in elytral striæ moderately large, distinct

* The clothing of the prothorax (except to a slight extent in its density) is uniform in all the species tabulated by me. On the under-surface it is always white and denser and finer than on the elytra.

only towards base; interstices slightly convex, very feebly punctate. Anterior femora edentate. Length, $1\frac{7}{8}$ mm.

Hab.—W.A.: Mullewa.

A dingy species, and the smallest one I am acquainted with in the genus.

CYTTALIA NIGRICLAVA, *n. sp.*

Pale-testaceous; under-surface (except apical segments of abdomen) tinged with piceous; club black. Elytra rather more densely setose than is usual.

Rostrum shorter than prothorax. Scape almost the length of funicle and club combined. Punctures in elytral striæ feeble; interstices rather wide, almost flat, feebly punctate. Anterior femora distinctly dentate. Length, $2\frac{1}{2}$ mm.

Hab.—Swan River.

A pale, moderately distinct species.

CYTTALIA INORNATA, *n. sp.*

Testaceous, occasionally reddish-testaceous; apical half of club infusate. Clothing (except that on the upper-surface it is yellow) as in *parva*.

Rostrum about two-thirds the length of prothorax, grooved in middle towards apex, and less noticeably so between middle and scrobes. Scape the length of funicle and club combined. Punctures in elytral striæ distinct towards base, becoming feebler towards apex; interstices convex, moderately wide, finely punctate. Anterior femora feebly dentate. Length, $2\frac{1}{2}$ —3 mm.

Hab.—W.A.: Albany, Mount Barker, Swan River, Geraldton.

Somewhat variable in size, and slightly variable in the depth of colour.

CYTTALIA MACULATA, *n. sp.*

Head and basal two-thirds of rostrum black, prothorax dark-red, its apex darker; elytra reddish-testaceous or reddish-piceous, each with a fairly distinct piceous spot about the middle; under-surface (apical segments of abdomen excepted) piceous, legs testaceous; antennæ reddish, club and part of funicle infusate. Each of the elytral interstices with a distinct line of rather stout whitish setæ, elsewhere feebly setose.

Rostrum slightly longer than prothorax, feebly but noticeably curved. Eyes almost circular. Scape thin, the length of funicle and club combined. Punctures in elytral striæ very distinct and subquadrate, striæ deeper towards sides than in middle. Anterior femora very feebly dentate. Length, $2\frac{1}{2}$ mm.

Hab.—Geraldton, Swan River.

Very distinct (as are also the three following species) on account of its colour.

CYTTALIA ACACIÆ, *n. sp.*

Head, rostrum (except apex), prothorax, and scutellum piceous; elytra testaceous, tinged with piceous about scutellum and the sides, and very feebly along the suture; under-surface black in male, the abdomen excepted in female; legs and antennæ testaceous, club black. Elytra with moderately dense, short setæ or pubescence, interstices each with a line of comparatively short setæ.

Rostrum subequal in length with prothorax, feebly curved. Scape the length of funicle only. Punctures in elytral striæ very distinct towards base and sides; striæ deeper at sides than in middle; interstices convex, scarcely visibly punctate. Anterior femora edentate. Length, $2\frac{1}{2}$ mm.

Hab.—Geraldton.

Specimens were beaten in abundance from *Acacia* blossoms, and were usually densely covered with pollen.

CYTTALIA NIGRA, *n. sp.*

Entirely black. Elytra with fine white pubescence, each of the elytral interstices with a line of short setæ, not (as in all the other species here described, except *impura*) placed in single file.

Rostrum shorter than prothorax. Scape slightly shorter than funicle. Elytra strongly striate-punctate, punctures everywhere distinct, striæ (especially towards sides and suture) rather deep, interstices convex and densely punctate towards base. Anterior femora edentate. Length, $2\frac{1}{2}$ —3 mm.

Hab.—Swan River.

Numerous specimens were obtained by means of the sweep net.

CYTTALIA RUFIPES, *n. sp.*

Black, legs and antennæ (club black) pale reddish-testaceous. Elytra with short yellowish pubescence, and with fine lines of yellowish setæ.

Rostrum shorter than prothorax. Scape slightly shorter than funicle. Punctures in elytral striæ feeble except towards base and sides; interstices feebly convex, and rather densely punctate. Four anterior femora edentate, teeth of posterior large, but smaller than usual. Length, $2\frac{1}{2}$ — $2\frac{3}{4}$ mm.

Hab.—Swan River.

CYTTALIA SYDNEYENSIS, *Blackb.*

Mr. Blackburn, at the foot of his description of this species, remarks having seen examples with a blackish metasternum, &c., and of which he says, "I cannot satisfy myself represent a distinct species." I have a pair taken *in cop*, in which the metasternum and scutellum are black in the male, and scarcely

darker than the general colour in the female. This sexual variation of the under-surface appears in several other species, e.g., *ventralis* and *acaciæ*.

C. TARSALIS, *Blackb.* *Hab.*—N.S.W.: Queanbeyan.

C. ERICHSONI, *Pasc.* *Hab.*—N.S.W.: Tamworth.

C. VENTRALIS, *Pasc.* *Hab.*—W.A.: Geraldton, Swan River.

Derm reddish or testaceous, elytra almost or quite concolorous with prothorax.

Rostrum slightly longer than prothorax.

Club and almost the entire funicle infusate ... *impura*, n. sp.

Club infusate, funicle not ... *Sydneyensis*, Blkb.

Rostrum the length of or slightly shorter than prothorax.

Tarsi infusate ... *tarsalis*, Blkb.

Tarsi concolorous with tibiæ.

Length (including rostrum) less than 2 mm. ... *parva*, n. sp.

Length at least $2\frac{1}{2}$ mm.

Club entirely black ... *nigriclava*, n. sp.

Apex only of club black (or piceous).

Metasternum black; abdomen red in female, black in male ... *ventralis*, Pasc.

Metasternum and abdomen reddish, not sexually variable.

Rostrum feebly or moderately grooved in middle near apex ... *inornata*, n. sp.

Rostrum not grooved ... *Erichsoni*, Pasc.

Elytra with two piceous spots ... *maculata*, n. sp.

Prothorax piceous; elytra pallid tinged with piceous about scutellum and along suture ... *acaciæ*, n. sp.

Black.

Legs black ... *nigra*, n. sp.

Legs pallid ... *rufipes*, n. sp.

GLAUCOPELA RUFA, n. sp.

Dark-red, sterna sometimes piceous. Clothed with yellowish setose pubescence, on the prothorax leaving six nude spaces—one on each side, two at base, and two at apex; elytra with pubescence more or less linear in arrangement and frequently interrupted, and leaving three more or less distinct semi-nude spaces—one near base, one near apex, and one behind middle. Under-surface with greyish-yellow pubescence.

Eyes large, round, depressed. Rostrum distinctly longer than prothorax, sexually variable in length; finely punctate; shining. *Prothorax* transverse, sides rounded, base about twice the width of apex; densely and strongly punctate. *Elytra* wide, short, much wider than prothorax; punctate-striate, interstices wider than striæ, and seriate-punctate. Length, 2 mm.; rostrum, $\frac{1}{2}$ — $\frac{2}{3}$ mm.; width, $1\frac{1}{5}$ mm.

Hab.—W.A.: Swan River; N.S.W.: Whitton.

In colour this species is different to all its described congeners, being of an uniform dark- or brownish-red. The rostrum is

decidedly longer than usual, but the insertion of the scape is as in all the other species.

GLAUCOPELA INSTABILIS, n. sp.

Black; rostrum (except base), antennæ, tibiæ, and tarsi red. Upper-surface with white or whitish scales, mixed with black or other scales; under-surface and femora with white scales, tinged with blue or green.

Rostrum rather wide, shorter than prothorax; strongly punctate, more densely towards base than apex. *Prothorax* almost twice as wide as long; densely punctate. *Elytra* suboblong, considerably wider than prothorax, parallel-sided to near apex; striate-punctate, interstices rather wide, feebly convex, and finely punctate. Length, 2 mm.; rostrum, $\frac{2}{5}$ mm.; width, 1 mm.

Hab.—W.A.: Geraldton, Swan River, Beverley.

The clothing of this species is excessively variable, and is not exactly the same in any two specimens out of about forty under examination. The scales on the prothorax are usually paler at the sides than on the disc; there is usually a pale median line dividing two dark patches of scales; sometimes the line is entirely absent, and the discal scales may be entirely black, or coppery-yellow, or of a dull white; in an occasional specimen the prothorax is clothed with black scales, except for a feeble line of white at the base and side. The clothing of the elytra is even more variable than of the prothorax, the paler scales may be of a dead-white, or coppery, or tinged with blue; they may occupy almost the entire surface, or be distributed as feeble spots; in some specimens the black scales form six more or less distinct spots; in others the white scales form scutellar and sutural markings, and three more or less interrupted transverse fasciæ.

Derm reddish	...	...	...	...	<i>rufa</i> , n. sp.
Derm black or piceous-black.	...	...	...	...
Legs red	...	...	...	...	<i>fuscomarmorea</i> , Blkb.
Femora black, tibiæ and tarsi red.	...	...	...	...
Clothing uniform	...	...	...	...	<i>varipes</i> , Blkb.
Clothing more or less variegated.	...	...	...	...
Elytra squamose and setose	...	...	...	...	<i>distincta</i> , Blkb.
Elytra squamose only	...	...	...	...	<i>instabilis</i> , n. sp.

G. unicolor (Pascoe) is described as being two lines in length. Of the above species *distincta* is the largest, and measures but one and one-half lines.

MYOSITTA CARPOPHAGA, n. sp.

Head and rostrum red, prothorax reddish-testaceous; elytra, under surface, legs, and antennæ testaceous. Clothed with very fine yellow pubescence, absent on head (except between eyes) and disc of prothorax.

Head densely punctate, finely towards base, coarsely between eyes; eyes ovate. Rostrum moderately stout, feebly curved, finely punctate, in male the length of prothorax, in female distinctly longer. Scape slightly longer than funicle, in male inserted distinctly nearer apex than base of rostrum and considerably passing apex, in female inserted almost in exact middle and just passing apex. *Prothorax* transverse, sides rounded and increasing to base, densely and slightly irregularly punctate. *Scutellum* semicircular, finely punctate. *Elytra* longer than prothorax, head, and rostrum combined, and not much wider than prothorax, sides parallel to near apex, shoulders oblique; striate-punctate, punctures subquadrate, larger in male than in female; interstices convex, finely punctate. *Under-surface* densely and finely punctate. *Femora* thickened; posterior very strongly, intermediate slightly, anterior not at all dentate. Length, male, 6 mm.; rostrum, $1\frac{1}{6}$ mm.; width, 2 mm.; (female, length, $6\frac{2}{3}$ mm.; rostrum, $1\frac{2}{3}$ mm.).

Hab.—N.S.W.; Galston. (Reared and beaten from cones of a species of *Banksia*).

A pallid species allied to *cirrifera* (Pascoe) from which it is readily distinguished by its narrower form, paler colour, and absence of elytral spots. It appears to be close to *tabida* (Pascoe) but differs from the description of that species in being considerably larger, and with a transverse prothorax; the elytra are elongate and parallel-sided, and each of their punctures (when seen from above) appears to be surrounded by a darker ring. Pascoe says of *tabida* that they "appear in certain lights to be surrounded by a paler ring."

MYOSITTA APIONOMORPHA, *n. sp.*

Black (the female occasionally dark piceous-brown); scape and first joint of funicle red, rest of the antennæ black. Elytra with short and very sparse adpressed white setæ, and with longer sparse and suberect setæ; under-surface with moderately dense white pubescence.

Head strongly punctate between eyes, finely and sparsely towards base; eyes subovate, more prominent, and less widely separated in male than in female. Rostrum rather slender, slightly curved, distinctly longer than prothorax; with rather strong elongate punctures; a distinct longitudinal impression between antennæ. Scape the length of funicle, inserted at about one-third from, and considerably passing apex of rostrum in male, in female inserted at about two-fifths from and just passing apex. *Prothorax* slightly longer than wide, sides rounded and increasing to near base; densely but somewhat irregularly

and shallowly punctate. *Scutellum* transverse, semicircular, finely punctate. *Elytra* much wider than prothorax, shoulders slightly rounded, sides in male parallel to near apex, in female slightly dilating to beyond the middle; feebly striate, strongly punctate, punctures larger and closer together in male than in female; interstices feebly convex, highly polished and scarcely visibly punctate, in female wider than punctures, in male wider on disc, narrower on sides. *Under-surface* minutely punctate, metasternum almost microscopically transversely corrugate. *Legs* rather long; femora thickened, all (but especially the posterior pair) very strongly dentate. Length, male, $3\frac{1}{3}$ mm.; rostrum, 1 mm.; width, $1\frac{1}{3}$ mm. (female, length, $4\frac{2}{3}$ mm.; rostrum, $1\frac{2}{3}$ mm.).

Hab.—Galston (on *Banksia* sp., Dumbrell and Lea).

Very distinct from any previously described species.

MYOSITTA BANKSIÆ, n. sp.

Of an uniform (except that the antennæ and legs are very slightly paler) and rather dark-red. Sides of prothorax with yellowish pubescence; elytra with sparse, semi-erect, stout, yellow setæ; under-surface very sparsely pubescent (except in front of anterior coxæ, between and at sides of intermediate and at sides of posterior coxæ).

Head densely punctate, moderately coarsely between eyes, finely towards base; eyes large, subovate, larger and more prominent in male than in female. Rostrum of male the length of prothorax, distinctly curved; strongly punctate; with a distinct longitudinal impression between antennæ; of female considerably longer than prothorax, and almost straight. Antennæ as in preceding, except that the scape is longer than the funicle. *Prothorax* transverse, sides rounded, base but little wider than apex; moderately densely but shallowly punctate; with an almost impunctate median line. *Scutellum* small, subtriangular. *Elytra* much wider than prothorax, shoulders rounded; sides in female parallel to near apex, in male very feebly decreasing from shoulders; striate punctate, punctures moderately large; interstices wider than punctures, convex, and frequently transversely impressed, so that each appears to be composed of feeble oblong spaces having a slightly granulate appearance. *Under-surface* highly polished, very minutely punctate. *Legs* moderately long; femora thickened, posterior very strongly dentate, the others rather feebly dentate. Length, male, $4\frac{1}{6}$ mm.; rostrum, 1 mm.; width, $1\frac{2}{3}$ mm. (female, length, $4\frac{1}{3}$ mm.; rostrum, $1\frac{2}{3}$ mm.).

Hab.—Galston (on several species of *Banksia*, Dumbrell and Lea).

A large female measures 6 mm. The species is allied to the preceding, from which, however, it is abundantly distinct. I know of no other species possessing similar elytral interstices. From the description of *rufula* (Pascoe) it differs in being very shining and differently clothed, third tarsal joint not strongly dilated, &c.

M. CIRRIFERA, *Pasc. Hab.*—Galston, Tasmania.

M. MELANOCEPHALA, *Pasc. Hab.*—King George's Sound, Swan River.



NOTES ON THE GEOLOGY OF KANGAROO ISLAND,
WITH SPECIAL REFERENCE TO EVIDENCES
OF EXTINCT GLACIAL ACTION.

By WALTER HOWCHIN, F.G.S.

Plates IV., V.

[Read July 4, 1899.]

On several previous occasions I have been permitted to place before this Society notes in elucidation of the extinct glacial field comprehended within the limits of the Cape Jervis Peninsula. At the southern extremity of this area, more particularly, there occurs some very striking illustrations of Glacial Till, forming low coastal hills a hundred feet in height. From the Lighthouse situated at the Cape the cliffs of Kangaroo Island are clearly distinguishable across the Strait at a minimum distance of eight miles. From the thickness of the glacial deposits at the Cape it appeared highly probable that they would be found, if searched for, on Kangaroo Island as well as on the mainland.

The earliest opportunity was seized to test this point by a visit to the Island undertaken in the last week of 1898. Whilst pursuing the main object of my visit during the limited time at my disposal, I was able to make a few general observations on the geology of the Island, which may conveniently be included in the present paper.

EOCENE.

Queenscliffe.—At Beare's Point, a little north of the Queenscliffe Jetty, and for a mile to the southward of the Point, the cliffs consist of Eocene limestones. Near the Jetty the stone is almost entirely polyzoanal in composition, and in places is so loosely cemented that it frets away rapidly by exposure to the weather. About half a mile from the Jetty, on the south side, the limestone becomes stronger, and is of a bright pink colour, undistinguishable from the pink-coloured Eocene limestone of the head waters of the Hindmarsh River.* The limestone is quarried on the beach and shipped for flux. Near the Jetty the Eocene beds have a dip of 15° S.E., which increases in a southerly direction to 25° S.E., where they pass out of sight under more recent formations.

* Trans. and Proc. Roy. Soc., S. Aus., vol. XXII., 1898, p. 15.

For about a mile on their southern limits these Tertiary beds are overlain by a remarkable travertine conglomerate, the included stones consisting entirely of rounded pebbles of basalt, which appear in striking contrast to the white cement in which they are embedded. The parent rock from which the basalt has been derived exists in situ about one-and-a-half miles to the north-west. The conglomerate reaches a maximum thickness of from three to four feet, and is sparingly fossiliferous. Two shells, *Truncatella marginata* and *T. scalarina*, are present in considerable numbers. The Truncatellæ have their habitat in the higher littoral zone, and as the bed in which they have been preserved is from ten to twelve feet above present sea level, it supplies evidences of an elevation of the coast line within recent times. The exclusive character of the embedded stones makes it probable either that the basaltic sheet, just referred to as their source, extended as far south as the site of the conglomerate bed at the time of its formation, or that the deposit was formed at the mouth of a river which had its drainage almost exclusively over the basaltic area.

Smith's Bay.—An inconspicuous outcrop of Eocene limestone also occurs in Section 317, Hundred of Menzies, on the banks of a creek a little west of the Cape Borda main road. It is situated about two miles south-west of Smith's Bay. The fossiliferous limestone occurs in broken fragments on the surface of the ground.

BASALT.

Kingscote and Gap Hills.—The sea cliffs which trend north from Queenscliffe Jetty exhibit some very interesting geological features. At the old Jetty near Kingscote, three quarters of a mile north of Queenscliffe, a very instructive section is visible. A basaltic cap, about a hundred feet in maximum thickness, forms the greater part of the cliff face, thinning out to nothing on either side. The igneous rock is greatly jointed, both vertically and horizontally, breaking up by weather action into vertical prisms of small size. This fissured condition of the stone makes it readily serviceable for road metal, and formally it was shipped to Port Adelaide for this purpose.

The basalt at this point occupies an eroded valley about a quarter of a mile wide, in a white, friable, quartzose sandstone, which sometimes passes into a coarse grit. The sandstone is horizontal, and in places exhibits false bedding. It has a thickness of about 40 feet at Kingscote, and contains, particularly near its base, large concretionary nodules of ironstone. As these ferruginous concretions, when exposed, weather into large cup-shaped masses, they are sometimes locally used as drinking troughs for poultry.

The basaltic cap continues uninterruptedly along the high ground from Kingscote to the Bluff, at the entrance to the Bay of Shoals, a distance of about two miles. It is evident that originally this basaltic sheet covered a much greater extent of country than it does at present, having been subjected to extensive denudation that has broken up the original igneous plateau into isolated areas, separated by miles of low land. It reappears at Rettie's Bluff, five miles to the west of Kingscote, and forms the table-topped summits of the Gap Hills, extending in a lineal direction, with some interruptions, from Kingscote to Smith's Bay, a distance of twelve miles.

The underlying sandstone, already referred to, can be traced round the Kingscote Point to the Bluff, and reappears under the basalt in the Gap Hills, and extends at least as far as Smith's Bay. At the latter place, near the residence of Mr. George Turner, the sandstone was eroded, before the volcanic overflow, into a considerable mound, around and over which the basalt has flowed. The section can be seen in a deep gully that has been cut through the igneous cap, and exposed the underlying beds.

The geological age to which this igneous activity must be referred is at present uncertain, but probably it took place in late Tertiary, or even Post Tertiary times, and might be synchronous with the great volcanic phenomena that was a marked feature of the Mount Gambier and Southern Victorian areas about that period.

GLACIAL.

Kingscote.—In the sea cliffs at Kingscote the white sandstone underlying the basalt is itself underlain by a stiff, blue, and mottled clay at sea level, which continues in a southerly direction to the Queenscliffe Jetty, and follows the coast to the northward along the southern shores of the Bay of Shoals. Its presence on the beach makes the ground sticky and unpleasant to walk upon. The line of junction between this clay and the Eocene beds at Beare's Point is not very distinct, but appearances seem to indicate that it occupies a position inferior to the Tertiary limestones.

Resting on this clay along the beach a few erratics were noticed, consisting chiefly of quartzites and comparatively large boulders of a creamy white quartz. There were also a few large and round nodules of flint present, the origin of which is doubtful, but they have probably been brought there by human agency.

As to the age of this clay, the evidences are by no means clear, but from what I saw subsequently in my journey, I am inclined to think that this beach clay may be the boulder clay of the district. The comparative absence of boulders from this.

part of the beach may be accounted for by the slight amount of denudation to which the clay has been subjected at this point. I regret that I had not time to re-examine this ground on my return journey.

Bay of Shoals.—After rounding the Bluff in the Bay of Shoals the cliffs become low and uniform, composed of a reddish clay covered with travertine. A range of low hills runs parallel with the coast at half a mile distance, and, from appearances, are capped with travertine limestone. The north side of the Bay is destitute of cliffs, the shore line being composed of sand intermixed with patches of travertine that rises gently from the water-level. No distinct evidences of glacial action were observed within the limits of the Bay of Shoals.

Salt Lagoon.—The first indisputable proofs of glacial action were met with some distance inland from the head of the Bay of Shoals. Deviating from the coast at Salt Creek, I went three miles in a south-west direction, and visited Salt Lagoon in Section 63, Hundred of Menzies. The Lagoon (which must be distinguished from a larger "Salt Lagoon," situated about two miles to the north-east) is a sunken area, not quite half a mile in length, and in summer is dry and incrustated with salt.

On the western side of the Lagoon, in clay ground, I found numerous travelled stones, some of large size. Sixteen good-sized granite boulders, besides numerous quartzites, were counted within a short distance of the lake. The eastern and southern boundaries of the lake consist of travertine ridges, but on the top of the rise on the south side there is a conspicuous dark-coloured and very siliceous quartzite boulder, which has been much flaked, whether by human agency or not is difficult to say. The boulder clay at this point has a trend northwards, following the base of Rettie's Bluff, a very prominent basaltic escarpment of the Gap Hills.

Returning to the Bay of Shoals, the northern shores were followed to Point Marsden. In this locality the geological features are entirely obscured by sand and travertine, and little of interest was met with till Point Marsden was reached, at the extremity of the north-west peninsula of Kangaroo Island.

Point Marsden to Smith's Bay.—Near the Point a very remarkable sandstone (to be referred to presently), occupies the coast line, and continues for many miles in a westerly direction, making travelling by the beach difficult and wearying. A few erratics can be seen lodged between the serrated outcrops of the sandstone near Point Marsden, but are much more numerous a little further to the west.

The cliffs along this part of the coast, whilst attaining a considerable altitude, are very disappointing, being capped with

travertine limestone, which is often several yards in thickness, and rests upon limestone rubble and marls. The travertine material has, in most cases, fallen on the lower face of the cliffs, forming a talus, overgrown with scrubby vegetation, entirely obscuring the beds that may be beneath the calcareous cap; but there can be little doubt that the glacial beds underlie much of the travertine of the north coast, as the retreating cliffs have left a great number of large erratics strewn along the beach, in varying numbers, as far as my observation extended westwards.

In a little bay, about three-quarters of a mile on the western side of Point Marsden, where the sandstone outcrop is partially interrupted by a sandy beach, there is a remarkable assemblage of these ice-travelled stones. It was not difficult at this point to stand in one position and count 20 large granite boulders within easy sight. In a closely connected group were the following:—A rounded mass of pink granite, 4 ft. by 2 ft. 6 in., split in two; a similar rock close by, 2 ft. by 1 ft.; grey granite, 3 ft. by 1 ft. 9 in.; pink granite, 2 ft. 6 in. by 1 ft. 7 in.; grey granite, 2 ft. by 1 ft. On the seaward side of this group was an immense block of pinkish granite, which had been broken into several pieces, but which originally had measured 12 ft. by 6 ft. In addition to the granite boulders, there were travelled stones of various kinds, quartzites being in equal numbers with the granites.

After rounding White Point, the extreme roughness of the coast, together with the excessive heat, compelled me to climb the cliffs and make my way through the scrub until Emu Bay was reached. Emu Bay may be said to be one of the finest stretches of hard sand, with deep water close in, to be found in the colony. It is three miles in extent, and contains a few boulders, particularly on its western side. Near Mr. Bates' farmstead, which is close to the beach, there is a bank of shingle that exhibits a great variety of stones, including rolled pebbles of the breccia beds described below. Erratics, some of which are of considerable size, can be seen scattered over the paddocks following the valley of the Emu Bay Creek, through Mr. Snelling's farm, and extending southwards, beyond the main road from Queenscliffe, forming a continuous stretch of boulder clay from Emu Bay to Rettie's Bluff and Salt Lagoon, already referred to, a distance of eight miles. Some fine examples of granite boulders occur in Mr. Mitchell's paddocks, near the head waters of the Emu Bay Creek.

Smith's Bay.—From Emu Bay to Smith's Bay the coast is rugged, with high cliffs of sandstone. On the eastern side of Smith's Bay there is an excellent section of boulder clay (see Plate IV). It is overlain by a thick formation of travertine-limestone and rubble,

and rests unconformably on the eroded edges of dark-coloured friable shales of the Point Marsden series. Numerous erratics occur on the beach, and are seen in situ in the clay. One of these, consisting of sandstone, is seen projecting from the boulder clay about halfway up the cliff, which measured 7 ft. by 6 ft., and 3 ft. thick. This fine tabular mass is markedly striated and polished on its upper surface. From this point, to the extent of half a mile, the boulders strew the beach in all directions. Two granite boulders gave the respective measurements of 5 ft. by 3 ft. 9 in., by 2 ft. 6 in. high, and 7 ft. 6 in. by 4 ft. 6 in. A large quartzite measured 7 ft. 9 in. by 5 ft. 3 in., and another, nearly even with the sand, was 10 ft. 6 in. in its longer axis. The boulder clay at Smith's Bay goes inland in a southerly and south-easterly direction, skirting the flanks of the range known as the Gap Hills; it passes through the gap in the range, and expands in a southerly direction as far as Sections 272 and 273.

On the land farmed by Mr. John Turner, the Clerk of the District Council, situated within half a mile from the sea at Smith's Bay, the boulders are so thick that they have had to be removed from the ploughed land before it could be cultivated. One of these was a large tabular quartzite, 4 ft. 6 in. by 3 ft., and 2 ft. 6 in. high, which required, as stated by Mr. Turner, a team of six bullocks to draw. Most of these erratics strewn over the land are beautifully faceted, polished, and striated by ice action.

On the eastern side of the Bay, the creeks which run at the back of the coastal range of hills, as well as the adjoining paddocks on the Queenscliffe main road, are covered with glacial drift, and in places the ground is simply a gravel bed of these transported stones. Extensive patches have been bared of vegetation by the presence of mineral springs, as well as wash from rains, so that the included stones of the boulder clay can be studied in this locality with great advantage. Dark-coloured siliceous quartzites (many of them banded) are much in evidence. Several varieties of pink and grey granites are common, some of which are extremely coarse in texture, whilst others are microcrystalline. Amongst other varieties were noticed: gneiss, hornblendic, and schistose rocks. Some of the granites closely resembled the granitoid rocks of the Port Victor district, whilst others did not. A careful study of the lithology of these boulders might supply a clue to the source from which they have come, as this locality is particularly favourable for such investigations, the travelled stones being in great variety and well exposed.

The boulder clay rises to the flanks of the Gap Hills to the south of Smith's Bay, but I was unable to find any place where the glacial clay could be seen in stratigraphical relationship with

the basalt. The talus formed by this much-jointed igneous rock is very extensive, and for the most part has covered both the white sandstone outcrop and the adjacent boulder clay. The probabilities, however, seem to be that the boulder clay underlies the white sandstone, and consequently the basaltic cap also.

The white sandstone, which is inferior to the basalt throughout the district, Mr. Brown considers the equivalent of the sandstone of the Inman Valley, with which it has a close resemblance. As the sandstones of the Hindmarsh, Inman, and Yankalilla districts sometimes carries glaciated erratics, there can be no doubt that it belongs to the same series as the underlying boulder clay of the neighbourhood. I saw no erratics in the sandstone on Kangaroo Island, but the analogy in other respects seems to point to its being the upper member of the glacial beds on Kangaroo Island as it is on the mainland.*

In defining the contour of the boulder clay in its landward extension on the south side of the Gap Hills, I am much indebted to the extensive local knowledge of Mr. John Turner, who assisted me in marking off its limits on the map (Plate V.), but the lines of occurrence must be taken as approximate only.

So far as I saw the country, I am led to think that it is the occurrence of the glacial clay at the surface which forms the very productive cultivable land met with on the Island, but which, it is to be regretted, forms but limited patches between extensive stretches of unproductive limestone and sandy country.

Only in one instance did I observe the Glacial Till in direct contact with the bed rock, and then it was resting on soft shales that were unfavourable for the preservation of glacial features.

The glacial remains described in this paper extend in a straight line 12 miles from east to west, and seven miles in a north and south direction, and greatly enlarges the area previously known to have been under glacial conditions in South Australia. The extinct ice field may now be described as extending over 70 miles from Smith's Bay, Kangaroo Island, on the west, to Hindmarsh River on the east, and not less than 40 miles in a north and south direction from Kangaroo Island to Hallet's Cove on the mainland. There is the highest probability that further research will show that the ice action has been much more extended than the area now described, although the general prevalence of sand and travertine over the lower portions of the Island greatly masks the underlying strata in positions where the glacial beds are most likely to occur.

* A similar white sandstone is seen at Hallet's Cove, where it overlies the boulder clay, and separates the latter (within the limits of the amphitheatre) from the overlying fossiliferous Miocene limestone. The line of unktion between the sandstone and Miocene beds exhibits numerous erratics.

PALÆOZOIC.

As already stated, a very remarkable sandstone occupies the coastline extending westernly from Point Marsden to an unknown distance on the west side of Smith's Bay, and is different from any other formation that I have seen in the colony. Mr. H. Y. L. Brown, Government Geologist, who visited the district a few weeks earlier than myself, has described the peculiar features of this formation in a report recently published. It is a comparatively soft, laminated, reddish-coloured sandstone, frequently exhibiting mica on the planes of stratification, and is false-bedded as well as contorted in places. It weathers easily under the action of the sea, and is frequently converted by this process into a honeycombed rock. At some horizons the sandstone is of a sub-argillaceous character, and exhibits a tessellated system of jointing, marked by double raised ridges surrounding each square, as is sometimes seen in deposits of clay-iron ore.

At Emu Bay and on the east side of Smith's Bay there are thick beds of dark-coloured laminated shale.

At Point Marsden, and for some distance in a westernly direction, the dip is 15° north-east. At White Point the dip has increased to 45° in the same direction. On the east side of Emu Bay the dip is reversed at 15° to south-west, and on the west side of the same Bay the dip is once more to the east and east-south-east at about the same angle. At Smith's Bay the dip once more varies from north-west to north-north-east.

The most striking feature of this formation is the presence of a number of beds of Breccia, which are intercalated with the sandstones near the highest exposed beds of the series. These Breccia-beds are somewhat irregular, varying much in thickness within short distances; they are roughly lenticular in section, and do not in any case exceed a maximum thickness of six feet. The included fragments vary in size from coarse grit up to blocks two feet in length, although stones of the latter size are very rare. The fragments are almost without exception sharply angular.

The contents of these Breccia-beds are extremely varied. Amongst the commonest occurrences were observed a pink-colored felspathic gneiss, various granitoid rocks, buff and grey limestones, quartzites, jasperous and other varieties of quartz, and, more rarely, micaceous and hornblendic schists. The cementing agents seem to be principally calcareous or colloid silica (chalcedony). This great diversity of mineral character seems to point to the fact that the included stones of these Breccia-beds were gathered from a variety of sources, and the presence of a large number of limestone fragments is proof that the transport-

ing agent must have travelled over a limestone country in one part of its course.

The following is a section, in descending order, at Point Marsden, where the Breccia-beds occur, the thickness of these beds are reckoned at their maximum.

Section of Breccia-beds at Point Marsden.

Overlying sandstone: thickness unknown.

	Ft.	in.
1. <i>Breccia</i>	4	0
Sandstone—central portion, from 1 to 1½ ft., hard rock	4	0
2. <i>Breccia</i>	2	0
Sandstone band	0	6
3. <i>Breccia</i>	5	0
Flaggy sandstone	6	0
4. <i>Breccia</i> . Increases rapidly from 1 ft. to	3	0
Sandstone in thin flags	1	6
5. <i>Breccia</i>	6	0
Sandstone	8	0
6. <i>Breccia</i>	4	0
Sandstone	15	0
7. <i>Breccia</i>	2	0
Thick sandstones.		

At *White Point*, a distance of rather more than a mile from the above section, another Breccia (No. 8) occurs.

8. <i>Breccia</i>	4	0
Thick sandstones and shales.		

The total thickness of these Breccia-beds is about 30 feet. They are very sharply defined in their stratigraphical junction with the overlying and underlying beds. There is no commingling of material, except an occasional erratic enclosed in the stratified sandstone, generally within a few feet of the Breccia-beds.

The origin of these remarkable beds is difficult to determine. Although no indication of glaciation could be detected on the included fragments, it is difficult to refer these confused assemblages of rock fragments to any other agent than ice. The evidences which favour this conclusion are (1) The beds are unstratified; (2) the fragments are angular; (3) the lithological characteristics of the rocks are extremely varied; (4) the isolated erratics which occur in the sandstone may also be best explained by such a supposition. It may be that these Breccia-beds represent a terminal moraine with the foot of the glacier alternately advancing and retreating, which would account for these Breccias being irregularly interstratified with the sandstone layers. On the other hand it is remarkable that the included fragments are so limited in size. This feature might point to the agency of shore

ice of no great thickness, and therefore incapable of transporting stones of large size. These suggestions are only thrown out as possible causes for the peculiar features of these beds rather than any settled conviction as to their origin.

The geological age of this formation is doubtful. It does not appear to have been subjected to the metamorphic action that has converted the sandstones of the Mount Lofty Ranges into quartzites. It is free from vein quartz, which is a general feature of the latter, as well as being more friable. The derived limestones in the Breccia-beds are crypto-crystalline, and resemble some of the Cambrian marbles, but no fossils have been detected in them.

If the Breccia-beds are genuinely glacial in their origin, they are certainly much older than the glacial clays and erratics more particularly described in this paper, for the following reasons:—

1. No erratics at all comparable in size to those scattered over the surface occur in the Breccia-beds. The size of the stones in the latter seldom exceeded a foot in diameter.

2. Whilst some of the glacial erratics rested on the eroded edges of the sandstone and Breccias, there is no lithological similarity between the superficial erratics and the fragments which make up the Breccias.

3. At several points the boulder clay is seen to rest unconformably on the eroded edges of the Point Marsden series.

Judging from the general appearance of the sandstone, together with the occurrence of derived (?) Cambrian limestones in its Breccias, I am disposed to regard it as belonging to one of the middle or upper Palæozoic periods. The shale beds that are included in the series might be carefully searched for fossils with some hope of success. Great interest attaches to the westward extension of these beds, as their junction with the older rocks will probably be found in that direction, and might show an unconformability.

NOTES UPON SOME FOSSIL REPTILIAN REMAINS
FROM THE WARBURTON RIVER, NEAR LAKE
EYRE.

By A. ZIETZ, F.L.S., C.M.Z.S., &c., Assistant Director of the
S.A. Museum.

[Read September 5, 1899.]

In the year 1859 Prof. R. Owen described and figured some fossils in the Phil. Trans. of the Royal Society, London, vol. CXLIX., consisting of three vertebræ of a gigantic land lizard from the (Pleistocene?) deposits forming the bed of a tributary of the Condamine River, West of Moreton Bay, and named it *Megalania prisca*. In his description he points out its close relationship to the recent Varanidæ. For comparison with the fossils, figures are also given of the vertebræ of the *Varanus giganteus* from Central Australia.

In a second paper by the same author, which appeared in 1880, "dorsal," "sacral" and caudal vertebræ, a skull* and a fragment of the same are figured and described.

In the Proceedings of the Royal Society, London, 1886, Prof. R. Owen described and figured the sacrum and foot-bones, which, however, are stated by A. S. Woodward, Ann Mag. Nat. History, 1886, to be those of some large Marsupial. †

In 1888, A. S. Woodward, in a paper "On the Extinct Reptilian Genera *Megalania* (Owen) and *Meiolania* (Owen)," gives a summary of previous observations, and proposes the new name *Meiolania Oweni* ‡ for a Chelonian, which name has also been adopted by Lydekker in the Catalogue of Fossil Reptilia, &c., in the British Museum.

Woodward further states—"It appears that under *Megalania prisca* have been included (1) Lacertilian vertebræ and an occipital fragment, (2) Chelonian skull and tail-sheath, (3) Marsupial foot-bones."

The first necessarily form the type specimens of the genus and species, and the last are obviously at once excluded from consideration.

In the S.A. Government Geologist's Report for 1894, in a supplementary paper by Mr. R. Etheridge, junr., Palæozoologist

* A. S. Woodward states this skull to belong to a Chelonian.

† Diprotodon (A. Z.).

‡ See British Museum Catalogue of Fossil Reptilia, &c., Part III., p. 166.

in the Australian Museum, Sydney, "On the Occurrence of *Megalania* (Owen) (*sensu stricto*) in South Australia," two vertebræ are figured and described: Plate I., figs. 1, 2, 3, and Plate II., figs. 1, 2. The first is stated to be "a dorsal vertebra, probably from an immature individual, &c. It appears to correspond well with the dorsal vertebræ figured by the late Sir R. Owen, F.R.S., in his first paper on *Megalania*." This is undoubtedly a true *Varanus* vertebra.

Plate II. figs. 1-2. represent a vertebra which is described as "one of the lumbar series, very much larger than the dorsal." This vertebra, however, does not belong to *Megalania*, but is a true Crocodilian vertebra, and evidently belongs to the same species of crocodile, of which three vertebræ have been previously received by the S.A. Museum from Messrs. W. R. Cave & Co., in 1888.

These were obtained with the following fossils from the bed of the Warburton River, near Lake Eyre; probably from the same locality where Mr. Brown obtained his specimens. Fragments of lower jaw of *Nototherium*, fragments of *Diprotodon* bones, fragments of Kangaroo bones, dorsal vertebra of *Varanus* (*Megalania*) *priscus*, tail vertebra, unguinal phalanx, phalanx, three vertebræ, fragments of dermal scutæ of Crocodile, fragments of carapace and plastron of two Chelonian species, *Chelodina insculpta*, De Vis, and *Chelymys uberrima*, De Vis, and fragments of skull of a Siluroid fish.

All these bones are more or less petrified; and judging from their appearance and their fragmentary and often water-worn condition, seem to have been washed out of the sand and clay banks by floods, as already stated by Mr. Brown in his report of 1894.

The deposit, from which these fossils originate, was not found by him, although he travelled about 50 miles up the river.

Lydekker, in the Catalogue of Fossil Reptilia in the British Museum, vol. I., page 284, points out the close relationship of *Varanus* (*Megalania*) *priscus* (Owen) to an extinct Indian species (*Varanus sivalensis*). This species, as well as *V. priscus*, compared with our recent forms, owns proportionally shorter and stouter-built vertebræ than the latter. Owen says in his paper, "The chief peculiarity of the Australian fossil Lizard is its great size; the vertebræ rival in bulk those of the largest living crocodiles. Its estimated length was about 20 feet."

The vertebræ have already been figured, but not the phalanx, the unguinal phalanx (which measures over two inches in length), and which, as it appears to me, have not been found before.

The unguinal phalanx agrees very well, excepting its enormous size, with the corresponding one of *Varanus giganteus*, the "Perentie," which is stated to attain a total length of eight feet.

Judging from the much smaller size of the Warburton River fossils in comparison with those from the Condamine River deposits, they appear to belong to a much smaller and hitherto undescribed species, for which I propose the name *VARANUS* *WARBURTONENSIS*.

In the following table measurements are given of one of the two vertebræ under consideration, and also one of those described by Prof. Owen from the Condamine River, Queensland.

	<i>Condamine R.</i>		<i>Warburton R.</i>	
	In.	Lines.	In.	Lines.
Length of centrum	3	3	2	4
Length of non-articular lower surface of centrum	2	0	1	4
Breadth of centrum, behind the ball ...	1	11	1	2
Vertical diameter of centrum behind the ball	1	4	0	9
Vertical diameter of cup	1	9	1	2
Transverse diameter of cup	2	5	1	6
Breadth of neural arch above the costal tubercles	4	7	2	6
Vertical diameter from highest part of neural arch	3	4	2	3
Transverse diameter of anterior outlet of neural canal	0	9	0	6
Transverse diameter of posterior outlet of neural canal	0	4	0	3
Vertical diameter of anterior outlet of neural canal	0	3	0	4
Vertical diameter of posterior outlet of neural canal	0	5	0	5
Longest diameter of anterior zygopophysis	1	6	0	11
Vertical diameter of costal tubercle ...	1	0	0	7
Transverse diameter of costal tubercle ...	0	7	0	6
Antero-posterior extent of base of neuro-pophysis	1	10	1	2

NOTES ON MELONITE (NICKEL-TELLURIDE) FROM
WORTURPA, SOUTH AUSTRALIA.

By ALFRED J. HIGGIN, Lecturer on Chemistry, University
of Adelaide.

[Read September 5, 1899.]

Three separate samples of the telluride lately found at Worturpa were sent to me, all of which I found to be identical in appearance. The telluride occurs with quartz and calcite in thin lamellæ, but not showing distinct crystalline form.

It has a brilliant metallic lustre. The colour of the cleavage planes by direct reflection is silver-white; in oblique directions, reddish-brown; on the fractured faces of a more bronze-like hue. The hardness is 1·5; sp. gr., 7·6; streak lead-grey. A qualitative analysis proved that the mineral was telluride of nickel, containing traces of bismuth and lead, and a variable quantity of free gold.

A quantitative analysis of the mineral gave the following results:—

	(1)	(2)
	Per cent.	Per cent.
Insoluble matter	2·091	7·319
Gold	·329	·018
Nickel	22·99	21·274
Tellurium	74·49	71·500
	<hr/>	<hr/>
	99·90	100·111

The material for analysis was picked out when the stone had been broken up, and is, as will be seen, nearly free from foreign matter. There can be no doubt from these analyses that the mineral is melonite, $Ni_2 Te_3$. This would require—

	Per cent.
Nickel	23·51
Tellurium	76·49
	<hr/>
	100·00

This mineral has, so far as I am able to ascertain, only been found in one place, viz., in the Stanislaus mine, California, U.S. of America.

It is described by Genth in a paper entitled "Contributions to Mineralogy," published in the American Journal of Science, vol. XLV., 1868. Genth states that he only obtained a small

amount of the mineral, and then it was not pure, but mixed with quartz and small quantities of Hessite, Altaite, and, possibly, Native Tellurium.

The mineral has, he states, a metallic lustre, and is of reddish-white colour, similar to bismuth. He observed one microscopic but perfect six-sided plate, but states that the largest portion was in indistinct granular and foliated particles with eminent basal cleavage. This description does not quite agree with the appearance of the mineral from Worturpa, but probably the latter is purer than that examined by Geuth.

In some places the telluride of nickel from Worturpa has undergone oxidation, staining the surrounding matrix either green or yellow. There was not sufficient of the oxidation product present to enable me to determine its composition. But it is probably tellurite of nickel.

I examined several portions of the mineral in order to ascertain whether the gold was present in the free state or combined with tellurium. On dissolving the mineral in nitric acid, even when very dilute acid was used, the gold was always obtained in bright spangles, sometimes of considerable size, but even the smallest particles showed, when examined under the microscope, a bright shining surface.

Though the gold occurs in the free state in all the samples submitted to me, it is highly probable that it was in combination with Tellurium, and that the Telluride of gold has undergone decomposition.

It would be of interest to examine samples of the mineral obtained from a greater depth in the lode, where there could be no possibility of oxidation occurring.

All the samples were examined for Selenium and Cobalt, but none was found present.



A REVISION OF THE AUSTRALIAN
CYCLOSTREMATIDÆ AND LIOTIIDÆ.

By PROFESSOR RALPH TATE.

[Read September 5, 1899.]

Plates VI., VII.

This communication was submitted to this Society, August 2, 1898, but by reason of inability to prepare illustrations in time for issue in the volume for 1898, its publication was deferred. A brief abstract appears, however, on p. 239 of that volume, and therein is established the generic names *Cyclostremella* and *Pseudoliotia*. In the interval some additional information has been collected or published, notably the illustrations of *Liotia Lodderæ* by Mr. Hedley, and that five species of *Cyclostrema* and one of *Liotia* have been elaborated by Dr. Verco, the diagnoses of which, and accompanying illustrations in a published form, are deferred till his return from Europe; also, my attention has been drawn by Mr. Hedley to a paper by Miss Bush on "A Revision of *Cyclostrema* and Related Genera belonging to the Atlantic Fauna of America" (Trans. Connecticut Acad., 1897), wherein a new genus *Cyclostremella* is founded, which necessitates a new name for the genus typified by *Liotia Lodderæ*.

The limits of the genera *Cyclostrema* and *Liotia* are not so exact as to permit in all cases of a safe reference to one or the other.

The conchological characters largely relied on for *Cyclostrema* are a thin vitreous test, entire, simple non-varicosed aperture, and a multispiral operculum. For *Liotia*, a stout perlaceous test, last whorl descending at the front, aperture variced and entire, operculum spiral and covered with calcareous granules. As to the animal, that of *Liotia* is only known, and to the following extent: "does not possess intertentacular lobes, but the foot is furnished with lateral filaments, as in Trochidæ" (A. Adams, in P.Z.S., 1863).

As a result of a study of the larger number of Australian species embraced in the families Cyclostrematidæ and Liotiidæ, I find that several species have been wrongly assigned to their respective families. Thus, for instance, *Cyclostrema micans* and *Liotia Angasi* have solid shells, with an entire aperture, but not distinctly varicosed; by comparison of types in the British Museum, they are one and the same species, and as the test is

not pearly inside the family reference should be to *Cyclostrematidæ*, a position confirmed by my personal knowledge of its operculum. Another species of dubious generic location is *Liotia Loddereæ*, which, because of its thickened aperture, has a *Liotia*-like aspect; but its vitreous test, in the absence of other characters, makes it desirable to relegate it also to *Cyclostrematidæ*.

Having applied the above-mentioned conchological tests to many of our reputed species of these two families, I hope that my verdicts thereon may facilitate the preparation of a complete revision of them.

FAMILY CYCLOSTREMATIDÆ.

Cyclostrema is a heterogeneous assemblage of species, embracing such divergent characters as—

1. TEXTURE—*a*, porcellonous and thick, as in *C. micans*; *b*, translucent and thin, as in *C. Tatei*.
2. SHAPE—*a*, turbinate, as *C. tenera*, Jeffreys, and *C. conica*, Watson; *b*, discoid, as *C. nivea*, A. Ad.; *c*, planorbiform, as *C. cyclotina*, A. Ad.
3. APERTURE—*a*, simple, as in *C. Tatei*; *b*, thickened, as in *C. micans*; *c*, varicosely margined, as in *C. Loddereæ*.
4. UMBILICUS—*a*, wide in *C. Tatei*; *b*, almost obliterated in *C. micans*.
5. PERITREME continuous or incomplete.

These multifarious elements indicate that *Cyclostrema*, in an extended sense, is heterogeneously composed, and in my treatment of the Australian species I have endeavoured to arrange them in genera and sections best in accord with morphological characteristics—anatomical features still remain unascertained; nevertheless, I have added difficulties by the inclusion of three species of doubtful classificatory position.

GENUS CYCLOSTREMA, *Marryatt*, 1818.

Shell depressed; test thin, hyaline, usually spirally lined or ridged; aperture simple; umbilicus open.

The genus *Vitrinella*, C. B. Adams, does not appear to me to be distinct from the typical *Cyclostrematids*.

SECTION CYCLOSTREMA, *s. s.*

The characters of the genus.

SECTION TUBIOLA, *A. Adams*, 1864.

Shell turbinate; thin, opaque-white, and usually inornate.

The genus *Cirsonella*, Angas, which was placed provisionally by its author among *Trochidæ*, is, in my opinion, reducible to this section. Fischer, *Man. Conch.*, and Tryon, *Man. Conch.*, X., p. 16, place it subgenerically under *Tinostoma*. *Tinostoma* is not considered by me a member of the family.

GENUS LODDERIA, *Tate*, 1899.

Differs from *Cyclostrema*, *s. s.*, by its varicosely margined aperture. Type: *Liotia Lodderæ*, *Petterd.*

GENUS PSEUDOLIOTIA, *Tate*, 1898.

Shell somewhat like *Liotia*; test thick and porcellanous; aperture oblique to the axis, its margin thickened; umbilicus reduced to a mere chink; operculum horny, multispiral. Type: *Cyclostrema micans*, *A. Adams*; it recalls *Mölleria*, which is differentiated by a calcareous operculum. Judging from published figure and description, *Cyclostrema eburnea*, *Nevill*, is congeneric.

 CATALOGUE OF THE AUSTRALIAN
CYCLOSTREMATIDÆ.
GENUS CYCLOSTREMA, *s. s.*1. *Cyclostrema Tatei*, *Angas*. P.Z.S., 1878, p. 862, t. 54, fig. 10.

The ornamentation of the the shell of this species varies from eight spiral ribs to nearly smooth. The many keeled form resembles *C. cingulifera*, *A. Adams*, whilst the smooth form simulates *C. lævis*, *Kiener*. *Reeve*, in his *Monograph of the genus* records these Japanese species as also from *Port Lincoln*. My comparison of *C. Tatei* with the *British Museum* examples of *C. cingulifera* leaves me in doubt of their specific identity, chiefly on account of the very large size of the Japanese shells. Until *Mr. Edgar Smith* has given his opinion on the question, which he kindly promised to do, I shall expunge *C. cingulifera* and *C. lævis* from the *South Australian fauna*, as I tentatively regard *Reeve's Australian reference* to belong to *C. Tatei*.

The species is confined to *St. Vincent Gulf*, and the coast to the westward thereof. (*R. Tate*).

2. *Cyclostrema Harriettæ*, *Petterd*. *Journ. Conch.*, p. 141 (1884).

This *Tasmanian species*, types of which I have had under comparison, is closely related to *C. Tatei*, but differs by its regularly disposed spiral threads, transversely and closely striated (not oblique and distant), depressed spire, and by the subtruncate periphery of the last whorl. Also *Holdfast Bay*, *S. Australia* (*R.T.*).

3. *Cyclostrema Johnstoni*, *Beddome*. *Proc. Roy. Soc., Tasmania*, for 1882, p. 168 (1883). Pl. vii., figs. 7 a-b.

A depressed shell, ornamented with sharp elevated transverse ribs (about 35 on body-whorl), intercostal spaces without sculpture; aperture entire, not thickened.

It is very like *C. Archeri*, Tryon. Man. X., p. 89, t. 33, fig. 84, 1888, but "peristome thickened" does not apply, though his figure does not portray that character. The species belongs to Tasmania.

Cyclostrema inscriptum, *spec. nov.* Pl. vii., figs. 3 a-b.

Shell minute, very fragile, discoidal, diaphanous, widely umbilicated. Spire flat, not rising above the plane of the last whorl. Whorls four, convex, with a gentle antesutural slope; surface smooth and shining, but incremental striæ are visible under a pocket-lense. Aperture roundly oval, a little wider than high; peristome incomplete.

Dimensions of figured example.—Major diameter, 2·2; minor diameter, 1·6; height, 1·2 mm.

Locality.—West coast of South Australia.

This species differs from the smooth form of *C. Tatei* by its flat spire, the last whorl relatively less high, and by the absence of spiral ornament; it has not the compact build or sunken spire of *C. charopa*.

Cyclostrema delectabile, *spec. nov.* Pl. vii., fig. 4.

Shell small, thin, translucent white, subdiscoidal. Spire slightly elevated; widely and perspectivevely umbilicated. Protoconch globulose and hyaline. Ordinary whorls three, of rather rapid increase; ornamented by rounded spiral and axial threadlets, which on the antesutural slope are of about equal strength and equidistant, producing a reticulation of square meshes; on the rounded periphery the spiral riblets are dominant as far as the edge of the umbilical crater, but in its gentle slope the axial riblets reappear, and in greater strength than they are posteriorly. Aperture orbicular; peristome thin and continuous.

Dimensions of figured example.—Major diameter, 1·66; minor diameter, 1·1; height, ·95 mm.

Locality.—Fowler Bay, west coast of South Australia; collected by me in 1879.

Reticulated sculpture is rare in the family, and the peculiarity of its partial development in the present species is in itself a sufficiently distinctive character.

DOUBTFUL SPECIES OF CYCLOSTREMA.

Cyclostrema caperatum, *spec. nov.* Pl. vii., figs. 1 a-b.

Shell small, discoidal; diaphanous, though somewhat clouded around the umbilicus. Spire convex, slightly elevated; whorls four and a-half, inclusive of protoconch of one and a-half smooth whorls. The ordinary whorls slightly depressed at the posterior suture thence regularly subconvex, suture linear; all the whorls spirally lined, the linear ridges slightly narrower than the inter-

vening sulci about fourteen on the upper-surface of the body-whorl; the posterior one and a-half whorls ornamented by arched retroverted transverse folds; the last whorl abruptly rounded at the periphery to the flattened base, which is inconspicuously marked by concentric lineations.

Aperture roundly oval, a little wider than high, its vertical plane oblique to the axis of the shell; peristome incomplete; outer lip acute and medially ecurved; columellar lip nearly vertical, with truncated edge, and thickened at its junction with the basal lip. Umbilical orifice of moderate size, but exposing the penultimate whorl; umbilical crater with somewhat precipitous sides interrupted by a shallow spiral furrow.

Maximum diameter, 5; height, 2 mm.

Lakes Entrance Gippsland, Victoria, in shell-sand. Three examples collected by, and received from, Dr. Pulleine.

I am not satisfied that this new species is rightly placed in *Cyclostrema* or even in Cyclostrematidæ; the oblique aperture is not proper to *Cyclostrema*, whilst the spiral excavation around the umbilical crater, which recalls *Minolia* in Trochidæ and *Homalaxis* in Solariidæ (at least as represented by the species in the Parisian Eocene) is not known among Cyclostrematidæ. But I am at a loss where else to place it in the absence of characters which would be furnished by the animal or its operculum.

Supplemental Note.—The following extract from a letter (25/9/99) by Mr. C. Hedley, is of much interest regarding the systematic position of this species:—"Your *C. caperatum* I refer to the section *Solariorbis* of *Teinostoma*. The group is defined by Dall; briefly it is distinguished by an umbilical keel. The nearest ally of *caperatum* is *Starkeyæ*, N.S. Wales. A glance at the umbilicus serves to distinguish them, that of the latter being more choked by the umbilical keel; besides *caperatum* is striated; *Starkeyæ* smooth; *caperatum* absolutely larger and comparatively flatter."

***Cyclostrema charopa*, spec. nov.** Pl. vii., figs. 2a-2c.

Cyclostrema micra, Petterd, Journ. Conch., p. 139, 1884 (non *C. micra*, Ten.-Woods, 1877).

Shell minute, planorbiform, very widely umbilicated, sordid-white; spire slightly sunken. Whorls four, rapidly increasing, convex; last whorl with a sloping sutural margin; the ornament consists of close-set, slender, oblique growth-lines only; base convex, abruptly bounding the wide umbilicus, which exposes all the whorls. Aperture incomplete, nearly circular, a little wider than high; outer lip sharp, ecurved medially.

Dimensions of figured specimen.—Minor diameter, 1.1; major diameter, 1.84; height, .5 mm.

Habitat.—Tasmania (Petterd); South Australia (Dr. Verco).

The figured example, which I received from Mr. May, has been critically compared by me with Mr. Petterd's type, and is considered to be conspecific, though it is larger, and has an additional whorl, which has developed the sutural slope absent in the younger shell. This may not be a *Cyclostrema*, and I have been inclined to refer it to *Homalogyra*, but the simple aperture forbids such an attachment. The specific name is in allusion to the similitude of the shell to that of some species of the helicoid genus *Charopa*.

Cyclostrema Mayii, *spec. nov.* Pl. vi., figs. 4a-4c.

Shell minute, very fragile, discoidal, with a flat spire and rounded periphery, profoundly and widely umbilicated. Protoconch large, oblong, and inflated. Spire-whorls two, slightly sloping to the channeled suture; ornamented by thick and somewhat irregular growth-folds, those on the body-whorl passing across the periphery to the umbilicus; the rounded periphery is faintly angled above and below, less so below than above. Aperture circular, peristome entire and simple.

Dimensions of figured example.—Major diameter, 1.1; minor diameter, .84, height, .4 mm.

Habitat.—Tasmania, received from Mr. W. L. May, of Sandford, in honour of whom I have employed the species-name.

This is another *Homalogyra*-like shell, but distinct from *C. charopa* in its flat, not sunken spire, coarse ornament, and complete peristome.

SECTION TUBIOLA.

Cyclostrema Angeli, *T. Woods, sp.*

Rissoa (?) *Angeli*, Tenison-Woods, Proc. Roy. Soc., Tasmania, for 1876, p. 153 (1877); *id.*, *op. cit.*, p. 122, 1878.

This species seems congeneric with *C. conica*, Watson, "Voy. Challenger," of which Tryon remarks, "it is more like a *Scalardia*." Of Tenison-Woods' species, the same author says, "generic position doubtful;" though Tenison-Woods himself remarks, *op. cit.*, p. 122, "some authors would place the species in the genus *Cyclostrema*."

Habitat.—Tasmania (Blackman's Bay, ? type), my collection received from Mr. May; S. Australia, Dr. Verco.

Though *Rissoa*-like, yet by its fragile test, and in the absence of the opercular characters, it is better placed in *Cyclostrematidae*, because of the thinness of the test.

Tryon figures a Tasmanian shell as *Rissoa Angeli*, but it is a distinct species, hereafter to be described.

The axial ornament of *R. Angeli* consists of thick ribs, about ten on the last whorl, which cease at the periphery. Ten-

Woods' observation, "outer lip thickened," is not correct, as that appearance arises from the coincidence of the thick rib making the apertural margin, which it does not always do.

Cyclostrema erebresculptum, *spec. nov.* Pl. vii., fig. 5.

Syn.—*Rissoa Angeli*, Tryon, IX., p. 358, t. 71, f. 11 (original), non Ten.-Woods.

Umbilicated, turbinate-conical, thin, sordid-white. Whorls four, convex, with a well-impressed suture; ornamented with sharp, slender, crowded axial threads (30 or more on the last whorl, which extend on to the base), and by numerous interstitial spiral striæ. On the base the spiral striæ are as strong as the axial threads. Aperture circular, outer lip thin.

Dimensions of figured example.—Major diameter, .9; minor diameter, .76; height, .9 mm.

Habitat.—Tasmania (received from Mr. May).

This species is distinguishable from *C. Angeli* by more turbinate outline, and by its numerous slender axial threads, which extend on to the base; the sculpture recalls *C. Johnstoni*, which is, however, a discoidal shell. I do not regard it as an adolescent state of *C. Angeli*, because the posterior whorls (at any rate the penultimate one) have the type of costation as on the body-whorl.

Tryon's figure shows, and his description states, "sharp rather crowded growth-lines," which are at variance with Woods' statement that the ribs are thick and distant; characters borne out by the study of authenticated specimens of his species. I do not know the source whence Tryon obtained the several Tasmanian Cyclostrematids which he so unsatisfactorily figured, and seems not to have taken the pains to verify the application of the species names which accompanied them. There can be no hesitation for the opinion that in the present case he was misled into an error of identification.

Cyclostrema australe. * *Angas, sp.*

Cirsonella australis, *Angas*, P.Z.S., 1877, p. 38, f. 16.

Teinostoma (*Cirsonella*) *australis*, *Tryon*, Man. Conch. X., p. 107, t. 35, f. 83-84 (copied), 1888; *id.* *Henn. and Brazier*, P.L.S., IX., p. 175, 1894.

Cyclostrema Weldii, *Tenison-Woods*, Proc. Roy. Soc., Tasm. for 1876, p. 147 (1877).

Cyclostrema (*Tubiola*) *Weldii*, *Tryon*, *op. cit.*, t. 33, f. 11, p. 95 (original), 1888.

Cirsonella Weldii, *Brazier*, P.L.S., IX., p. 698, 1895.

* *Cyclostrema* is a neuter noun.

Cyclostrema Susonis, *Tenison-Woods, op. cit.*, p. 147, 1877.

Cyclostrema (Tubiola) Susonis, *Tryon, op. cit.*, p. 95, t. 33, f. 10 (original), 1888.

The three shells separately described as distinct species, namely, *Cyclostrema Weldii*, *C. Susonis*, and *Cirsonella australis*, are, in my judgment, conspecific. Their specific distinctness was not publicly challenged till 1895, when Brazier expressed the opinion that *Weldii* and *australis* were identical. Tyron, from his study of examples of the two Tasmanian species, follows Woods in their generic location, though further assigned them to the group *Tubiola*. With regard to Angas's *Cirsonella australis*, which it is evident he had no personal knowledge of, he was not so fortunate in the selection of a classificatory position for it. We, thus, had at this date the one species under two generic denominations. Brazier, following on, had to make choice of either *Cyclostrema* or *Tinostoma*, and very unhappily prefers the latter, retaining *Cirsonella* in subordination. That the species under consideration is not a *Tinostoma* but is a *Cyclostrema*, does not admit of argument; the distinctive characters of the two genera are too pronounced to make confusion possible. By comparison of authentic specimens of *C. Weldii* and *C. Susonis* with the type of *Cirsonella australis* preserved in the British Museum, I am able to confirm Brazier's suggestion that *C. Weldii* and *C. australis* are conspecific; but I differ from him as to the priority of the former name.

Tenison-Woods' paper containing a diagnosis of *C. Weldii* was read August, 1876, but was not published till 1877; that of Angas containing his *Cirsonella australis*, was read January 16, 1877, and was published early in that year. It may not be possible to ascertain definitely which publication appeared first, but as Angas's description is accompanied by figures, and Tenison-Woods's is not, preference should be given to his name, though, at the same time, Tenison-Woods's diagnosis is exact, whilst that of Angas is very superficial.

Brazier considers, moreover, that Tenison-Woods redescribed his *C. Weldii* as *C. immaculata*, but if he had consulted the diagnosis of that species he would have satisfied himself that not a single character is applicable to *C. Weldii*; in point of fact, *C. immaculata* is an immature *Liotia*, probably the shell so misnamed is *Cyclostrema Susonis*. I may add in this connection that the identification of Tenison-Woods's species is open to mistrust. I have had the same species communicated to me by different Tasmanian conchologists under three specific names representing three genera. This discord is largely attributable to the circumstances that the type examples in the Hobart Museum are not indicated, and that labels in some instances are

misplaced. These are facts which I have assured myself of, as regards certain cotypes labelled by Tenison-Woods most obligingly given me by Mr. Legrand, as they did not agree with the reputed types, and which I further found were at variance with the diagnoses. The quotation of *C. immaculata* under *C. Weldii* is evidently another case in point. Mr. Brazier trusted his correspondent, and his correspondent may have relied upon on the naming in the Hobart Museum; each believing their sources of information reliable, they have unwittingly perpetrated a grave error. Touching the identity of *C. Susonis* and *C. Weldii*, I may point out that the essential differences between these two so-called species, as indicated in Tenison-Woods's diagnoses, admit of explanation; they may be tabulated as follows:—

Weldii—diameters, 2 x 2 mm.; whorls six, growth lines present, umbilicus marginate.

Susonis—diameter, 1.5 mm.; whorls four, no ornament, umbilicus emarginate.

The smaller size and fewer whorls of *Susonis* indicate a younger shell. The spiral lines on the base of *Weldii* may be two or three; sometimes the one adjacent to the umbilical chink is more pronounced, in other examples the spirals are wanting. The presence or apparent absence of growth-lines may vary with the condition of the test. To sum up in the words of my correspondent, Mr. W. May, of Tasmania, "the margined umbilicus is not constant, but varies from several distinct grooves to perfect smoothness;" and, again, "I can see no difference between *C. Weldii* and *C. Susonis*"—opinions which I endorse, based on independent study of the species.

Specimens of *C. australe* in my cabinet, coming from New South Wales, Tasmania, and South Australia have the opercula preserved. The operculum is concave on the outer face, thin, translucent, of seven to eight whorls around a central nucleus, obliquely and distantly striated.

Habitat.—New South Wales (type of *Cirsonella australis*!); Tasmania! (types of *C. Weldii* and *C. Susonis*); South Australia, Streaky and Fowler Bays (R. Tate), St. Vincent Gulf (Dr. Verco!), Noarlunga and Macdonnell Bay (Mr. Adcock!).

Cyclostrema micron. Ten.-Woods.

1877, *C. micra*, Proc. Roy. Soc., Tasm. for 1876, p. 147.

Cyclostrema (Tubiola) micra, Tryon, Man. Conch., X., p. 95, t. 33, f. 13 (original).

This is more turbinata than *C. australe*. In addition to its Tasmanian habitat, it occurs in South Australia.

Cyclostrema contabulatum, *spec. nov.* Pl. vii., fig. 6.

Shell small, globosely turbinate, narrowly umbilicated, thin, translucent, smooth and shining; whorls four, convex, narrowly flattened at the suture, marked with fine oblique growth striae. Body-whorl rounded at the periphery. Aperture slightly oblique, subcircular; peristome complete; columella-lip slightly arched and everted, somewhat concealing the small umbilicus.

Dimensions of figured example:—Major diam., 2.26; minor diam., 1.72; height, 2.28 mm.

Localities.—Streaky and Fowler Bays, abundant in shell-sand; also Salt Creek, St. Vincent Gulf.

This species is related to *C. micron*, but is narrowly umbilicated, and the whorls are shouldered.

GENUS LODDERIA, *Tate*, 1899.

Cyclostremella, *Tate*, 1898, non *Bush*, 1897.

Lodderia Lodderæ, *Petterd*, *sp.*

Liotia Lodderæ, *Petterd*, *Journ. Conch.*, p. 135, 1884; *id.*, *Hedley*, *Proc. Linn. Soc.*, N.S.W., vol. XXIII., 1899, p. 802; three woodcut figures.

Localities.—Tasmania (*Petterd*!); South Australia, Denial, Streaky, and Fowler Bays (R.T.), Port Victor and MacDonnell Bay (A. Adcock!); New South Wales, Sydney Harbour (C. Hedley!).

L. Lodderæ has the operculum and vitreous test of the *Cyclostrematidae*.

From the observations of Messrs. Hedley and Pilsbry, *op. cit.*, *Vitrinella liricineta*, *Garrett*, is congeneric; and a third species may be the following.

Lodderia minima, *Ten.-Woods*, *sp.*

Liotia minima, *T.-Woods*, *Proc. Roy. Soc.*, Victoria, 1877.

I have not seen this species, but from the description it would seem to be allied to *L. Lodderæ*. The habitat is not stated, but it is presumably either Tasmanian or Victorian.

GENUS PSEUDOLIOTIA, *Tate*, 1898.**Pseudoliotia micans**, *A. Adams*, *sp.*

Cyclostrema micans, *A. Adams*, *P.Z.S.*, 1850; *id.*, *A. Adams*, *Thes. Conch.*, t. 255, f. 7 and 27; *id.*, *Tryon*, *Man. Conch.*, 1888, X., p. 88, t. 31, f. 17, 18 (copied).

Liotia Angasi, *Crosse*, *Jour. de Conch.*, 1864, t. 13, f. 4; *id.*, *Tryon*, *op. cit.*, p. 110, t. 36, f. 4 (copied).

Liotia speciosa, Angas, P.Z.S., 1871, †t. 1, f. 26; *id.*, Tryon, Man. Conch., X., p. 110, t. 36, f. 5 (copied).

Cyclostrema micans (including *Liotia Angasi*), Tate, Trans. Roy. Soc., S. Austr., XXI., p. 43, 1897.

Cyclostrema micans, var. *gracilior*, Tate, *op. cit.*, XXII., p. 71, 1898.

I have already indicated that my study of the types of *C. micans* and *L. Angasi*, which are in the British Museum, leads me unhesitatingly to declare them conspecific; though they have been treated as distinctive, both generically as well as specifically, by Tryon. Authenticated specimens of *L. speciosa*, received from the Australian Museum, are certainly congeneric with *C. micans*, and, in my judgment, belong to the micromorphic state of that species; and in slight decrease of the ornament make an approach to the varietal form, which I have named *gracilior*. Tryon thought that *L. speciosa* would prove synonymous with *L. Angasi* (*op. cit.*, p. 110). The operculum of *Pseudoliotia micans* is horny, pellucid, nucleus central, four-whorled; the outer face is concave, obliquely and distantly ridged.

Distribution.—Japan (types of *C. micans*! and *C. pulchella*) and Singapore; S. Queensland (Brisbane Museum!); New South Wales (*L. Angasi*! and type of *L. speciosa*! by Angas); Victoria; Tasmania (*Tenison-Woods*); South Australia (type of *L. Angasi*!).

***Pseudoliotia micans*, var. *Gowllandi*.**

Liotia Gowllandi, Brazier, P.Z.S., 1874, t. 83, f. 1-2; *id.*, Tryon, Man. Conch. X., p. 110, t. 36, f. 7-8 (copied).

According to Tryon this species appears to him "to be synonymous [with *L. speciosa*], judging from description and figure." Certainly they are not helpful to a solution of the validity of the species, but thanks to Mr. Hedley I have received four specimens of Brazier's shell, which permit me to offer the following observations:—*L. Gowllandi* is a micromorph, and like other small states of *C. micans* (as var. *gracilior* and *speciosa*) has only two keels instead of three on the upper surface of the body-whorl; moreover, there is a tendency to fusion of the two peripheral keels and to obliteration of the basal rib, and in consequence of the latter feature the threads on the base radiate uninterruptedly from the periphery to the keel. The same form occurs at Western Port, but of the many examples of it under observation some show variability in this particular towards differentiation of the keels.

Localities.—Percy Island, N.E. coast of Australia (Brazier's type); Milne Bay, New Guinea (C. Hedley!); Port Western, Victoria (R. Tate!).

List of species attributed to Cyclostrematidæ recorded as Australian.

Names previously recorded.	Names adopted.
Angeli (Rissoa), <i>Ten. Woods.</i>	Cyclostrema Angeli.
Angeli (Rissoa), <i>Tryon.</i>	Cyclostrema crebresculptum.
Australis (Cirsonella), <i>Angas.</i>	Cyclostrema australe.
*Brunniensis, <i>Beddome.</i>	Skenea? Brunniensis.
Cingulifera, <i>A. Adams.</i>	Not Australian.
Harriettæ, <i>Petterd.</i>	Cyclostrema Harriettæ.
Immaculata, <i>Ten.-Woods.</i>	Liotia sp. (juv.).
Johnstoni, <i>Beddome.</i>	Cyclostrema Johnstoni.
Josephi, <i>Ten.-Woods.</i>	Collonia Josephi.
Lævis, <i>Kiener.</i>	Not Australian.
Lodderæ, <i>Petterd.</i>	Lodderia Lodderæ.
Micans, <i>A. Adams.</i>	Pseudoliotia micans.
Micra, <i>Ten.-Woods.</i>	Cyclostrema micron.
Micra, <i>Petterd.</i>	Cyclostrema charopa.
Minima (Liotia), <i>Ten.-Woods.</i>	Lodderia minima.
Spinosa, <i>Ten.-Woods.</i>	Astralium sp. (juv.).
Susonis, <i>Ten.-Woods.</i>	Cyclostrema australe.
Tatei, <i>Angas.</i>	Cyclostrema Tatei.
Weldii, <i>Ten.-Woods.</i>	Cyclostrema australe.

FAMILY LIOTIIDÆ.

GENUS LIOTIA, *Gray, 1842.*

Tryon in his Manual of Conchology adopts the section *Liotina*, and refers to it as its sole living representative our *L. australis*, but in doing so he has misapplied certain distinctive features attributed to *Liotina* which are not possessed by *L. australis*.

Liotina was established by Munier-Chalmas in 1877 (*vide* Fischer) for the reception of *L. Gervillei*, DeFrance, and two other Eocene species of the Paris-Basin. The salient characters claimed for it are:—"Shell not nacreous interiorly, umbilicus with a tuberculose funiculus." Aperture "not nacreous" does apply to the species of the Paris-Basin, rather as a consequence of fossilization than that they were originally so, in the same way that a much-bleached beach example of *L. australis* will have lost its nacre. However, the phrase is most certainly not applicable, as implied by Tryon, to fresh specimens of *L. australis*.

Again, I find that the several species of *Liotia* actually known to me have, at least in the adult stage, a spiral funiculus in th

* From Mr. May I have received an authentic example of Beddome's shell; it has not the aspect of a *Cyclostrema*, and its two and a-half whorls are suggestive of an embryonic or very juvenile stage; I am unable to locate it generically. Mr. May remarks, *in litteris*, on its resemblance to *Skenea planorbis*.

umbilical crater. However, it is not tuberculose as in the fossil *L. Gervillei*, but is dentated in *L. australis* and *L. Tasmanica*, and crenated in *L. clathrata*, *L. subquadrata*, and *L. Mayana*.

I fail, therefore, to appreciate the alleged differences which separate *Liotina* from *Liotia*; the differences presented by the umbilical funiculus are specific only, whilst the non-nacreous attribute is more apparent than real.

***Liotia australis*, Kiener, sp.**

Reference.—Iconog., t. 4, f. 7 (Delphinula); *id.*, Reeve, Icon-Conch. (Monograph of Delphinula), f. 20, 1843.

Kiener's type was collected by Peron (Baudin Expedition) at St. Pierre and St. Francis Isles in South Australia, and cotypes are referred to the Phillipines. The species is common in South Australian waters, I know it from Victoria, and it is recorded for Tasmania by Tenison-Woods.

L. australis has an operculum proper to the genus. The anterior thickening of the columella is decurrent on the umbilical rim, and the spiral funiculus is sharply dentated on the edge. The species exhibits great variability in size of the adult, the adult stage being indicated by the largely thickened aperture, thus a macromorph has a maximum diameter of 12 mm., an extreme micromorph 4.5, whilst these two are linked by intermediate sizes.

***Liotia annulata*, Ten.-Woods. Pl. vi., figs. 7a-7b.**

Reference.—Proc. Roy. Soc. Tasm., for 1877, p. 121, 1878; *id.*, Tryon, Man. Conch., X., p. 111, t. 36, f. 20 (original).

Synonym.—*Liotia compacta*, Petterd, Jour. Conch., 1884, p. 135.

I have examples from Tasmania and Corio Bay (J. Mulder), Victoria, which agree in the chief particulars with Tenison-Woods's description and Tryon's figure of *L. annulata*; but all are without completed apertures, are minute or small sized and few-whorled, and are presumably immature, or have not yet acquired the characteristic apertural conformation of an adult *Liotia*; however, the inner shell layer is nacreous, and the generic location is probably correct. It is neither the young of *L. australis*, as has been suggested, nor that of any of our Southern species. *L. australis* at 3 mm. diameter has a strong cancellate ornament; *L. Tasmanica* of the same size, which on account of its planorbiform shape most resembles *L. annulata*, has transverse frills developed on the periphery only and is without spiral lineation.

A feature omitted by Tenison-Woods and Tryon, which is exhibited by an example of 3 mills diameter, is the possession of three linear ridges on the periphery of the last whorl, which are

rendered distinct by the slight vaulting of the erect lamellæ at the intercrossing. Ten-Woods does not describe the periphery, and Tryon's figure shows the periphery uninterruptedly convex; and as his example has a diameter of 1.5 mm. only, it is clear that the peripheral lineation is acquired at a more advanced stage of growth; Petterd's type of *L. compacta*, which measures $1\frac{1}{4}$ mills, is similar.

The type of *L. compacta*, which I figure, as also all other examples seen by me and considered conspecific, is ornamented with transverse striæ between the ribs; on the other hand, Ten-Woods says of his *L. annulata*, the "interstices smooth." In all other respects the two shells are identical, and to reconcile the discrepancy in their diagnoses, it may be assumed that "smooth" as applied by Ten-Woods refers to the appearance as seen by the unaided eye. Petterd's character, "aperture expanded," conveys a false impression; Ten-Woods's observation is the correct one, "aperture bearing a varix round the mouth like one of the rings of the spire," and notes "the aperture has hardly that thickening which we observe generally in the genus,"

***Liotia Tasmanica*, Ten.-Woods.**

1865. *Liotia siderea*, Angas (list-name), P.Z.S., p. 178 (non Reeve).

1876. *Liotia Tasmanica*, Ten.-Woods, Proc. Roy. Soc., Tasm., for 1875, p. 153.

1895. *Liotia Tasmanica*, Hedley, P.L.S., N.S. Wales, vol. IX., p. 465, three woodcuts.

The South Australian shell which has been so long known as *L. siderea* is not Reeve's species, as I have satisfied myself by comparison with his type in the British Museum; they have much resemblance, but the Philippine shell has in particular a much more ample body-whorl. An immature shell of *L. Tasmanica*, all that I have seen, is identically that of the earlier whorls of the South Australian so-called *siderea*, whilst Hedley's figures of the Tasmanian shell remove all doubt as to the identity of the two. *L. siderea*, Reeve, is therefore expunged from the Australian fauna, as the only published occurrence of it is the faulty one by Angas. Tenison-Woods in his description compares his new species with *L. discoidea*, but in this regard an error of determination has been committed, as the Tasmanian shell of that name is not Reeve's species. The test and operculum of *L. Tasmanica* have the characteristics of the genus.

***Liotia calliglypta*, Melvill.**

Reference.—Journ. Conch., VI., t. 2, f. 10, p. 410, 1891.

The type was taken at Thursday Island, North Australia.

This may not be a *Liotia*, as "labro exteriori subreflexo" does not apply in the genus unless the shell is at that stage when the variced lip is commencing to be formed.

***Liotia clathrata*, Reeve, sp.**

Reference.—Icon. Conch. (Delphinula), f. 21.

The type is from the Philippines, and Reeve adds Australia. I have examples from New South Wales (ex. Aust. Mus.) and Queensland (ex. Brisbane Mus.); the operculum is *Liotian*.

***Liotia discoidea*, Reeve, sp.**

Reference.—*Op. cit.*, f. 15.

A Philippine shell, but has been recorded from North Australia.

***Liotia muricata*, Reeve, sp.**

Reference.—*Op. cit.*, f. 18.

Another Philippine shell extending to North Australia.

***Liotia Mayana*, spec. nov. Pl. vi., figs. 5a-5c.**

Syn.—*L. discoidea*, Ten.-Woods, Proc. Roy. Soc., Tasm., for 1877, p. 39, 1878, non Reeve.

I have had under examination Tasmanian examples attributed to *L. discoidea*, Reeve, but fail to recognise in them the distinctive characters of that species, as indicated by diagnosis and illustrations of it; especially is inapplicable "periphery with two prominent ribs," and the ornament of the base is different. The same species has been dredged by Dr. Verco in some abundance in South Australian waters.

In size and general appearance it resembles *L. subquadrata*, but the suture is not excavated, the aperture not so explanulately thickened, and its columella-margin is detached from the umbilical rim.

Its affinity is, however, greater with *L. clathrata* (actual examples compared) which has three liræ of equal size on the periphery instead of gradually diminishing in strength from above downwards, the costæ are more elevated, imbricating, and closer. In *L. Mayana* the last whorl is more rounded, keels less elevated, with four instead of three on the periphery; posterior whorls with three, not two, keels; keel at the suture nodular, not spinulose.

Habitat.—Tasmania, the species is rare; Victoria, South Australia (St. Vincent and Spencer Gulfs, and Fowler Bay, not uncommon in shell-sand).

***Liotia subquadrata*, Ten.-Woods.**

1877. *Cyclostrema immaculata*, Tenison-Woods. Proc. Roy. Soc., Tasm., for 1876, p. 148.

1877. *Liotia lamellosa* (pars.), Ten.-Woods, op. cit., p. 96.

1878. *Liotia subquadrata*, Ten.-Woods, P.L.S., N.S. Wales, ii., p. 236.

As already pointed out *Cyclostrema immaculata* was founded on a very immature condition (3 mm. diam.) of a *Liotia*, the adult form being presumably *L. subquadrata*; the absolute inadequacy of the diagnosis makes it desirable to suppress the name. In the same year the author described a Table Cape fossil as *L. lamellosa*, and in an appended note stated that a living example had been dredged off the Tasmanian coast. On comparison of the recent and fossil specimens I found differential characters to obtain such as are set forth in P.L.S. ii., p. 236, wherein Mr. Woods has applied the name of *L. subquadrata* to the living species.

Habitat.—Tasmania! and South Australia!; a rare shell, Middleton and Macdonnell Bay (A. Adcock!).

Liotia densilineata, spec. nov.

This species has the general aspect of an immature *L. australis*; the revolving liræ are almost obsolete, wholly so on the base; the transverse threadlets are depressed, very numerous, and crowded so as to obliterate entirely the cancellate ornament; the axial threadlets are fasciculated at both sutures giving rise to a corona on the anterior whorls and subspinose developments on the earlier ones; the umbilicus is large, its margin coronated by the fasciculation of the transverse threadlets. Aperture circular, outer margin slightly dilated but not varicose (the shell is probably not yet adult); columella margin is detached from the umbilical rim; the operculum is that proper to *Liotia*.

In *L. subquadrata*, the transverse ornament consists also of fine threadlets, but its revolving ridges are few and bold, imparting a quadrate outline to the last whorl.

Max. diam., 7; min. diam., 5; height, 4.5.

Habitat.—D'Entrecasteaux Channel, Tasmania (very rare). One example received from Mr. W. L. May, which is much corroded, and altogether its condition does not permit of a satisfactory pictorial representation.

LIST OF SPECIES-NAMES EXCLUDED OR SYNONYMIC.

Angasi, Crosse = *Pseudoliotia micans*.

Compacta, Petterd = *L. annulata*.

Discoidea, Ten.-Woods = *L. Mayana*.

Gowlandi, Brazier, is a *Pseudoliotia*.

Lodderæ, Petterd, is a *Lodderia*.

Minima, Ten.-Woods, is a *Lodderia*.

Peroni, Kiener (Delphinula), is not Australian.*

Siderea, Angas = *L. Tasmanica*.

Speciosa, Angas = *Pseudoliotia micans*.

SPECIES DUBIOUS.

Incerta, Ten.-Woods, Proc. Roy. Soc., Tasm., for 1876, 1877 p. 148.

Mr. Petterd, 1888, regarded this shell as an immature *Astraliium Tasmanicum*, but this cannot be correct, as, except "nacreous," none of the characters of *L. incerta* apply to a young shell of *Astraliium Tasmanicum* = *aureum*, of 5 mm. diameter. On the other hand, Mr. Legrand states that it is a decided species of *Liotia*, whilst the author of the species writes, *op. cit.*, "I only provisionally class it as a *Liotia*." I incline to the opinion that it is an immature *L. Tasmanica*. In any case, it will be well to suppress the name.

* This shell is recorded from the Indo-Pacific regions, whilst the type is attributed by Peron to the Isles St. Pierre and St. Francis, off the coast of Western South Australia. That locality is the only Australian record known to me; it should be rejected, not only on that account, but also because it and other well-known species of the tropics attributed to the same locality by Peron, such as *Tellina capsoides*, *Isocardia semisulcata*, &c., have not been rediscovered in our temperate waters.

CONTRIBUTIONS TO A REVISION OF THE RECENT
RISSOIDÆ OF AUSTRALIA.

By PROFESSOR RALPH TATE.

[Read September 5, 1899.]

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- I. *Introductory Remarks.*
- II. *Classified List of Rissoiæ.*
- III. *Classified List of Rissoinæ.*
- IV. *Descriptive Notes on South Australian Rissoinæ (including diagnoses of new species).*

I. INTRODUCTORY REMARKS.

By way of apology for the fragmentary character of this essay I would explain—Firstly, that the large amount of South Australian material which I have accumulated in the last twenty years should no longer remain unrecorded, more especially that I have now elaborated our recent species in conjunction with those of the Older Tertiary of Australia; secondly, in the endeavour to bring the Australian species into an alignment with the subordinate groups of each genus, and thus indicate a closer affinity *inter se*, I have found it necessary to make considerable emendations of nomenclature, and in view of the increasing competition (which I am extremely glad to note) among Australian conchologists, I think it desirable to record my investigations without delay. Though the chapter on Rissoiæ is, in the main, a rectification of nomenclature, yet the jackal-like conduct therein exhibited is a consequence rather than an incentive to play such a rôle.

The family Rissoidæ is represented in Australian waters by two genera only, *Rissoia* and *Rissoina*, viewed in their widest acceptation. Prior to the publication of the "Mollusca of the Novara Expedition," very few species of the family had been recorded for Australia. Since then the chief contributions are those by Tenison-Woods on the Tasmanian species, and by Watson on those collected by the Challenger Expedition.

As indicating the rapid gain of species in the family, I may refer by way of illustration to the growth of our knowledge of the South Australian contingent. The first provincial list of marine shells by Angas in 1865 contains only one species of the family (*Rissoina D'Orbigny*); in 1880 the same conchologist

added four other species of *Rissoina* (based on material supplied by me). The genus *Rissoia* in one species (*R. Hulliana*) was recorded for the first time in my List of Marine Mollusca, published by Adcock in 1893. At that date I had in my possession the species herein catalogued, though their denominations had not then been authentically assured, and so were not included. The South Australian Rissoids now number about 50; this very large increase is due to the dredging operations by Dr. Verco, whilst the denomination of a large number of the species results from a comparison of the Tasmanian species which have been placed at my service by Mr. W. L. May (who has taken great pains to identify his species with the types).

The following table, which shows the provincial distribution of the species, does not take into account the undescribed species (*Rissoia*, 14; *Rissoina*, 2) in the collection of Dr. Verco.

	Total <i>sp.</i>	S.A.	V.	T.	New S.W.	Q.	N.A.	W.A.
<i>Rissoia</i> ...	42	23	8	23	24	3	2	2
<i>Rissoina</i> ...	36	7	7	14	10	3	16	3
Total ...	78	30	15	37	34	6	18	5

The superiority of numbers in the columns for South Australia, Tasmania, and New South Wales is the outcome of conchological zeal actively and continuously pursued for the past twenty-five years or more; the inferiority of numbers in the other provincial columns signifies, on the other hand, paucity of results rather than as an expression of climatic influence on the development of species.

The Australian area, as a whole, compares very favourable in the number of its species (78) with the rest of the world.

The sign ! suffixed to a locality name indicates that specimens therefrom are in my cabinet or have been studied by me. The incompleteness of these "Contributions" arises from want of personal knowledge of certain species.

As a warning note, I may allude to the tendency in the family to great variability of size. Employing the modified aperture as an index to the adult condition, which we are safe in doing so, because in no case have I found indications of former apertural modifications. I appeal by way of illustration to my measures of a macromorph and a micromorph of my *Rissoina punctatissima*, both with completed apertures and of the same number of whorls. Despite this variability in size, not actually observed in all the species, I do not find correspondingly therewith variations of sculpture, at any rate not to that extent to make specific limitations difficult to define.

II. CLASSIFIED LIST OF RISSOLÆ.

I. SUBGENUS RISSOIA.

1. SECTION RISSOIA (*sensu stricto*).

- R. SALEBROSA, Dunker, 1866.
S.A. (Dr. Verco), N.S.W. (type), Sydney (ex. Aust. Mus!).

2. SECTION APICULARIA.

- R. TRAJECTA, Watson, 1886.
N.A. (type).
R. NOVARENSIS, Frauenfeld, 1867.
N.S.W., Sydney (ex. Aust. Mus!).

II. SUBGENUS SABANÆA.

1. SECTION SABANÆA (*s. s.*).

- R. FLAMMEA, Dunker, 1866.
N.S.W. (type).
R. INCIDATA, Dunker, 1866.
N.S.W. (type), Sydney (ex. Aust. Mus!); S.A. (Dr. Verco).
R. BICOLOR, Petterd, 1884.
Tasmania (type)!; Streaky Bay, S.A.!
? R. DUBITABILIS, Tate (*nom. mut.*).
 R. dubia, Petterd, 1884; non DeFrance, 1827; non Johnston, 1884.
Tasmania (type).

2. SECTION AMPHITHALAMUS, *Carpenter*, 1865.

Scrobs, Watson, 1886.

- R. SCROBICULATOR, Watson, 1886.
N.S.W. (type).
R. OLIVACEA, Dunker, 1867.
 Diala tumida, T. Woods, and *R. Diemenensis*, Petterd, 1884 (teste Brazier).
S.A. (Dr. Verco); Vict.; Tasm. !; N.S.W. (type), ex. Aust. Mus. !
R. FRAUENFELDI, Schwartz, 1866.
N.S.W. (type), ex. Aust. Mus. !; S.A. (Dr. Verco).
R. PELLYÆ, Nevill, 1881.
S. Australia (type)!.
R. PETTERDI, Brazier, 1894.
 R. pulchella, Petterd, Jour. Conch., 1884, non Risso.
Tasmania (type) !; South Australia (Dr. Verco) !; New South Wales.
R. CYCLOSTOMA, Ten-Woods, P.R. Soc., Tasm., 1877, p. 152.
 R. (Cingula) cyclostoma, Tryon, Man. Conch., IX., p. 344, t. 71, f. 8.

It has been suggested that this species is only a smooth form of *R. Frauenfeldi*, but I consider it a valid species, as in addition to the smooth test, the shape is more pupoidal.

Tasmania (type)!; Victoria and S. Australia (Tate); New South Wales (Henn).

R. TASMANICA, Ten.-Woods, 1877, as *Stylifer*. Tasmania (type)!; South Australia and Victoria (Tate).

R. ISCHNA, Tate (*nom. mut.*).

Rissoina cylindracea, Ten.-Woods, Proc. Linn. Soc., N.S.W., 1877.

The transference of this species to *Rissoina* necessitates the employment of a new name, because *cylindracea* has been in use in the genus by Krynicki 1837.

N.S.W.; off Port Jackson (type); authenticated examples in my collection, ex. Aust. Mus.

R. JACKSONI, Brazier, 1894.

R. badia, Watson, 1886, non Petterd, 1884.

N.S.W. (type), ex. Aust. Mus. !; S.A. (Dr. Verco).

R. VERCONIS, Tate (*nom. mut.*).

R. badia, Petterd., Jour. Conch., 1884, p. 138, non A. Adams, 1861.

Tasmania (type)!; N.S.W. (Henn.); S.A. (Dr. Verco).

R. MICROTHYRA, Martens.

S.A. (Dr. Verco); Mauritius (type).

3. SECTION ANABATHRON.

R. CONTABULATA, Dunker, 1866.

S.A. !; V.; T. (W. L. May)!; N.S.W. (type), ex. Aust. Mus.!

R. UNILIRATA, Ten.-Woods, P. R. Soc., Tasm., 1878, p. 123 (*Rissoina*).

Tasmania (type)!

III. SUBGENUS CINGULA.

1. SECTION CINGULA (s. s.).

R. MERCURIALIS, Watson, 1886.

N.A. (type).

R. AUSTRALIE, Dunker, 1866.

N.S.W. (type).

2. SECTION ONOBA.

R. AGNEWI, Ten.-Woods, 1877.

Tasmania (type)!

R. TENISONI, Tate (*nom. mut.*).

R. (Cingulina) australis, Ten.-Woods, P.R.Soc., Tasm., 1877, p. 146; *id.*, 1878, p. 151 (emended description), non G. B. Sowerby.

R. (Onoba) australis (Ten.-Woods), Suter, Proc. Mal. Soc., 1898, p. 4.

Suter's description of this species is a copy of Ten.-Woods' earlier diagnosis, and he has overlooked the subsequent emendations made by that author.

The date of transference of *Rissoa australis*, G. B. Sby., to *Rissoina* was subsequent to the publication of Ten.-Woods' name, hence there was a dual employment of *australis* in *Rissoina*; similarly Watson describes an *australis*, whilst there is also *R. australis*, Dunker, 1866, a too similar name to make it desirable to retain *australis* for Woods's species.

Tasmania (type)!; Victoria; S.A. (Dr. Verco); Stewart Island, N.Z. (Suter).

3. SECTION CERATIA.

R. MACCOYI, Ten.-Woods, 1877.

Tasmania (type)!; S.A. (Dr. Verco); N.S.W.

4. SECTION SETIA.

R. ATKINSONI, Ten.-Woods, 1877.

Tasmania (type)!; S.A.!

R. ATROPURPUREA, Dunker, 1866.

S. Aust. (Dr. Verco); N.S.W. (type), ex. Aust. Mus.!

R. NITENS, Dunker, 1866.

N.S.W. (type), ex. Aust. Mus. !; S.A. (Dr. Verco).

R. BEDDOMEI, Tate (*nom. mut.*).

R. flama, Beddome; 1882, non *flammea*, Dunker, nec Pease.

Tasmania (type); N.S.W. (Brazier); Sydney (ex. Aust. Mus.!). Beddome's name is an orthographical blunder.

R. TORCULARIS, Ten.-Woods, 1877.

Tasmania (type).

R. MIXTA, Tate (*nom. mut.*).

R. ochroleuca, Brazier, 1894, non Brusina, 1869.

N.S.W. (type). Received from Aust. Mus.

5. SECTION MICROSETIA.

? R. APPROXIMA, Petterd., 1884.

Tasmania (type).

? R. LAYARDI, Petterd., 1884.

Tasmania (type).

6. SECTION CINGULINA.

R. MELANOCHROMA, Tate (*nom. mut.*).

R. melanura, Ten.-Woods., Proc. Roy. Soc.

Tasmania, 1877, p. 153.

* *R. (Cingulina) melanura*, T. Woods, Tryon, Man. Conch., IX., p. 358, t. 7, f. 7.

I have changed Woods's name because it had been previously employed in the genus by C. B. Adams in 1850.

Tasmania (type)! Cape Northumberland and West Coast of S. Australia.

IV. SUBGENUS ALVANIA.

1. SECTION ALVANIA (*s. s.*).

R. DEVECTA, Tate (*nom. mutand.*).

Alvania gracilis, Angas, P.Z.S., 1877, p. 174, t. 26, f. 16;

id., Tryon, Man. Conch., IX., p. 364, t. 66, f. 47
(copied).

The prior employment of *gracilis* in the genus by MacGillivray makes it necessary to substitute another name for the one given by Angas.

Port Jackson, New South Wales (type), ex. Aust. Mus.!

S. Australia (Dr. Verco).

R. HULLIANA, Tate, 1893.

Dunkeria fasciata, Ten.-Woods, P.R.S., Tasm., 1876,
p. 146; *Alvania fasciata*, Ten.-Woods, *op. cit.*, 1877,
p. 152 (emended description).

Rissoa (Alvania) Hulliana, Tate (*nom. mut.*). Hand
List, S. Australia Moll., 1893, p. 7.

The prior employment of the species name *fasciata* for a *Rissoia* by Requier in 1848, Coq. Corse., p. 56, necessitated a new name, which is in compliment to Rev. T. Hull, who was, while resident in Tasmania, an enthusiastic conchologist.

Tasmania (type)! Victoria, S. Australia (abundant at Streaky and Fowler Bays), and W. Australia (R. Tate).

R. STRANGEI, Brazier, 1894.

R. lineata, Petterd., Jour. Conch., 1884, p. 137.

R. (Apicularia) Strangei, Brazier, P.L.S., N.S.W., IX.,
1894, t. 14, f. 11, p. 173; *id.*, p. 695, 1895.

Petterd's name is the older. *R. Strangei* was independently described in 1894, and subsequently Brazier showed the two to be identical, and because of the pre-occupation of *lineata* by Risso in 1826 his name must stand.

Tasmania! (type of *R. lineata*); New South Wales (type of *R. Strangei*); S. Australia (Dr. Verco).

R. BAYNTONI, Beddome, 1882.

Tasmania (type).

2. SECTION ALVINIA.

R. CHEILOSTOMA, Ten.-Woods, 1877.

R. plicata, Hutton, Cat. Marine Moll., N.Z., 1873, p. 29;

id., Suter, Proc. Mal. Soc., III., p. 6, 1898 (non
Deshayes, 1838).

R. cheilostoma, Ten.-Woods, Proc. Roy. Soc. Tasmania,
1877, p. 152; *id.*, Tryon, Man. Conch., IX., p. 366,
t. 68, f. 31 (original).

Alvania elegans, Angas, P.Z.S., 1877, t , f. (non A. Adams, 1851, non Brusina, 1869).

Suter has identified the New Zealand and Tasmanian shells, despite certain discrepancies in the two diagnoses. This step is substantiated by his re-description of Hutton's species based on New Zealand specimens, and gives priority to Hutton's name. The insufficiency of the original diagnosis has been rendered further unstable by the author's uncertainty as to the generic location of his species, thus at first regarded as a *Rissoia*, it was transferred to *Rissoina* in 1880 and to *Eglisia* in 1885. Under these circumstances I would press the rigid exercise of the rule of priority to preserve Tenison-Woods's name (Angas' name has been in prior use by at least two authors) and this is afforded by the fact that Deshayes in 1838 (*teste* Schwartz) described a *Rissoa plicata*.

Tenison-Woods and Angas placed their species in *Alvania*. I agree with Tryon and Suter in quoting the species under *Alvinia*, a section later erected by Montserrat in 1884.

Tasmania (type)!; Cape Northumberland, S. Australia (R. Tate); Victoria.

New South Wales (type of *R. elegans*), ex. Aust. Mus.!

New Zealand (type of *R. plicata*).

R. GARRETTI, Tate (*nom. mut.*).

R. venusta, Garrett, 1873, non Philippi, 1844.

South Queensland (ex. Brisbane Mus. !); type-locality Viti Is.

SYNONYMS AND EXCLUDED SPECIES.

Angeli, *Ten.-Woods*=*Cyclostrema Angeli*.

Australis, *Ten.-Woods*=*R. Tenisoni*.

Badia, *Petterd*=*R. Verconis*.

Badia, *Watson*=*R. Jacksoni*.

Brazieri, *Ten.-Woods*=*Assimineia*, sp.

Cylindracea, *Ten.-Woods* (*Rissoina*)=*R. ischna*.

Diemenensis, *Petterd*=*R. olivacea*.

Dubia, *Petterd*=*R. dubitabilis*.

Elegans, *Angas*=*R. cheilostoma*.

Fasciata, *Ten.-Woods*=*R. Hulliana*.

Flamia, *Beddome*=*R. Beddomei*.

Gracilis, *Angas*=*R. devecta*.

Lineata, *Petterd*=*R. Strangei*.

Mariæ, *Ten.-Woods*=*Diala varia*.

Melanura, *Ten.-Woods*=*R. melanochroma*.

Ochroleuca, *Brazier*=*R. mixta*.

Plicata, *Hutton*=*R. cheilostoma*.

Pulchella, *Petterd*=*R. Petterdi*.

Punctatostriata, *Ten.-Woods*=*Adelactæon concinna*=*casta* (*teste* Brazier).

Siennæ, *Ten.-Woods*=*Assimineia* Tasmanica.
 Tumida (Diala), *Ten.-Woods*=*R. olivacea*.
 Venusta, *Garrett*=*R. Garretti*.

III. CLASSIFIED LIST OF RISSOINÆ.

KEY TO THE SUBGROUPS OF RISSOINA.

Aperture with basal emargination.	
No funicular rib on base.	RISSOINA.
Axially costated.	<i>Rissoina</i> .
Posterior whorls costated, anterior whorls smooth, or spirally striate.	<i>Morchiella</i> .*
Sculpture reticulate.	<i>Phosinella</i> .
Sculpture of fine costæ and spiral striations.	<i>Zebinella</i> .
Spiral ribs nodulose, outer lip crenate.	<i>Pyramidelloides</i> .
Surface punctulate, aperture auriform, outer lip margined and expanded.	DIASTICTUS.
A funicular rib on base.	RISSOLINA.
Aperture without basal emargination.	SCHWARTZIELLA.

I. SUBGENUS RISSOINA.

1. SECTION RISSOINA.

- R. SCOLOPAX*, Sowerby.
 North Australia (Melvill and Standen, Journ. Linn. Soc., 1899, p. 171).
 Loyalty Island.
- R. THAUMASIA*, Melvill and Standen, 1898.
 North Australia, Melvill and Standen, *op. cit*; Madras.
- R. FASCIATA*, A. Adams, 1851.
R. Smithi, Angas, 1867 (*teste* Brazier).
 New South Wales (type); Sydney (ex. Aust. Mus.!).
- R. GERTRUDIS*, Ten.-Woods, 1876.
 Tasmania (type); Victoria.
- R. HANLEYI* (Schwartz).
 Philippines (type); New South Wales (ex. Aust. Mus.!) ;
 Victoria (R. Tate).
- R. NIVEA*, A. Adams.
 S. Australia (type) !; Victoria; Tasmania !; W. Australia !
- R. SPIRATA*, Sowerby, 1824.
 S. Australia !; Vict. !; Tasm. !; N.S.W. ; N. Aust.
- R. TRIANGULARIS*, Watson, 1886.
 N. Aust. (type).
- R. VARIEGATA*, Angas, 1867.
 N.S.W. (type), ex. Aust. Mus. !; Tasm. !

* See post, p. 240.

2. SECTION PHOSINELLA.

R. CLATHRATA, A. Adams.

N. Aust. (Chevert Exped.); Torres Straits (ex. Aust. Mus. !)

R. EXASPERATA, Sowerby, 1866.

R. quasillus, Melvill (*teste* Hedley).

Palm and Darnley Islands, N. Aust. (Chevert Exped.); New Caledonia (type); Funafuti (Hedley).

R. HEDLEYI, Tate, 1899.

South Australia (type).

R. HORRIDA, Garrett.

R. Curtisi, E. A. Smith, *R. australis*, Sow., are synonyms after Tryon.

Queensland.

The quotation of this species for S. Aust. is an error; the single example so named is a worn *Rissoia cheilostoma*.

R. NODOCINCTA, A. Adams, 1851.

North Australia.

R. SEMISCUPTA, Tate, 1899.

Tasmania. !

3. SECTION ZEBINELLA.

R. ELEGANTULA, Angas.

West Australia to New South Wales; also S. Africa.

R. RETICULATA, Sowerby, 1824.

North Australia (Chall. Exped.).

4. SECTION PYRAMIDELLOIDES.

R. MIRANDA, A. Adams.

N. Aust. (Challenger Exped.).

II. SUBGENUS DIASTICTUS.

R. PUNCTATISSIMA, Tate, 1899.

South Australia (type).

III. SUBGENUS RISSOLINA.

R. CRASSA, Angas, 1871.

W. Aust. !; S. Aust. !; Vict. ; N.S.W. (type), ex. Aust. Mus. !; Queensland (ex. Brisbane Mus. !).

R. FLEXUOSA, Gould, see post, p. 243.

W. Aust. ; S. Aust. !; Victoria !; Tasm. !; N.S.W. (type), Sydney (ex. Aust. Mus. !).

R. MERCURIALIS, Watson, 1886.

N. Aust. (type).

R. PLICATA, A. Adams, 1851.

R. scalarina, A. Adams; *R. turricula*, Pease (*teste* Hedley). N. Aust. (Chevert Exp.).

IV. SUBGENUS SCHWARTZIELLA.

R. CINCTA, Angas, 1867.
N.S.W. (type); Tasmania.

SPECIES UNCLASSIFIED AND UNFIGURED.

R. cardinalis, *efficata*, *inconspicua*, *inermis*, *pulchella*, and *teres*—all of Brazier, and all the types from North Australia.

R. Kershawi, *minutissima*, and *suprasculpta* of Tenison-Woods; *R. approxima*, Petterd, all of Tasmania.

R. cretacea, Tenison-Woods; type from New South Wales.

SYNONYMS AND EXCLUDED OR DOUBTFUL SPECIES.

Angasi, *Pease* = *flexuosa*.

Australis, *Sowerby* = *horrida* (teste Tryon).

Brazieri, *Ten.-Woods*. A *Rissoia* is implied by the subgeneric title of *Setia*, but the shell belongs to *Assimineae*.

Concatenata, *Ten.-Woods*. From the description this is a doubtful *Rissoina*. If it belongs there, it is juvenile. Mr.

May, who has studied the type, says it is unidentifiable.

Curtisi, *E. A. Smith* = *horrida* (teste Tryon).

Cylindracea, *Ten.-Woods*, is a *Rissoia*.

D'Orbigny, *Schwartz* = *spirata*.

Flindersi, *Ten.-Woods* = *Diala pagodula*.

Lirata, *Angas* = *nivea*.

Montrouzieri = *spirata*.

Quasillus, *Melville* = *exasperata* (teste Hedley).

Scalarina, *A. Adams* = *R. plicata*.

Smithii, *Angas* = *R. fasciata*.

St. Claræ, *Ten.-Woods* = *Diala monile*, var.

Tasmanica, *Ten.-Woods*, is a *Rissoia*.

Toxopleura, *Tate* = *R. nivea*.

Turricula, *Angas* = *R. flexuosa* (teste Tryon).

Turricula, *Pease* = *R. plicata*.

Unilirata, *Ten.-Woods*, is a *Rissoia*.

DESCRIPTIVE NOTES ON SOUTH AUSTRALIAN RISSOINÆ.

GENUS RISSOINA.

SECTION RISSOINA (*sensu stricto*).*Rissoina nivea*, *A. Adams*.

References.—*R. nivea*, *A. Adams*, P.Z.S., 1851, p. 265; *Schwartz*, *Rissoiden I.*, 1860, p. 47, f. 10; *Reeve*, *Icon. Conch.*, f. 91; *Tryon*, *Man. Conch.*, IX., 1887, p. 379, t. 55, f. 24 (copied from *Reeve*).

Synonyms.—*R. lirata*, *Angas*, P.Z.S., 1880, p. 417, t. 40, f. 11; *Tryon*, *Man. Conch.*, IX., p. 373, t. 54, f. 10 (copied from *Angas*).

R. toxopleura, Tate (nom. mut.), Trans. Roy. Soc. S. Aust. XVII., 1893, p. 200.

R. nivea is referred by Tryon to *Schwartziella*, whilst he places *R. lirata* under *Rissoina* (*sensu stricto*). I am afraid that either I do not appreciate the differences between these sections or that Tryon had no personal knowledge of the species, as I have no hesitation in attaching *R. lirata* to *R. nivea*. If there be any question as to its sectional position, it should be as to its reference to *Zebinella*.

The type of *R. nivea* was collected at Port Lincoln, and the species was listed for South Australia by Angas, P.Z.S., 1878, p. 867; whilst the specimens which served him for his description and figure of *R. lirata*, published two years later, were supplied by me. The descriptions of the two are essentially identical, whilst my cotypes of *R. lirata* agree thoroughly with Schwartz's figure of *R. nivea*.

In ignorance of the invalidity of Angas' name I changed it, as above indicated, because it had previously been employed by Gould in 1861.

Distribution.—This species is common in shell-sand in St. Vincent Gulf, the type is from Port Lincoln, and I have taken it at Denial Bay on the west coast of South Australia. It has been sent to me from King George Sound, West Australia. Tenison-Woods records it for Tasmania.

Rissoina spirata, Sowerby.

References.—*R. spirata*, Sowerby, Genera Shells, 1820-24, t. 208, fig. 2; Schwartz, Rissoiden, 1860, p. 101, f. 69; Reeve, Icon. Conch., f. 17 (*bad*); Tryon, Man. Conch. IX., p. 388, t. 58, f. 29 (copied from Reeve).

Many synonyms are included by Tryon under *R. spirata*; of these *R. d'Orbigny*, which, judging from Schwartz's figure of it, is inseparable. *R. d'Orbigny* has been listed as a South Australian shell by Angas, but in 1893 I referred it to *R. spirata*.

The specimens which I attribute to *R. spirata* have the exact outline and size corresponding with Schwartz's figure, but instead of the anterior whorls having the axial ornamentation replaced by spiral striae they present a gradual decadence in the strength of the costation, and though it is faint on the body-whorl, yet it is more conspicuous, even there, than the microscopic spiral striation.

Tryon refers *R. spirata* to *Morchiella*, but it offers, at any rate in our Southern Australian examples, no essential differences from *Rissoina* (*s.s.*); it is thus a connecting link between the two sections. A smooth and small kind also occurs. The *Morchiella*-state may possibly be exhibited in each of the sub-

ordinate groups, but at any rate it appears in at least two of them; thus, *R. spirata* is a Morchiella among *Rissoina* (*s.s.*), and *R. Antoni* among *Phosinella*, and though I have not observed the total extinction of the ornament of the younger part of the spire on the body-whorl in other groups, yet the tendency thereto is shown by some species in each. On these grounds, Morchiella should be rejected.

Distribution.—In South Australia I have taken it at many localities throughout its coast-line, from the Great Australian Bight to Cape Northumberland. I have examined examples from Victoria and Tasmania. It is reported from New South Wales and North Australia. Occurs in New Caledonia (as *R. Montrouzieri*), &c., to Indian Ocean and Gulf of Suez.

SECTION PHOSINELLA.

Rissoina Hedleyi, *spec. nov.* Pl. vii., fig. 8.

Solid, translucent-white, conically turritid. Whorls five (protoconch not known), moderately convex, suture impressed; ornamented by subacute axial ribs, much narrower than the concave interspaces, crenated by spiral sulcations and their intervening riblets, both axial and spiral ribs increase in number with the growth of the shell, the spiral riblets are absent on the first whorl, four on the next, six on the penultimate, and ten on the body-whorl. Aperture oblique, roundly elliptic; outer lip arched, thickly varicosed and crenated on the outer margin; inner lip arched, produced anteriorly; the basal funiculus nodulose-dentate, and truncated by the deep basal sinus.

Length, 4.25; width, 2 mills.

Fowler Bay, South Australia (R. Tate, 1879); and Port Western, Victoria (received from Dr. Pulleine).

From the reproduced figure and description given by Tryon, *Man. Conch.*, of *R. Samoensis*, Dunker, in Kuster, *Conch. Cab.*, t. 15c, f. 1, this new species must be closely related to it; the observable differences are that the Samoan shell has three spiral riblets on the antepenultimate, four on the penultimate, and seven on the body-whorl; whereas the South Australian shell has correspondingly four, six, and ten; and, moreover, the axial ribs are much wider apart. The species-name is in compliment to Australia's chief malacologist.

Rissoina semisculpta, *spec. nov.* Pl. vii., fig. 10.

Shell solid, translucent, conic-turritid; whorls five (apex deficient); gradated, separated by a depressed canaliculate suture; posterior whorls ornamented by axial, subacute plications, and three revolving riblets, which cut up the plications into somewhat nodulose crenatures.

The ornamentation begins to fade on the penultimate whorl, and the last whorl is smooth, except for a slight crenulation on the narrow shoulder, and faint spiral and axial lineation on the rest of the whorl.

Aperture oblique, semilunate, narrowed above, and effuse below; columella-lip very oblique, sinuate, distinctly produced, and thickened anteriorly; outer lip arched, anteriorly dilated, thickened, but not varicose.

Length, 6; width, 2.5 mm.

Locality.—Tasmania (received from Mr. W. L. May).

The only living species to which *R. semisculpta* approximates sufficiently to necessitate detailed comparison is *R. Antoni*, Schwartz, from which it differs by gradated whorls, axial costation more defined, and the nodulose cancellation hardly, or not at all, developed.

SECTION ZEBINELLA.

Rissoina elegantula, Angas.

References.—*R. elegantula*, Angas, P.Z.S., 1880, p. 417, t. 40, f. 10; Reeve, Conch. Icon.

Tryon, Man. Conch. IX., t. 58, f. 13 (copied), p. 386.

Tryon "thinks that *R. elegantula* will prove a younger state of this species [*striata*, Quoy & Gaimard]; it has eight whorls and is six mills, long." Angas received his types from me, they were adults; the species exhibits, however, variation in size, a macromorph before me measures 8 mills, and has eight whorls, and the axial lines are not obsolete on the body whorl; so that there is good reason, in the absence of actual comparison, for the opinion that *R. elegantula* is different from *R. striata*.

Distribution.—In South Australia it is found in St. Vincent and Spencer Gulfs, and extends westward to King George Sound. I have named it from Victorian and Tasmanian examples, and Mr. Henn has recorded it from New South Wales.

SUBGENUS DIASTICTUS.

Rissoina punctatissima, spec. nov. Pl. vii., fig. 9.

Shell conically pyramidal, somewhat thin and translucent (somewhat clouded at the suture and white at the aperture). Whorls five (apex unknown), slightly convex, spirally sulcated; sulci closely punctated in a single series. The sulci increase in numbers with the growth of the shell; on the posterior whorls the two, three, or four antesutural ones are wider and deeper than the rest; about twelve sulcations on the penultimate whorl; on the body whorl they are numerous, equally slender, and occupy the whole surface. Aperture auriform and somewhat explanate;

the outer lip is very much thickened and prominently margined ; the aperture is but slightly angulated at the junction of the basal lip and the columella.

Dimensions.—Length, 6 ; width, 3 mills ; micromorphs range to half-size.

Localities.—Common in shell-sand at Streaky and Fowler Bays, collected there by me in 1879 ; I have also taken it at Aldinga Bay in St. Vincent Gulf.

This species is not a typical *Zebinella*, its ornamentation being limited to punctuate sulci, whilst its expanded and variced aperture still further removes it. Nevertheless, there are some points of agreement therewith, and the distinctive characters are not so trenchant as to justify generic separation. In the absence of material for comparison, I venture to place it in proximity to *Rissoina expansa*, Deshayes, of the Parisian Eocene, which M. Cossmann, 1888, has made the type of a new genus, *Diastictus*, the original diagnosis of which is as follows :—“*Conica, subulata, anfractis regulariter punctulatis ; apertura auriformi et expansilabri ; labro marginato et reflexo, columella arcuata, callosa.*” Omitting *subulata* (which is rather specific than of generic value) every word of the definition seems to be applicable to the recent species ; if my interpretation be correct, then *R. punctatissima* is another instance of an Eocene group surviving in Australian waters.

SUBGENUS RISSOLINA.

Rissoina crassa, Angas.

References.—*R. crassa*, Angas, P.Z.S., 1871, p. 17, t. 1, f. 16. Reeve, Conch. Icon., f. 70 ; Tryon, Man. Conch. IX., t. 55, f. 20 (copied).

Tryon refers this species to *R. Rissoi*, Audouin, inhabiting the Red Sea, but his figures of the two incline one to a different view.

Distribution.—The type is from Port Jackson, and South Australian examples from my collection were named by the author of the species. I have specimens of it from King George Sound ; it has been recorded from Victoria, and I have received it from Queensland under the name of *R. ambigua*. The South Australian occurrences are Holdfast Bay, Aldinga Bay and Salt Creek in St. Vincent Gulf, Wauraultie in Spencer Gulf, Streaky Bay, and at the Head of the Great Australian Bight.

Rissoina flexuosa, Gould.

References.—*R. flexuosa*, Gould, Otia, p. 144, Reeve, Conch. Icon., f. 97 ; Tryon, Man. Conch. IX., p. 380, t. 68, f. 1-2.

Synonyms.—*R. turricula*, Angas, P.Z.S., 1867, p. 114, t. 13, f.

20; Reeve, Conch. Icon., f. 69. *R. Angasi*, Pease, Amer. Journ. Conch. VII., 1872, p. 20.

This species has the apertural characters proper to *Rissolina*, and is, therefore, removed thereto from *Schwartziella*.

The types of *R. flexuosa* and *R. turricula* are both from New South Wales. Tryon states the origin of the synonyms, p. 381, *op. cit.*, as follows:—"Gould's description was made from an immature specimen; Angas subsequently described it as *R. turricula*, which being pre-occupied by Pease, the latter changed it to *R. Angasi*." Reeve treats them as distinct species.

The identification of South Australian examples with *R. turricula* was in the first instance due to Angas, from material forwarded by me.

Distribution.—New South Wales (types). In South Australia it has the same range as *R. crassa*. I have identified examples from West Australia, Victoria, and Tasmania (previously recorded by Tenison-Woods).

DEFINITIONS OF NEW SPECIES OF LAND SHELLS FROM SOUTH AUSTRALIA.

By PROFESSOR RALPH TATE.

[Read September 5, 1899].

Glyptorhagada euglypta, *spec. nov.* Pl. vi., figs. 3a-3c.

Shell sublenticular; spire broadly and flatly conical, slightly raised above the plane of the body-whorl; apex obtuse.

Whorls five, of somewhat rapid increase, nearly flat, separated by a linear impressed suture. Last whorl abruptly and briefly descending at the front, moderately inflated, sharply keeled; flatly convex from the peripheral keel to the suture but interrupted by a narrow flat or slightly depressed area contiguous with the keel; the antepipheral area sharply curved and merging into the tumid base. Aperture sub-quadrately oval, the major axis transverse; margins feebly thickened and reflected; columella arched, expanded, and reflected over about one-half of the umbilical crater; margins of the aperture united by an adnate callus. Umbilicus moderately wide, but deep, with somewhat precipitous sides, about one-sixth the diameter of the base.

The ground colour is unknown, as all the specimens are bleached, though a few of them still retain traces of rufous colour bands, one at the suture and one occupying the post-peripheral depression.

Sculpture.—The two apical whorls without sculpture or faintly closely transversely striated, the tip is small and immersed, the first whorl relatively large and somewhat inflated, graduating into the narrower and moderately convex second whorl. The ordinary spire-whorls are ornamented by refracted sharply elevated subacute corrugations, which are flatly crenated on their summits; on the last whorl, in particular, intermediate corrugations are crowded at the suture, the intercostal spaces have coincident lineations; the corrugations serrate the keel, about ten in a length of one millimetre measured in the anterior part of the whorl, thence they extend sigmoidally to the umbilicus.

Dimensions.—Major and minor diameters, 25 and 21; height, 13; horizontal and vertical diameters of aperture, 12; diameter of umbilicus, 4.

Locality.—Collected by Mr. H. Y. L. Brown, Government Geologist, at Anabama, situate about one hundred miles north-east from Burra Burra.

The specific name *euglypta* (well-carved), is in allusion to the bold sculpture of the shell.

Affinities.—This species, in respect of sculpture and shape, comes nearest to *Helix* (*Rhagada*) *Bordaensis*, Angas, 1880. It differs from it by larger size, relatively deeper (so that the aperture is different in outline), the spire slightly elevated, the corrugations stronger, more distant and crenulated, and by smaller umbilicus. The type of *G. Bordaensis* seems not to be adult; and all examples known to me of the size of the type have four whorls, not five as stated by Angas; and as indicative that the adult stage has not yet been reached, the body-whorl does not show descension at the front, or the margin of the aperture any reflection, or little or none of the columella.

Angasella polypleura, *spec. nov.* Pl. vi., figs. 2a-2c.

I have always been dubious as to the correctness of my reference to *Helix cyrtopleura*, Pf., of a helicoid snail collected by me in 1878, on the Bunda Plateau of the Great Australian Bight. Authentic specimens of Pfeiffer's species are not extant in any cabinet in Australia, and I cannot learn that the shell has been retaken at the original locality, "Plains near Lake Torrens." The geographical isolation of the two shells, 400 miles apart, with no species of *Angasella* in the intervening area, was suggestive of specific distinctness. Pfeiffer's description and figure are not detailed enough for safe determination of an allied species; but during my visit to England in 1896, I made actual comparisons of the Bunda shell with the type and cotypes of *H. cyrtopleura* in the Natural History Museum, London, with the result that in my opinion they are not conspecific. The new species has a more inflated body-whorl and more numerous riblets. [This is from memory, as my notes on the detailed differences have been lost.]

The following are the chief characters of *A. polypleura*:—Colour in life light-brown becoming sordid-white on the body-whorl. The body-whorl much descends in front, and is ornamented with about sixty sigmoid thread-like ribs the intercostal spaces are coarsely granular, the granules having a tendency to coalesce to form rugae. The peristome is largely and acutely reflected, and its margins joined by a thick adnate callus; the columella is arched and broadly and thickly reflected over part of the umbilical crater. The elevation of the spire varies from almost flat to as much as 4.5 mm. above the plane of the last whorl towards the front. The embryonic part, which consists of two turns, is relatively large and smooth (as seen under a pocket lense).

An average of the measurements of three fairly typical speci-

mens of *A. polypleura* compared with the dimensions of the type of *A. cyrtopleura* is as follows (in decimals of an inch):—

			polypleura.		cyrtopleura.
Greatest diameter	...	...	.71	...	.70
Least diameter	...	...	.61	...	.57
Height of shell	...	...	.42	...	.25
Height of aperture	...	...	.35		

Locality.—Bunda Plateau, Great Australian Bight; in great abundance as dead shells strewn on the surface, but found living buried in the loess-soil at the bases of shrubs.

Flammulina Pulleinei, *spec. nov.* Pl. vi., figs. 1a-1c.

Shell umbilicated, depressedly conical, spire slightly elevated; colour reddish-brown. Whorls four, convex at anterior suture, thence flatly convex to posterior suture, of moderate increase; last whorl rounded at the periphery, base convex and somewhat inflated.

The ornament consists of very oblique subdistant lamella-like corrugations, with intervening close-set coincident lineations (about five or six), and transverse microscopic striæ in the interstitial spaces; the corrugations pass across the periphery in sigmoid curves to the umbilicus.

Aperture slightly oblique, roundly-oval; peristome incomplete, margins distant and acute; the columella-margin is dilated and reflected. Umbilicus of moderate size.

Major diameter, 4.25; minor diameter, 3.75; height, 2.5; diameter of umbilicus, .75.

Two examples taken alive at Carrieton, S.A., by Dr. Robert Pulleine.

This snail has a caudal appendage, and its jaw consists of loosely conjoined plates, and thus far agrees with *Flammulina*. I do not know of any described species with which it is necessary to make comparison; some forms of *F. Fordei* present some resemblance in ornament, but in other respects that species is very different.

Helicina crassidens, *spec. nov.* Pl. vi., fig. 6.

Shell trochiform, somewhat thin, subtranslucent, and subvitreous. Spire regularly conoid, with a submammillary apex. Whorls four and a-half, slightly convex, but perceptibly depressed at the posterior suture; last whorl subangulated at the periphery. The ornament consists of elevated, acute, spiral ridges; five on the body-whorl above the periphery, and about four, more slender and closer ones, on the circumferential portion of the base.

Aperture slightly oblique, semilunar; peristome shortly expanded and subreflected; columella short, simple, gradually

curving to the basal lip; basal lip with a large tooth-like incrasation near to its junction with the columella.

Umbilical callus small, granulated. Operculum unknown.

Major diameter, 4; minor diameter, 3.5; height, 2.5.

One example found by Dr. Robert Pulleine in the rejectamenta of the River Wakefield, at Balaklava, S.A.

This species by its lirate ornament should fall in the group *Perenna*, Guppy, 1867, and on the other hand it has affinity with the *Luciella*-like species by reason of its dentate peristome, a combination of characters which makes it unnecessary to institute comparisons. As the genus in Australia belongs mainly to the North-East, though reaching South into the coastal tracts of the Northern parts of New South Wales, the question naturally arises, Is the present species indigenous? or is it an accidental importation? But whatever may be its origin, I believe it to be undescribed. It may be urged in explanation of its anomalous geographic position, that a more marked paradox is furnished by *Stenopus rusticus*, which is restricted to the North-East extremity of Queensland and to the coast-cliffs on the east side of St. Vincent Gulf in South Australia.

EXPLANATION OF PLATES.

PLATE VI.

Fig.

- 1a-1c. *Flammulina Pulleinei*, n. sp., p. 247.
- 2a-2c. *Angasella polypleura*, n. sp. p. 246.
- 3a-3c. *Glyptorhagada euglypta*, n. sp., p. 245.
- 4a-4c. *Cyclostrema Mayii*, n. sp., p. 218.
- 5a-5c. *Liotia Mayana*, n. sp., p. 227.
- 6. *Helicina crassidens*, n. sp., p. 247.
- 7a-7b. *Liotia compacta*, Petterd, p. 225.

PLATE VII.

- 1a-1b. *Cyclostrema caperatum*, n. sp., p. 216.
- 2a-2c. *Cyclostrema charopa*, n. sp., p. 217.
- 3a-3b. *Cyclostrema inscriptum*, n. sp., p. 216.
- 4. *Cyclostrema delectabile*, n. sp., p. 216.
- 5. *Cyclostrema crebresculptum*, n. sp., p. 219.
- 6. *Cyclostrema contabulatum*, n. sp., p. 222.
- 7a-7b. *Cyclostrema Johnstoni*, Beddome, p. 215.
- 8. *Rissoina Hedleyi*, n. sp., p. 241.
- 9. *Rissoina punctatissim.*, n. sp., p. 242.
- 10. *Rissoina semisculpta*, n. sp., p. 241.

A REVISION OF THE OLDER TERTIARY MOLLUSCA OF AUSTRALIA

PART I.

BY PROFESSOR RALPH TATE.

[Read September 5, 1899.]

In 1880, I commenced the publication of a series of essays on the Mollusca of the Older Tertiaries of Australia, still far from completion; since that time many additional species have been obtained, a large number of which await diagnostic descriptions, other authors have occupied themselves with the fauna, and my opinions regarding some of the species have been changed as the result of fuller acquaintance with them and their related species. Taken altogether, it seems desirable to submit an up-to-date knowledge of the Molluscan constituents of our Older Tertiary faunas, so far, at least, as concerns those groups which have been systematically dealt with by me in the pages of these Transactions.

The "Revision" will consist of a list of admitted species under their revised generic and specific names, will include full references to additional species and diagnoses of new ones. The locality records will be given in full, these are based on specimens in the University Museum, Adelaide, for the great part, and on those that I have studied in other collections; other records than these are indicated by the suffixed names of the authors responsible for their determinations. Synonyms are the result of a comparison of types or of well-authenticated examples, unless otherwise stated. The localities of the types are printed in distinctive type.

The geological horizons admitted for the present are Eocene, Post-Eocene, and Miocene, as set forth more in detail in *Trans. Roy. Soc., S.A., Vol. XXIII., p. 197, 1899.*

The retrospective references under each species will not extend beyond the respective essays of mine on which this Revision is based, as prior references, unless involving misrepresentations, are therein contained. The chief bibliography of later date will be given under each class to which the publications indicated respectively refer.

CLASS PALLIOBRANCHIATA.

The geological distribution of Palliobranches in Cainozoic horizons in Australia is very restricted, as with the exception of *Magasella Cumingiana*, a recent species in Post-tertiary deposits at the Tintinara bore, Tatiara Desert, at a depth of 154-160 feet, and of a species of *Terebratella*, *T. pumila*, in the Miocene at Gippsland Lakes, the whole fauna is of Eocene age, or, perhaps, extending to Oligocene. *Rhynchonella Baileyana* was wrongly attributed to the Australian Miocene. A few Eocene species had been listed as belonging to the Miocene fauna at Grange Burn and Muddy Creek near Hamilton; but as all examples collected, since full knowledge was gained that two distinct faunal horizons were in contact at those localities, exhibit the characteristic features of a derivative source, the species in the Hamilton Miocene are not considered to be of endemic origin.

BIBLIOGRAPHICAL REFERENCE.

1. Tate, "On the Australian Tertiary Palliobranches," *Tran. Roy. Soc., S. Aust.*, vol. III., 1880, pp. 140-170, plates 7-11.

A contribution of apparent importance is plate 33 in R. M. Johnston's "Geology of Tasmania," 1888. This plate is devoted to the illustration of fifteen species of Tertiary Brachiopoda, some of them are reputed by the author to occur at Table Cape; however, as the figures are bad copies of those in my monograph, the local records based thereon are of no value. On pages 232 and 233 of the same work is a list of our Palæogene Brachiopods showing provincial occurrences in parallel columns. The Tasmanian list I can only revise from the collection made by me on two separate visits to Table Cape; and I am constrained to reject some of the names, as I have good reason to believe they were introduced through faulty identifications. In this connection I urge that a mere superficial examination is not always reliable, and that in several instances actual dissection is necessary to resolve the similitudes, such as are presented by *Terebratula vitreoides* and *Terebratella Tepperi*; *Magallania insolita* and *Terebratella furculifera* (adult); *Terebratula Aldingæ* and *Terebratella furculifera* (junior); *Terebratella Woodsii* and *Magasella lunata*.

FAMILY TEREBRATULIDÆ.

GENUS TEREBRATULA, *Bruguière*.

- T. vitreoides**, *T. Woods*, 1878, non Tate, 1, p. 144. Pl. viii., fig. 5.
 POST-EOCENE.—TABLE CAPE, Tasmania.
- T. Tateana**, *T. Woods*, 1878; *T. vitreoides*, Tate, 1, p. 144; non *Waldheimia Tateana*, Tate, 1, p. 150. Pl. viii., fig. 2.

My interpretation of the two species of *Terebratula* in the Table Cape-beds, named as above, by Tenison-Woods, proves to be wrong, as the result of an examination of numerous examples, collected by myself, and of a careful study of Woods' indifferent figures.

The commoner shell is elongate-oval with a more or less biplicate front; the beak somewhat laterally compressed and somewhat protruding; the foramen, which is obliquely truncated, is narrow oval. Young shells of this species, which T.-Woods named *T. Tateana*, have all the features of the adult. I have traced them up to larger than the examples figured by me, 1, t. 8, f. 5 *a*—*b*, t. 10, f. 7, as *T. vitreoides*. In wrongly attaching that name I was influenced by the fact that the specific character was in the name, as *Tateana* much more resembles *vitrea* than *vitreoides* does.

The less common species, *T. vitreoides*, T.-Woods, is orbicular in outline varying to subpentagonal oval, the beak is almost flush with the umbo of the brachial valve, the foramen is very large and circular; young shells of eight millimetres diameter are the counterparts of the adults, which have the following measurements:—Transverse diameter, 24; longitudinal diameter, 26; sectional diameter, 12; diameter of foramen, 3 x 4 mm.

T. vitreoides resembles *Terebratella Tepperi*, and it is highly probable that Johnston and Pritchard have erroneously so named it.

Young and old shells of *T. Tateana* and *T. vitreoides* have proved on dissection to belong to *Terebratula*.

T. vitreoides differs from *Tateana* by its orbicular outline, absence of a mesial biplication, and the much abbreviated beak and larger foramen.

Localities.—EOCENE—Aldinga Bay, Adelaide-bore, and River Murray Cliffs (South Australia); Muddy Creek, Gelibrand River, Mornington, Moorabool Valley, Corio Bay, Mitchell River, Shelford (Victoria).

POST-EOCENE.—Spring Creek (Victoria), and TABLE CAPE (Tasmania).

T. Aldingæ, *Tate*, 1, p. 144.

EOCENE.—ALDINGA BAY, in the glauconitic limestone, S. Aust.; Cape Otway, Victoria (a doubtful identification); also New Zealand.

T. subcarnea, *Tate*, 1, p. 144.

EOCENE.—Chalk-cliffs, GREAT AUSTRALIAN BIGHT.

A very large *Terebratulid* occurs in the indurated clays of the Aldingian Section; the specimens are invariably much crushed, but the best and only specimen in the collection indicates a much compressed lenticular shell, with an almost circular marginal out

line of about 70 mills. diameter, and a thickness of 20 mm. (but it will be probably a little more in a perfect specimen). The surface is smooth, the growth-folds few and somewhat lamellar, and imbricating at the sides; the test is thick, as much as 2 mm. in the umbonal region, and densely punctate. On account of the thickness of test, probably, there is no external indication of a mesial septum. It may be a very large form of *T. subcarnea*, but if it be a *Magellania*, then it is new, and I suggest for it the name *M. cyclica*. It cannot be an extremely large *M. insolita*, which is the only Australian species that makes an approach to it, but that shell is elongate-oval, the beaks attenuated and sub-erect, exposing a broad and high deltidial area, and a small foramen, in contrast with the circular outline, stout incurved beak, and a moderately-sized foramen.

GENUS MAGELLANIA, *Bayle*, 1880 (*nomen mutandum*).

Waldheimia, King, 1849, non Brullé, 1846.

M. corioensis, *McCoy*, 1877; *id.*, *Tate*, 1, p. 156.

EOCENE.—Mannum (S. Aust.); CORIO BAY, Muddy Creek, Mornington (Vict.). POST-EOCENE.—Spring Creek near Geelong (Vict.).

M. (?) Crouchii, *T. Woods*, 1865; *id.*, *Tate*, 1, p. 153.

EOCENE.—MOUNT GAMBIER (S. Aust.).

M. (?) divaricata, *Tate*, 1, p. 149.

EOCENE.—River Murray Cliffs at MANNUM (S. Aust.); Moorabool and Spring Creek (*Hall and Pritchard*).

M (?) fimbriata, *Tate*, 1880, 1, p. 150.

EOCENE.—ALDINGA BAY (S. Aust.); Cape Otway (Vict.).

M. furcata, *Tate*, 1, p. 148.

EOCENE.—Moorabool Valley (*Hall and Pritchard*), Cape Otway (Vict.); ALDINGA BAY and Port Vincent (S. Aust.).

M. Garibaldiana, *Davidson*, 1862; *id.*, *Tate*, 1, p. 146.

EOCENE.—River Bremer near Callington, River Murray Cliffs, Croydon-bore 1,000 ft. (S. Aust.); Muddy Creek, Gelibrand River, Mornington, Moorabool Valley, Corio Bay, Airey's Inlet and Shelford (Victoria).

POST-EOCENE.—Table Cape (Tasmania).

M. grandis, *T. Woods*, 1865; *id.*, *Tate* 1, p. 152.

EOCENE.—River Murray Cliffs and MOUNT GAMBIER (S. Aust.); Shelford and Maude (Vict.).

POST-EOCENE.—Table Cape (Tasmania).

M. gravida, *Suess*, *Voy. Novara*, *Palæont.*, p. 56, t. 9, fig. 5 (*Waldheimia*).

Waldheimia concentrica, *Hutton*, *Cat. Tert. Moll.*, N.Z., p. 35, 1873.

Terebratula (?) bulbosa, Tate, 1, p. 145.

Professor Hutton writes me, "I think that *T. Tayloriana*, Colenso, Tasmanian Jour. of Science, 1844, is the same." However, that name cannot be employed as it was preoccupied in *Terebratula* by Lea, 1841.

EOCENE (?).—Edithburg, St. Vincent Gulf (S.A.).

EOCENE (Oamaru Formation).—New Zealand.

M. insolita, Tate, 1, p. 151, t. 9, f. 6b. (non. 6a).

Waldheimia tapirina, Hutton, Cat. Tert. Moll., N.Z., p. 36, 1873.

Hutton's name is virtually a *nomen nudum*, as the diagnosis is absolutely devoid of specific characters, and is unaccompanied by a figure.

EOCENE.—Mount Gambier, ALDINGA BAY, and Adelaide-bore (S.A.); Muddy Creek, Camperdown, Gelibrand River, Cape Otway, Morington, Corio Bay, Bairnsdale (Vict.); also New Zealand.

POST-EOCENE.—Spring Creek (Victoria).

M. Johnstoniana, Tate, 1, p. 151.

EOCENE.—ALDINGA BAY (South Australia).

M. MacLeani, Tate, 1, p. 153.

EOCENE.—River Murray Cliffs at MURBKO (S. Aust.); Moorabool Valley (Vict.), *teste* Hall and Pritchard.

M. pectoralis, Tate, 1, p. 157.

EOCENE.—ALDINGA BAY and Happy Valley (S. Aust.).

M. sufflata, Tate, 1, p. 157.

? *Waldheimia triangulare*, Hutton, *op. cit.*, p. 36, 1873.

EOCENE.—Aldinga Bay, coast cliffs from PORT VINCENT to Stansbury (S. Aust.); possibly also New Zealand.

M. Tateana, Tate, 1, p. 150.

This species simulates *Terebratula Tateana*, T.-Woods, to which I had wrongly referred it, but the figures and diagnosis furnished by me belong to the present species and not to that of Woods. The generic distinctions for each cannot be called in question.

EOCENE.—ALDINGA BAY; Port Vincent, Stansbury and Muloo-wurtie, Yorke-Pen. (South Australia). Gelibrand River (Victoria).

M. Taylori, *Etheridge*, 1876; *id.* Tate, 1, p. 155.

EOCENE.—River Murray Cliffs near MORGAN (South Australia).

M. Vincentiana, Tate, 1, p. 154.

Waldheimia gravida, Hutton, Cat. Tert. Moll., N.Z., p. 36, 1873 (non Suess).

EOCENE.—PORT VINCENT on Yorke Peninsula (South Australia), also New Zealand (Oamaru Formation).

GENUS TEREBRATULINA, *D'Orbigny*, 1847.

T. catinuliformis, *Tate*, 1896, T. Roy. Soc., S. Aust., p. 130, *nom. mut.*

T. Davidsoni, Etheridge, 1876; *id.* *Tate*, 1, 158, non *Boll*, 1856; non *King*, 1871.

EOCENE.—RIVER MURRAY CLIFFS, Aldinga Bay, Port Vincent and Stansbury, Mount Gambier, Croydon-bore near Adelaide (968—1,230 ft.), Mulgurdawa-bore near Wellington (213 ft.), (South Australia); Muddy Creek, Moorabool Valley, Birregurra, Shelford (Victoria).

POST-EOCENE.—Beaumaris (Cheltenham) and Spring Creek (Victoria); Table Cape (Tasmania).

T. lenticularis, *Tate*, 1, p. 159.

EOCENE.—River Murray Cliffs, ALDINGA BAY, Adelaide-bore, and Muloowurtie near Ardrossan (S. Aust.); Muddy Creek and Corio Bay (Victoria). Waurm Ponds (*Hall* and *Pritchard*).

T. Scoulari, *Tate*, 1, p. 158.

Terebratella Suessi, *Hutton*, Cat. Tert. Moll., N.Z., 1873, p. 37.

EOCENE.—RIVER MURRAY CLIFFS, Aldinga Bay, Adelaide-bore, Kingscote (Kangaroo Island), Muloowurtie (S. Aust.); Muddy Creek, Gelibrand R., Mornington, Maude (*Hall* and *Pritchard*), Corio Bay, Moorabool Valley, Shelford and Camperdown (Victoria); also New Zealand (Oamaru Formation).

POST-EOCENE.—Table Cape (Tasmania).

Hutton's definition does not contain a single specific character; it will apply equally well to any of the species of the *caput-serpentis* group; moreover, the generic reference is absolutely wrong.

T. triangularis, *Tate*, 1, p. 159.

EOCENE.—ALDINGA BAY and Chalk-cliffs of the Great Australian Bight (S. Aust.); Cape Otway (Victoria).

GENUS TEREBRATELLA, *D'Orbigny*, 1847.

T. furculifera, *Tate*, 1, p. 161.

EOCENE.—Chalk cliffs of the Great Bight, ALDINGA BAY, and Adelaide-bore (S. Aust.); also New Zealand.

The specimens from the Great Bight, incorrectly referred to *Waldheimia insolita*, prove on dissection to belong to *Terebratella* and to the species *furculifera*. They are adult, as indicated not only by greater size than the type, but by the large development of the deltidial pieces, which have coalesced to form a broadly triangular area, medially and axially ridged, thus reducing the

foramen to a relatively small circular aperture. Height, 25 length, 22·5; sectional diameter, 10·5 mm.

T. (?) pentagonalis, *Tate*, 1, p. 161.

EOCENE.—ALDINGA BAY (S. Aust.).

T. Tepperi, *Tate*, 1, p. 160.

EOCENE.—“MULOOWURTIE CLAYS,” near Ardrossan, Yorke Peninsula (S. Aust.).

T. Woodsii, *Tate*, 1, p. 161.

POST-EOCENE.—TABLE CAPE (Tasmania); Spring Creek (Victoria), *teste*, Hall and Pritchard.

I have collected a few examples of a terebratulid which is evidently the shell attributed to *Magellania corioensis*, McCoy, by Tenison-Woods, and my tentative reference of it to *Terebratella* proves to be correct; as it possesses a loop very similar to that of *T. furculifera*, though the diverging portions of it are minutely and distantly toothed on the margin. The largest specimen measures:—Transverse and longitudinal diameters, 12; sectional diameter, 5·5 mm.

Terebratella, *sp.*

A unique specimen from the Eocene clays at Cape Otway, Victoria, consisting only of the umbonal portions of both valves in apposition, and displaying the interior, indicates a species related to *T. Tepperi*, but with much inflated valves of an elongate-oval shape in marginal outline.

Terebratella pumila, *spec. nov.* Pl. viii., fig. 1.

The largest of three specimens from the Miocene at the Gippsland Lakes is of a somewhat circular outline, 5 mills. in diameter, depressedly convex, and its front margin slightly depressed. It has the large foramen of *Terebratella*; the interior displays a low mesial septum rising high into the interior at its anterior extremity in about the centre of the valve, and showing on it traces of lateral rods. (The specimen has been sacrificed to gain this knowledge.) It is most certainly distinct from any described species, and is of interest as being the first indication of a Palliobranchiata in our Miocene deposits.

[*T. Gaulteri* (Morris), Hutton, Cat. Tert. Moll., N.Z., p. 37, 1873, of the Oamaru Formation proves on dissection to be a *Rhynchonella*.]

GENUS MAGASELLA, *Dall*, 1870.

M. compta, *Sowerby*, 1845; *id.*, *Tate*, 1, p. 162.

EOCENE.—River Murray Cliffs at Mannum; near Callington; Parriekie Well, 60 miles east of Cook's Plains; Muloowurtie, Port Vincent, and Stansbury, Yorke Peninsula (South Austr.).

Muddy Creek, Gelibrand River, Maude, Mitchell River, Camperdown, Moorabool Valley, Portland (*Woods*), PORT FAIRY (*Strezlecki*) (Victoria).

POST-EOCENE.—Beaumaris and Spring Creek (Victoria).

M. deformis, *Tate*, 1, p. 165.

EOCENE.—ALDINGA BAY, Muloowurtie, Kangaroo Island (South Australia).

M. lunata, *spec. nov.* Pl. viii., figs. 3-3a.

EOCENE.—CROYDON-BORE, near Adelaide, at from 400 to 1,230 feet; River Murray Cliffs at Mannum; Mulgurda-wa-bore, near Wellington, at 213 ft. (South Australia). Belmont near Geelong (Vict.)

Shell small, surface smooth or with a few distant depressed growth-folds, largely and copiously punctated (visible under a pocket lense) about 250 pores in a field of 1.1 mills. diameter; suborbicular to subpentagonally oval in marginal outline, plano-convex in sectional outline; hinge-line arched, not so long as the greatest width of the shell.

Pedunculated valve medially elevated, its front margin indented by a deep, narrow, concave sweep corresponding with the medial elevation. The beak is of moderate size, hardly up-curved, its truncated foramen being nearly flush with the umbonal area of the brachial valve; foramen of moderate size.

Brachial valve flat except towards the front, where it is abruptly depressed in the middle line.

The internal characters are the same as in *M. deformis*, the septum reaches nearly to the opposite valve.

Dimensions of an average-sized specimen. — Length, 5.5; height, 6; sectional diameter, 2.5 mills.

The species is related to *M. deformis*, but differs by more orbicular outline, stout and short beak, larger foramen and flat brachial valve. It simulates *Terebratella Woodsii*, but its anterior depression is shallower and more abrupt. The numerous examples, all of a nearly uniform size, from the Croydon-bore should dispel the doubt that they are young forms of *M. Woodsiana*, which does not occur there.

M. Tenisoni, *Woods*, 1865; *id.*, *Tate*, 1, p. 165.

EOCENE.—MOUNT GAMBIER (S. Aust.) and Portland (Vict.) [*Woods*].

M. Woodsiana, *Tate*, 1, p. 163.

EOCENE.—RIVER MURRAY CLIFFS, Mount Gambier, Aldinga Bay (S. Australia); Muddy Creek, Gelibrand River, Mornington, Birregurra, Moorabool Valley, Camperdown, Airey's Inlet (Victoria).

POST-EOCENE.—Table Cape (Tasmania).

Mr. G. B. Pritchard, Proc. Roy. Soc. Vict., 1896, p. 143, has reduced this species to a synonym with *M. compta* on the grounds that "there are so many gradations between them;" this is not my experience. The main distinctive characters of *M. compta* are the straight hinge-line and the tendency to biplication at the front.

FAMILY THECIDIIDÆ.

GENUS THECIDIUM, *DeFrance*, 1828.

T. australe, *Tate*, 1, p. 166.

EOCENE.—MUDDY CREEK (Victoria).

FAMILY RHYNCHONELLIDÆ.

GENUS RHYNCHONELLA, *Fischer*, 1809.

R. Baileyana, *Tate*, 1885, quoted from the Miocene locality, Jemmy's Point, Gippsland Lakes, is not Australian. My surmise of its mesozoic origin is confirmed by Mr. R. Etheridge, jun., who attributes it to the Cretaceous of Faxoe.

R. squamosa, *Hutton*; *id. Tate*, 1, p. 166.

EOCENE.—River Murray Cliffs, Aldinga Bay, and Muloo-wurtie, near Ardrossan (South Australia); Muddy Creek, Maude (*Hall* and *Pritchard*), Waurn Ponds near Geelong (Victoria); also NEW ZEALAND.

POST-EOCENE.—Table Cape (Tasmania).

Rhynchonella (?) *tubulifera*, *spec. nov.* Pl. viii., figs. 4-4a.

EOCENE.—MUDDY CREEK (Victoria).

Shell lenticular, suborbicular or transversely quadrate-oval in marginal outline; cardinal margin arched, anterior and posterior margins rounded, front margin nearly straight. Pedunculate valve depressedly convex; beak bluntly and shortly pointed, straight, and declinous from the hinge; foramen broadly triangular, large, margined by two suberect narrow-lanceolate deltidial pieces.

The ornament of the valves consists of rounded radial costæ, increasing in numbers by repeated bifurcation, forty or more slightly serrating the margin; there they are a little wider than the subconcave furrows. The ribs are surmounted by stout truncated tubular spines, sufficiently close together to be almost imbricating. Interior unknown.

Dimensions.—Length, 7·5; height (incl. beak), 6·75; sectional diameter, 2·5 mm.

One example obtained by Mr. J. Dennant from the polyzoal rock at Muddy Creek.

Observations.—I had considered this unique fossil to belong to

Terebratulina, and as a list name *T. tubulifera*, new sp., it appears in "Report Austral. Ass. Adv. Sc.," vol. II., p. 442, 1890, but the beak, foramen, and ornament suggest an affinity with *Rhynchonella squamosa*. Nevertheless, it presents externally certain resemblances to other genera, and its correct systematic position must be deferred till other specimens are discovered. Of *Rhynchonella squamosa* I have no juvenile specimens with which to make comparison; but the adult of it has usually not more than half the number of ribs. The tubular spines may be viewed as the result of fusion of the margins of vaulted scales, which are so characteristic of *R. squamosa*, but in this new species the concentric lamella do not pass across the furrows as in the other species; moreover *R. tubulifera*, if juvenile, is indicative of a much less gibbous shell in the adult stage.

FAMILY CRANIIDÆ.

GENUS CRANIA, *Retzius*, 1781.

C. quadrangularis, *Tate*, 1893, Proc. Roy. Soc., N.S. Wales, p. 191, t. 11, f. 12-12a.

EOCENE.—Muddy Creek, WAURN PONDS, and Maude (Victoria).
POST-EOCENE.—Table Cape (Tasmania).

INDEX TO PALLIOBRANCHIATA.

[The names of genera are printed in small capitals, those of valid species in Roman type, all synonyms in *Italic* type].

- Aldingæ, *Tate* (*Terebratula*).
- Australe, *Tate* (*Thecidium*).
- Bulbosa*, *Tate*=*Magellania grvida*.
- Catinuliformis*, *Tate* (*Terebratulina*).
- Cælata* [*McCoy*] *Woods*=*Rhyn. squamosa*.
- Compta*, *Sowerby* (*Magasella*).
- Compta*, *Woods*=*Magellania Garibaldiana*.
- Compta*, *Etheridge*=*Magasella Woodsiana*.
- Concentrica*, *Hutton*=*Magellania grvida*.
- Corioensis*, *McCoy* (*Magellania*).
- Corioensis*, *Woods*=*Terebratella Woodsii*.
- CRANIA, *Retzius*.
- Crouchii*, *Woods* (*Magellania*).
- Cyclica*, *Tate* (*Terebratula*).
- Davidsoni*, *Etheridge*=*Terebratulina catinuliformis*.
- Deformis*, *Tate* (*Magasella*).
- Divaricata*, *Tate* (*Magellania*).
- Fimbriata*, *Tate* (*Magellania*).
- Furculifera*, *Tate* (*Terebratella*).
- Gambierensis*, *Etheridge*=*Magellania grandis*.
- Garibaldiana*, *Davidson* (*Magellania*).

Gaulteri, Morris (*Terebratula*) is a Rhynchonella.

Grandis, Woods (Magellania).

Gravida, Suess (Magellania).

Gravida, Hutton=Magellania Vincentiana.

Imbricata, Woods=Magellania Garibaldiana.

Insolita, Tate (Magellania).

Johnstoniana, Tate (Magellania).

Lenticularis, Tate (Terebratulina).

Lucida (McCoy) Woods=Rhyn. squamosa.

Lunata, Tate (Magasella).

MacLeani, Tate (Magellania).

Macropora, McCoy=Magellania Garibaldiana.

MAGASELLA, Dall.

MAGELLANIA, Bayle.

Pectoralis, Tate (Magellania).

Pentagonalis, Tate (Terebratella).

Pumila, Tate (Terebratella).

Quadrangularis, Tate (Crania).

RHYNCHONELLA, Fischer.

Scouleri, Tate (Terebratulina).

Squamosa, Hutton (Rhynchonella).

Subcarnea, Tate (Terebratula).

Suessii, Hutton=Terebratulina Scouleri.

Sufflata, Tate (Magellania).

Tapirina, Hutton=Magellania insolita.

Tateana, Woods (Terebratula).

Tateana, Tate (Magellania).

Taylori, Etheridge (Magellania).

Tayloriana, Colenso=Magellania gravida.

Tenisoni, Woods (Magasella).

Tepperi, Tate (Terebratella).

TEREBRATELLA, D'Orbigny.

TEREBRATULA.

TEREBRATULINA, D'Orbigny.

THECIDIUM, DeFrance.

Triangulare, Hutton (?)=Magellania sufflata.

Triangularis, Tate (Terebratulina).*

Tubulifera, Tate (Rhynchonella?).

Vincentiana, Tate (Magellania).

Vitreoides, Tate=Terebratula Tateana.

Vitreoides, Woods (Terebratula).

Waldheimia, King=MAGELLANIA.

Woodsiana, Tate (Magasella).

Woodsii, Tate (Terebratella).

* Has priority to *T. triangularis* [Eth.], Davidson, 1884=*Terebratula striata*, var. *triangularis*, Etheridge, 1881.

CLASS PTEROPODA.

BIBLIOGRAPHICAL REFERENCES.

1. Tate, "Pteropods of the Older Tertiary of Australia," in Trans. Roy. Soc., S. Aust., vol. IX., 1887.
2. Harris, "Tertiary Mollusca of Australasia," British Museum Publication, 1897.

GENUS LIMACINA, Lamarck, 1819.

Spiralis, Eydoux and Souleyet, 1840.

L. tertiaria, Tate.

Spiralis tertiaria, Tate, **1**, p. 196.

Limacina tertiaria, Harris, **2**, p. 19.

EOCENE.—MUDDY CREEK and Mornington (Victoria).

GENUS STYLIOLA, Lesueur, 1825.

S. annulata, Tate, **1**, p. 195.

EOCENE.—ADELAIDE-BORE.

S. bicarinata, Tate, **1**, p. 195.

EOCENE.—MUDDY CREEK, Victoria.

S. Rangiana, Tate, **1**, p. 194.

Clio (Styliola) Rangiana, Harris, **2**, p. 20.

EOCENE.—MUDDY CREEK and Mornington.

GENUS VAGINELLA, Daudin, 1800.

V. eligmostoma, Tate, **1**, p. 195: *id.*, Harris, **2**, p. 21.

Mr. Harris gives the result of a comparison of the specimens of this species and *V. depressa* of the Bordeaux basin, a resemblance that I had noted, which justifies the retention of *V. eligmostoma* for the Australian fossil.

EOCENE.—MUDDY CREEK, Gelibrand River, and Mornington (Victoria).

GENUS HYALEA, Lamarck, 1799.

HYALEA, *sp.*

Eocene at Mornington.

As yet only one example is known to me, but most unfortunately it broke to pieces on immersion in water to free it from the clayey-matrix, and before I had investigated its specific relationships.

CLASS SCAPHOPODA.

BIBLIOGRAPHICAL REFERENCES.

1. Tate, "Scaphopods of the Older Tertiary of Australia," in Trans. Roy. Soc., S. Aust., vol IX, 1887.
2. Harris, "Tertiary Mollusca of Australasia," British Museum Publication, 1897.
3. Sharp and Pilsbry, in "Tryon's Manual Conchology," vol. XVII., 1898.

FAMILY DENTALIIDÆ.

The characters, viz., the presence or absence of an apical slit or notch or of an apical plug, which have been utilised for the genera of the family, have lately been shown to be more or less adventitious, and, therefore, they can be employed only for mere classificatory convenience; hence *Entalis*, as previously employed by me in a generic sense, merges into *Dentalium*. However, I adopt Pilsbry's arrangement of the groups, though I degrade his subgenera to sections, as a convenient method of contrasting our species.

GENUS DENTALIUM, *Linnaeus*.SECTION DENTALIUM (*sensu stricto*).

Shell longitudinally ribbed at least posteriorly, apex without slit or notch.

This group is unrepresented in the Older Tertiaries, unless *D. bifrons* should eventually prove to be without an apical slit or fissure.

SECTION FISSIDENTALIUM, *Fischer*, 1885.

Shell longitudinally ribbed at least near the apex, a long apical slit.

D. bifrons, *Tate*, 1, p. 192; *id.*, *Harris*, 2, p. 295.

POST-EOCENE.—Spring Creek (Victoria).

MIOCENE.—MUDDY CREEK (Victoria).

The apex is still unknown, and therefore the location of the species in this section or in the foregoing is uncertain.

D. Mantelli, *Zittel*, 1864; *id.*, *Tate*, 1, p. 190; *id.*, *Harris*, 2, p. 293.

EOCENE.—River Murray Cliffs and Aldinga Bay (S. Aust.); Bellarine Pen. (Hall and P.), Muddy Creek, Gelibrand River, Mornington, Corio Bay, Birregurra, Moorabool Valley, Camperdown, Shelford, Cape Otway (Victoria); also NEW ZEALAND.

POST-EOCENE.—Table Cape (Tasmania), and Spring Creek (Victoria.)

I am now able to pronounce on the specific distinction of *D. Mantelli* and *D. Kickxi*, Nyst (authentic examples of the latter from the Miocene at Boom, Belgium, I have under observation). Tasmanian examples of *D. Mantelli* were referred by Tenison-Woods to the Belgian species. I do not know to what group *D. Kickxi* belongs, but apart from any apical differ-

ences, *D. Mantelli* enlarges more rapidly, and the costation is acute, elevated, and regularly disposed, primary and secondary costæ alternating; in *D. Kickxi* the costations are broad, depressed, and irregularly disposed, anteriorly they are more numerous than in the Australian species.

D. latesuclatum, *spec. nov.* Pl. viii., fig. 9.

Shell nearly straight, nine-angled (rarely twelve-angled) of rapid increase, being about seven times as long as wide. Surface ornamented with nine (rarely twelve), strong, elevated ridges, which are somewhat compressed at the sides and roundly truncated atop; the ridges are somewhat irregularly disposed being closer together on the convex aspect and fewer on the concave aspect, they extend from the apex in undiminished strength to the oral aperture; the concave furrows at the apex are of about equal width with the ridges, thence they increase in breadth till at the oral aperture they are on the convex aspect from two to three times as wide as the ridges, and as much as four times on the concave aspect. The interstitial furrows in the basal portion may have a few longitudinal threads and striæ, and are traversed by sub-distant incremental lines which pass over the costæ.

Apex truncated with a long narrow slit on the convex face, no plug; the aperture is circular internally, polygonal externally; oral aperture with a thin acute margin (thus indicating a perfect shell) of a polygonal outline.

Length, 40; breadth of oral aperture, 6—7 mill.

MIocene.—In the basal clay-bed at GRANGE BURN near Hamilton, Victoria (nine examples).

Among species of the same section having a prominent polygonal transverse section the Grangeburn fossil makes a closer agreement with *D. striatum*, Lamarck, as figured by Deshayes, Mon. Dentale, than with any other, but it is abbreviated in length and is broader, has nine ridges, not twelve to fourteen. There are, however, some species in Section Dentalium (restricted) which offer some similitude, such as *elephantinum*, *aprinum*, &c. It is not likely to be mistaken for *D. Mantelli* with its numerous and slender ribs, which are evanescent at the anterior one-third or thereabouts.

SECTION GRAPTACME, *Pilsbry and Sharp*, 1897.

Surface sculptured with close, fine, deeply engraved, longitudinal striae near the apex.

D. sectiforme, *spec. nov.* Pl. viii., figs. 6-6a

Shell small, very slender, very little tapering, slightly arched, translucent-white and shining. Sculpture of very numerous,

close, subequal riblets extending longitudinally from apex for about three-fourths of total length of shell. The riblets become faint at about half the total length, where appears fine annular sculpture; the anterior one-fourth with fine annular sculpture. Aperture circular with an acute peristome. Apex with a straight, short, narrow slit on the convex side; apical orifice contracted by a plug deeply and widely cleft from the convex to the concave side,

Length of shell, 11 to 13; diameter of aperture, 1; height of arch from chord, 1.25 mm.

MIocene.—MUDDY CREEK (Victoria).

In Pilsbry's arrangement of the recent Dentaliums, this fossil species falls in the "Group of *D. sectum*" of the Section Graptacme. In slenderness and curvature it approximates to the two species including in the group, nearer to *calamus* than to *sectum* by the longitudinal striæ extending nearly to the aperture; from both it is distinguished by the prominent annular sculpture of the anterior portion of the tube.

SECTION LÆVIDENTALIUM, *Cossmann*, 1888.

Shell smooth with annular growth lines.

a. Apex with a short slit or triangular notch.

D. subfissura, *Tate*, 1, p. 191; *id.*, *Harris*, 2, p. 296.

Apical fissure a short triangular notch with a plug in the type example.

EOCENE.—RIVER MURRAY CLIFFS and Aldinga Bay (S. Aust.); Bellarine Pen. (Hall and P.), Muddy Creek, Gelibrand River, Mornington, Corio Bay, Belmont, Camperdown, Shelford, Maude, Cape Otway (Victoria).

POST-EOCENE.—Spring Creek (Victoria).

Dentalium pictile, *spec. nov.* Pl. viii., fig. 8.

Shell slender, about thirteen times as long as wide, much arched, smooth, without any trace of striæ, dark coloured with lighter-coloured oblique bands. Apex about one millimetre in the lateral diameter, slightly less in the concavo-convex diameter, with a short and broad notch on the convex side; there are traces of a plug.

Length, 52; breadth of oral aperture, 4; height of arch from chord, 6 mills.

POST-EOCENE.—TABLE (CAPE Tasmania).

Previously listed by Tate and Dennant, Correlation Papers, III., 1896, as *D. subfissura*. I separate this species from *D. subfissura*, because of its greater curvature, not so slender at the apex, which is elliptic, and not circular in sectional outline.

D. largierescens, *spec. nov.* Pl. viii., figs. 10-10a.

Shell smooth and shining, considerably arched, six and a-half times as long as wide, rapidly increasing; sculptured with distinct, oblique, incremental lines; apical fissure a short slit or triangular notch on the convex side, no plug; anterior extremity circular.

Length, 44; diameter of anterior extremity, 6·5; at apex, 1; height of arch above the chord, 2 mills.

This new species resembles *D. subfissura*, from which it differs by stronger curvature, by rapid increase, not so attenuated apically, and by the obliquely annular sculpture. The rapid increase in diameter and the strong curvature distinguish it also from recent species.

POST-EOCENE.—BEAUMARIS (six exs.).

MIOCENE.—Junction-bed, Grange Burn (one ex.); Gippsland Lakes (one ex., J. Dennant).

b. Apex simple, without notch or slit.

D. lacteolum, *spec. nov.*

D. lacteum, Tate, 1, p. 193, non Deshayes.

A reference to the full description and ample illustrations of *D. lacteum*, Deshayes, in Pilsbry's monograph of the genus, satisfies me that this recent species is not present in our Older Tertiaries. The transverse section of both is circular, but the rate of increase of the sectional diameter is not the same; thus in *D. lacteum*, with a total length of 30 mm., the diameter is 2·5, whilst in the fossil species for a length of 35 mm. the diameter is 2·25 (vix); hence *D. lacteolum* is a more slender shell. It is straighter and more slender than the posterior part of *D. subfissura*, and is therefore somewhat similar to *D. acriculum*, from both distinguished, of course, by the absence of an apical notch.

Tenison-Woods recorded *D. lacteum* (?) as a Table Cape fossil, but the only *Lævidentalium* at that locality, so far as known from my own and other collections, is *D. pictile*, which I am disposed to regard as the shell observed by him.

EOCENE.—MUDDY CREEK and Gelibrand River, Victoria.

SECTION FUSTIARIA, *Stoliczka*, 1868.

Shell smooth, or with annular sculpture; slit long.

D. acriculum, Tate, 1, p. 192; *id.*, Harris, 2, p. 296.

Shell curved, slender, smooth.

EOCENE.—MUDDY CREEK, Victoria.

D. australe, Sharp and Pilsbry, 3, p. 192.

Entalis annulatum, Tate, 1, p. 191. Name preoccupied by Gmelin, by Sandberger, and by Meyer.

Shell large, nearly straight, with annular lines.

EOCENE.—MUDDY CREEK and Shelford, Vict.

POST-EOCENE.—Spring Creek, Vict.

A variant of this species occurs at Spring Creek, which is usually more slender, the length to the breadth being 12 to 1, as against 10 to 1; and in one individual the apical slit is 18 millimetres.

SECTION EPISIPHON, *Pilsbry and Sharp*, 1899.

Apex entire with a projecting tube.

a. Shell longitudinally ribbed.

D. aratum, *Tate*, 1, p. 192; *id.*, *Harris*, 2, p. 293.

This species has a truncated apex of about one millimetre diameter from the orifice of which protrudes a very short, smooth subpellucid tube. The truncated end is of a white ceramic lustre and is concentrically striate; the whole appearances suggest that the embryonic and attenuated tip has been cast off. *D. aratum* differs from all congeners in the group by its longitudinal ornament and sculpture.

EOCENE.—RIVER MURRAY CLIFFS and Muloowurtie, S. Aust.; Bellarine Pen. (Hall and Pritchard), Muddy Creek, Gelibrand River, Fyansford, Birregurra, Mornington, Camperdown, Cape Otway (Victoria).

POST-EOCENE.—Spring Creek.

b. Shell with annular ridges.

D. tornatissimum, *spec. nov.* Pl. viii., figs. 7-7a.

Shell very small, nearly straight; sculptured with annular rounded ridges, more or less regular throughout the whole length (here and there a stouter annulation of about double breadth), wider than the deep narrow intervening grooves, ten in a millimetre length of the apical part.

Test very thick. Apex simple, circular, truncate; projecting from the aperture is a round pipe about .16 in diameter and .2 mm. long. Anterior extremity not known; all the specimens present the appearance of being fragments of larger individuals; however, the transverse section is circular.

Length 7, diameter at aperture .9, at apex .55 mill.

MIOCENE.—GIPPSLAND LAKES (4 exs., J. Dennant).

This species is closely related to *D. tornatum*, Watson, dredged off Levuka in 12 fms. (Challenger Exped.), which is distinguished from other components of Pilsbry and Sharp's subgenus *Episiphon* by its annular grooves. *D. tornatum* is described as possessing deep, close-set, slightly oblique, annular grooves in the upper part of the shell only, becoming shallower further down and cease at last rather abruptly. The fossil analogue has the

grooves, not at all oblique or very slightly so, equally strong at the anterior as at the posterior extremity, but on the other hand the fossil is, so far as known, only about half the length of the living species. I am afraid comparison of actual specimens can only decide if there be differences in the number of the annulations for equal units of length, as the figures and description by Watson do not afford a sufficiency of detail on this head. Nevertheless, it is stated that the flat bands are of variable widths, and increase with the growth of the shell from about 0.011 inch to twice that amount, a description that does not apply to the fossil; and, moreover, the test is so thick that translucency can hardly have belonged to it.

SECTION GADILINA, *Forresti*, 1895.

Apex entire, shell subtriangular in section.

D. Tatei, *Sharp and Pilsbry*, 3, p. 218 (*nom. mutand.*).

D. triquetrum, *Tate*, 1, p. 193; non *Brocchi*, 1814.

EOCENE.—ADELAIDE-BORE.

FAMILY SIPHODONTALIIDÆ.

GENUS CADULUS, *Philippi*, 1844.

C. mucronatus, *Tate*, 1, p. 193; *id.*, *Harris*, 2, p. 297.

EOCENE.—MUDDY CREEK (Victoria).

POST-EOCENE.—Spring Creek (Victoria).

SECTION GADILA, *Gray*, 1847.

C. acuminatus, *Tate*, 1, p. 194; *id.*, *Pilsbry*, 3, p. 183, t. 32, figs. 47-49.

MIOCENE.—Aldinga Bay (S. Aust.)

RECENT.—SOUTH AUSTRALIA and N. S. Wales.

Mr. Pilsbry, *op. cit.*, very justly remarks that the species name is inappropriate, though it is appropriate as applied to the perfect shell. It happens that the apical half or so is deciduous, and certainly the decollated portion, which is the part generally known, cannot be called acuminate. As regards this interesting phase of the *Cadulus*-shell, I leave to Dr. Verco to make more fully known, as the material in his possession is more thoroughly illustrative than what I possess.

However, I borrowed the name after Deshayes, who, on the authority of Angas, had so attached his MS. name to New South Wales specimens in the British Museum, and Angas so listed the species for South Australia on the testimony of examples forwarded by me. (*Proc. Zool. Soc.*, 1878, p. 868).

C. infans, *spec. nov.* Pl. viii., fig. 11.

Similar to *C. acuminatus* (Pl. viii., fig. 12), though words can hardly convey those differences which the eye can appreciate. The shell

is slightly swollen in the anterior one-third on the convex side, thence gradually tapering to each end; the convex side is not so arched as in *C. acuminatus*, whilst in contrast with *C. infans*, in which the shell tapers from its greatest diameter, the shell of *C. acuminatus* has an almost uniform diameter throughout, until very near the extremities a slight decrease in diameter is observable. Apertures circular and their margins acute.

Length.—3·2 mills.

MIOCENE.—MUDDY CREEK (one ex.).

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CLASS LAMELLIBRANCHIATA.

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2. Tate, *id.*, Part II., *op. cit.*, vol. IX., 1887.
3. Tate, "Unrecorded Genera of the Older Tertiary Fauna of Australia," Journ. Roy. Soc., N.S. Wales, vol. XXVII., 1894.
4. Harris, "Tertiary Mollusca of Australia," British Museum Publication, 1897.

FAMILY OSTREIDÆ.

GENUS OSTREA, *Linnaeus*, 1758.

O. arenicola, *Tate*, 1, p. 97; *Harris*, 4, p. 300.

MIocene.—*Aldinga Bay*, Murray Cliffs (S. Aust.); Gippsland Lakes and Shelford (Vict.), doubtful identifications.

O. hyotidoidea, *spec. nov.*

O. hyotis, *Tate*, 1, p. 96, pl. vi., fig. 5; *Harris*, 4, p. 229; non *Linnaeus*.

Now that I have examples of *O. hyotis* for comparison with the fossil oyster of our Eocene beds, which I had tentatively referred to that living species, I am induced to regard the two as distinct. The fossil species is more depressed, more irregular in outline; the radial ridges less elevated and obtuse, whilst the foliaceous scales very rarely develop into tubular spines; at the same time its restriction to Eocene strata implies specific distinction.

EOCENE.—*River Murray Cliffs* and *Aldinga Bay* (S. Aust.); *Muddy Creek*, *Mornington*, *Moorabool Valley* (*Hall* and *Pritchard*), and *Shelford* (Vict.).

POST-EOCENE.—*Table Cape* (Tasm.).

O. manubriata, *Tate*, 2, p. 184; *Harris*, 4, p. 300.

MIocene.—*Muddy Creek* (Vict.).

O. Sturtiana, *Tate*, 1, p. 97; *Harris*, 4, p. 299.

MIocene.—*River Murray Cliffs* (S. Aust.).

EXCLUDED SPECIES.

O. hippopus, *Tate*, 1, p. 98, name preoccupied by *Lamarck*, 1818, is, I think, an individual monstrosity of *Gryphæa tarda*.

SUBGENUS GRYPHÆA, *Lamarck*, 1801.

G. tarda, *Hutton*, 1873; *id.*, *Tate*, 1, p. 98; *Harris*, 4, p. 302.

Ostrea hippopus, *Tate*, 1886.

EOCENE.—*Aldinga Bay*, *Witton Bluff*, *Chalk-cliffs of the Great Bight* (S. Aust.); *Muddy Creek*, *Cape Otway*, *Shelford* (Vict.); also *New Zealand*.

POST-EOCENE.—*Spring Creek* (identification doubtful).

FAMILY DIMYIIDÆ.

GENUS DIMYA, *Rouault*, 1850.**D. dissimilis**, *Tate*, 1, p. 100; *Harris*, 4, p. 306.EOCENE.—R. Murray Cliffs, Aldinga Bay, Muddy Creek, Gelibrand River, Mornington, Birregurra, Corio Bay, Moorabool Valley and Bellarine Peninsula (*Hall* and *Pritchard*), Camperdown, Shelford, Cape Otway, Maude.

POST-EOCENE.—Beaumaris and Spring Creek (Vict.); Table Cape (Tasm.).

D. sigillata, *Tate*, 1, p. 100; *Harris*, 4, p. 306.EOCENE.—*Aldinga Bay* (Turritella-marls).

FAMILY ANOMIIDÆ.

GENUS PLACUNANOMIA, *Broderip*, 1832.**P. Ione**, *Gray*; *id.*, *Tate*, 1, p. 101; *Harris*, 4, p. 303.

EOCENE.—Fyansford and Muddy Creek, doubtful identifications; Corio Bay.

POST-EOCENE.—Spring Creek (Vict.).

MIOCENE.—Aldinga Bay and River Murray Cliffs (S. Aust.); Muddy Creek and Gippsland Lakes (Vict.).

RECENT.—S. Australia, Tasmania, and New Zealand.

P. sella, *Tate*, 1, p. 102; *Harris*, 4, p. 304.EOCENE.—R. *Murray Cliffs* (S. Aust.); Muddy Creek, Mornington, and Shelford, Waurn Ponds (*Hall* and *Pritchard*); also New Zealand.

POST-EOCENE.—Spring Creek (Vict.); Table Cape (Tasmania).

GENUS ANOMIA, *Linnaeus*, 1758.**A. (?) cymbula**, *Tate*, 1, p. 101.EOCENE.—*Aldinga Bay* (Glauconic limestone).

FAMILY PECTINIDÆ.

GENUS PECTEN, *Muller*, 1776.**P. antiaustralis**, *Tate*, 1, p. 106; *Harris*, 4, p. 315.MIOCENE.—*Adelaide*, Aldinga Bay, and Edithburg (S.A.); Muddy Creek, Gippsland Lakes, and Shelford (V.).**P. consobrinus**, *Tate*, 1, p. 104; *Harris*, 4, p. 317.MIOCENE.—*Aldinga Bay*.

——— var.

EOCENE.—Aldinga Bay, Shelford, Maude and Belmont, Waurn Ponds (*Hall* and *Pritchard*).

POST-EOCENE.—Spring Creek.

P. palmipes, *Tate*, 1, p. 105; *Harris*, 4, p. 318.MIOCENE.—*Aldinga Bay* and Edithburg (S. Aust.).

P. subbifrons, *Tate*, 1882; *id.*, **1**, p. 104.

EOCENE.—Aldinga Bay and Shelford, Waurm Ponds (*Hall and Pritchard*).

MIOCENE.—Aldinga Bay, *Adelaide* (S.A.).

P. subconvexus, *Tate*, **2**, p. 185.

MIOCENE.—*Muddy Creek*, but possibly derived from Eocene.

P. Aldingensis, *Tate*, **1**, p. 109.

EOCENE.—*Aldinga Bay* and Stansbury (S. Aust.).

P. dichotomalis, *Tate*, **1**, p. 106.

EOCENE.—Bellarine Pen. (*Hall and Pritchard*), *Mornington*, *Gelibrand River* (Vict.).

P. Eyrei, *Tate*, **1**, p. 107; *Harris*, **4**, p. 318.

EOCENE.—*Aldinga Bay* (S. Aust.); Moorabool Valley and Maude (*Hall and Pritchard*) (Vict.).

P. Flindersi, *Tate*, **1**, p. 108.

EOCENE.—*Aldinga Bay* and Muloowurtie near Ardrossan (S.A.).

P. Foulcheri, *Woods*, 1865; *id.*, *Tate*, **1**, p. 111.

EOCENE.—R. Murray Cliffs and *Mount Gambier* (S.A.); Bellarine Pen. and Maude (*Hall and Pritchard*), *Muddy Creek*, *Mornington*, Moorabool Valley, Cape Otway, Shelford (V.).

POST-EOCENE.—Spring Creek (V.); Table Cape (T.).

P. Gambierensis, *Woods*, 1865; *id.*, *Tate*, **1**, p. 112.

EOCENE.—*Mount Gambier* (S.A.); Moorabool Valley (*Hall and Pritchard*), (V.).

POST-EOCENE.—Spring Creek near Geelong (V.).

P. Murrayensis, *Tate*, **1**, p. 105; *Harris*, **4**, p. 314.

EOCENE.—R. Murray Cliffs (S.A.); *Muddy Creek*, Moorabool Valley, Shelford (Vict.).

POST-EOCENE.—Spring Creek (V.).

P. Peroni, *Tate*, **1**, p. 108; *Harris*, **4**, p. 317.

EOCENE.—*Aldinga Bay* (S.A.); Waurm Ponds (*Hall and Pritchard*), Western Beach, Corio Bay (V.).

P. polymorphoides, *Zittel*, 1864; *id.*, *Tate*, **1**, p. 113; *Harris*, **4**, p. 316.

EOCENE.—River Murray Cliffs (S.A.); *Muddy Creek*, *Gelibrand River*, and Shelford, Waurm Ponds (*Hall and Pritchard*), (V.); also *New Zealand*.

POST-EOCENE.—Spring Creek (V.).

P. Sturtianus, *Tate*, **1**, p. 109; *Harris*, **4**, p. 315.

EOCENE.—River Murray Cliffs (S.A.); Waurm Ponds (*Hall and Pritchard*), *Muddy Creek*, Bairnsdale, Shelford (V.).

POST-EOCENE.—Spring Creek.

MIOCENE.—*Muddy Creek* (probably derived).

P. Meringæ, *spec. nov.**MIOCENE.—*Gippsland Lakes* (V.).

Shell suborbicular in marginal outline, equilateral, inequivalve, radially ribbed, ribs in five groups, ears large.

Right valve of about 50 mm. diameter, moderately inflated, ventral margin undulating corresponding with the areas occupied by the five groups of primary radial ribs and their intervening concave furrows. Primary ribs stout, flatly convex, with precipitous sides, about 18, variously grouped in twos, threes, and fives, forming elevated radial folds; the intervening concave areas with one or two slender ribs; the whole surface covered with close-set, slender, undulating, concentric liræ, more or less lamellose on the primary ribs (ten in a length of one mm. at the front on the medial line). Anterior ear large, falcate, with three or four radial riblets, crossed by concentric liræ forming slight squamæ on the riblets and terminating in a serrated crest on the dorsal margin. Posterior ear of less size, right-angled triangular, ornamented with fine concentric liræ.

Left valve flat, the ornament similar to, but alternating with, that of the inflated valve; the anterior ear has, however, stouter riblets, and the transverse liræ rise into erect lamelliform scales.

An adult left valve of 95 mm. diameter has five broad elevated rays, the ribs of which are finally evanescent, whilst the riblets in the interstitial furrows are not so pronounced as in the medium-sized valves.

Dimensions of the figured shell.—Antero-posterior diameter, 40; ventro-dorsal diameter, 35; thickness through both valves, 10 mm.

The name of the species perpetuates that of an aboriginal locality whence the fossils have chiefly been obtained.

This species is separated from the *bifrons*-group by the absence of shagreen sculpture; the clustering of the ribs into sets allies it to *polymorphoides* among our fossil forms, and to *undulatus* and related species among living species of the *Janira*-group. It differs from *polymorphoides*, its nearest ally, by the regular convexity of the inflated valve, and by the distinct equilaterality of the shell.

SPECIES EXCLUDED.

P. spondyloides, Tate, 1886—SPONDYLUS ARENICOLA.

P. deformis, Tate, 1887, is a worn HINNITES CORIOENSIS.

SECTION PSEUDAMUSSIUM, *H. and A. Adams*, 1855.

Surface smooth, no internal ribs.

* The illustrations of this and other species diagnosed in the following pages are deferred to the issue of the concluding part of the "Revision of the Lamellibranchiata."

P. Hochstetteri, Zittel, (*sp.*), 1861; *id.*, Tate, **1**, p. 114.

P. (Pseudamussium) Hochstetteri, Tate, P.R. Soc., N.S.W., vol. XXXI., p. 408, 1898.

EOCENE.—River Murray Cliffs, Mount Gambier, Aldinga Bay, Adelaide-bore, Stansbury, and Muloowurtie (South Australia); Muddy Creek, Shelford, Camperdown, and Airey's Inlet (Victoria); also *New Zealand*.

POST-EOCENE.—Spring Creek, Vic.; Table Cape, Tas.

SECTION PROPEAMUSSIUM, DeGregorio, 1883.

Valves with dissimilar ornament, smooth or radially striate, no internal ribs.

P. Yahlensis, Woods (*sp.*), 1865; *id.*, Tate **1**, p. 110.

Pseudamussium Yahlensis, Harris, **4**, p. 322.

P. (Pseudamussium) Yahlensis, Tate, P.R. Soc., N.S.W., vol. XXXI., p. 408, 1898.

Pecten Hectori, Hutton, Cat. Test. Moll., N.Z., p. 30, 1873.

EOCENE.—River Murray Cliffs and *Mount Gambier* (S.A.); Bellarine Pen. and Moorabool Valley (*Hall and Pritchard*), Corio Bay, Muddy Creek, Gelibrand River, Mornington, and Bairnsdale (Victoria); also *New Zealand*.

POST-EOCENE.—Beaumaris, Vic.; Table Cape, Tas.

GENUS AMUSSIUM, Megerle, 1811.

Valves with dissimilar ornament.

A. Zitteli, Hutton (*sp.*), 1873; *id.*, Tate, **1**, p. 115; *Harris*, **4**, p. 324.

EOCENE.—River Murray Cliffs, Aldinga Bay, and Mount Gambier (S.A.); Bellarine Pen. (*Hall and Pritchard*), Muddy Creek, Gelibrand River, Mornington, Fyansford, and Cape Otway (Victoria); also *New Zealand*.

POST-EOCENE.—Table Cape, Tasmania.

SECTION PLEURONECTIA, Swainson, 1840.

Valves smooth.

A. lucens, Tate, **1**, p. 115.

POST-EOCENE.—Spring Creek, Victoria.

MIOCENE.—*Aldinga Bay*, S. Australia.

GENUS HINNITES, DeFrance.

H. Corioensis, McCoy, 1879; *id.*, Tate, **1**, p. 116.

H. trailli, Hutton, Cat. Tert. Moll., N.Z., p. 32, 1873. *Pecten deformis*, Tate, **2**, p. 185.

Hutton's diagnosis contains no specific characters; and the name should be regarded as invalid.

EOCENE.—Waurin Ponds, Moorabool Valley and Maude (*Hall and Pritchard*), Muddy Creek, *Corio Bay*, Bairnsdale (V.); River Murray Cliffs (S.A.); also N.Z. (*Pareora* Formation).

POST-EOCENE.—Table Cape (T.).

The valve on which was founded *P. deformis*, and recorded as Miocene, has all the appearance of a derived origin.

FAMILY LIMIDÆ.

GENUS LIMA, Lamarck, 1789.

L. Bassii, Woods, 1877; *id.*, Tate, 1, p. 117; Harris, 4, p. 310.

EOCENE.—River Murray Cliffs, Aldinga Bay, Adelaide-bore (S.A.); Bellarine Pen. (*H.* and *P.*), Muddy Creek, Gelibrand River, Mornington, Belmont, Cape Otway, Maude, Shelford (V.); also N.Z.

POST-EOCENE.—Table Cape (Tasmania).

L. linguliformis, Tate, 1, p. 118; Harris, 4, p. 310.

EOCENE.—Belmont (*H.* and *P.*), Muddy Creek, Mornington (V.).

POST-EOCENE.—Table Cape (Tasmania).

L. polyactina, Tate, 1, p. 118.

EOCENE.—Adelaide-bore.

SECTION LIMATULA, S. Wood, 1839.

L. Jeffreysiana, Tate, 1884; *id.*, 1, p. 119; Harris, 4, p. 311.

Lima bullata [Born], Hutton, Cat. Tert. Moll., N.Z., p. 33, 1873; non Born.

EOCENE.—River Murray Cliffs, Aldinga Bay, Mount Gambier (S.A.); Waurm Ponds (*H.* and *P.*); Muddy Creek, Mornington, Shelford (V.); also New Zealand [Oamaru Formation].

POST-EOCENE.—Spring Creek (V.); Table Cape (T.).

MIocene.—Edithburg, Aldinga Bay, River Murray Cliffs (S.A.); Muddy Creek (V.).

L. subnodulosa, *spec. nov.*

Test stout; shell inflated, slightly inequilateral (the posterior side being a little protuberant in the middle line). Ornamented with 25 stout, rounded ribs, which are somewhat nodulose anteriorly; the narrower interstices are crossed by moderately stout threadlets.

This species has the aspect of a *Linea*, but there are no traces of teeth.

Dimensions.—Umbo-ventral diameter, 4·5; antero-dorsal diameter, 3·5; height of valve, 1·75 mm.

MIocene.—Muddy Creek, Victoria (one ex.). The shell is somewhat polished, evidently by erosion, and may have been derived from the underlying Eocene.

L. polynema, Tate, 1, p. 119.

EOCENE.—Adelaide-bore.

L. crebresquamata, *spec. nov.*

Shell considerably inflated with a prominent umbo which arches over the hinge-line. Hinge-line straight, narrow, the shell widening thence to about two-thirds of the total length, thence slightly narrowing to the arched front.

Radial ribs about 50, subacute, beset with suberect squamæ which are sometimes denticuliform; they extend down the sides of the ribs, but do not cross the furrows; the squamæ are close-set, and often subimbricate. The furrows are not so wide as the ribs, and appear to be inornate.

Dimensions.—Umbo-ventral diameter, 12; antero-posterior diameter, 8; length of hinge-line, 4; thickness through both valves, 10 mm.

POST-EOCENE.—Spring Creek, Vict. (three examples).

GENUS LIMEA, *Brown*, 1831.

L. alticostata, *Tate*, 1, p. 119.

EOCENE.—Adelaide-bore.

L. transenna, *Tate*, 1, p. 119; *id. Harris*, 4, p. 313.

EOCENE.—Mount Gambier, S.A.; Bellarine Pen. (*Hall and Pritchard*), *Muddy Creek*, Mornington, and Shelford (Victoria).

POST-EOCENE.—Table Cape, Tasmania.

L. multiradiata, *spec. nov.*

Shell moderately inflated with a pointed central umbo; subinequilateral, the umbo-ventral axis slightly oblique; wings slightly developed. The surface of the valves ornamented with numerous flatly-rounded smooth ribs (about ten to one mm. of width in the medial area), separated by flat, equally wide or slightly wider furrows; the furrows are ornamented by transverse, close-set, slender threadlets.

There are six teeth on each half of the hinge-line and its decurrent portions on the anterior and posterior side; those nearest the ligamental pit are oblique, the others are somewhat transverse.

Dimensions.—Length of hinge, 2; umbo-ventral diam., 5.25; antero-posterior diam., 5 mm.

EOCENE.—“*Turritella-marls*,” Aldinga Bay (six exs.).

This species resembles *L. transenna*, but has not the marked obliquity of that shell, and, moreover, the ribs are more numerous, with narrower interstitial furrows, and the transverse threadlets are finer and closer together.

FAMILY SPONDYLIIDÆ.

GENUS SPONDYLUS, *Linnaeus*, 1758.**S. gaderopoides**, *McCoy*, 1876; *id.*, *Tate*, **1**, p. 121; *Harris*, **4**, p. 307.EOCENE.—Aldinga Bay (Glauconitic limestone), Yorke-Peninsula, chalk-cliffs of the Great Bight (S.A.); Maude (*H.* and *P.*), Gelibrand River, Bairnsdale (V.).

POST-EOCENE.—Spring Creek (V.); Table Cape (T.).

S. pseudoradula, *McCoy*, 1877; *id.*, *Tate*, **1**, p. 121; *Harris*, **4**, p. 308.EOCENE.—River Murray Cliffs (S.A.); Bellarine Pen. (*H.* and *P.*), Muddy Creek, Gelibrand River, Mornington, Moorabool Valley, Shelford, Bairnsdale (V.).

POST-EOCENE.—Beaumaris (V.); Table Cape (T.).

S. arenicola, *Tate*, Aust. Assoc. Adv. Sc., vol. VI., 1896, p. 318.*Pecten spondyloides*, *Tate*, **1**, p. 19, t. 4, fig. 6, non fig. 7.*Spondylus Aldingensis*, *Tate*, 1896, T. Roy. Soc., S.A., vol. XX., p. 121.

MIOCENE.—Aldinga Bay (S.A.).

Pecten spondyloides having been ascertained to have all the interior characters proper to *Spondylus*, it seemed necessary to change the specific name, as *Spondylus spondyloides* is hardly a binomial form, hence the names *arenicola*, *Aldingensis*. These two names were applied about the same time, though the first appeared earlier in print, and a lapse of memory is the sole reason for using the latter.**S. Murravicus**, *Tate*, 1899.*Pecten spondyloides*, var., *Tate*, **1**, t. 4, fig. 7.

EOCENE.—River Murray Cliffs at Mannum, S.A.

GENUS PLICATULA, *Lamarck*.**P. ramulosa**, *Tate*, 1898, Proc. Roy. Soc., N.S.W., vol. XXXI., p. 408, t. 19, fig. 3.

POST-EOCENE.—Table Cape (Tasmania).

FAMILY PTERIIDÆ.

GENUS PTERIA, *Scopoli*, 1777.[*Avicula*, Bruguière; adopted from Klein, 1753, a pre-Linnæan name.]**P. nasuta**, *Tate*, **1**, p. 121.

EOCENE.—Adelaide-bore.

GENUS MARGARITIFERA, *Brown*, 1789.*Meleagrina*, *Lamarck*, 1812.

M. crassicardia, *Tate*, 1, p. 121; *Harris*, 4, p. 325.

EOCENE.—R. Murray and Muddy Creek.

MIOCENE.—*River Murray Cliffs* (S.A.).

OLDER PLIOCENE.—Dry Creek-bore, near Adelaide.

GENUS VULSELLA, *Lamarck*, 1799.

V. lævigata, *Tate*, 1, p. 122; *Harris*, 4, p. 326.

EOCENE.—*Aldinga Bay* (Glauconitic 'limestone).

GENUS MELINA, *Retzius*, 1781.

[*Perna*, *Bruguière*, 1792.]

M. sp., *Tate*, 1886.

EOCENE.—*Aldinga Bay* (S.A.); also Oamaru formation, New Zealand. From both localities known only as casts.

Melina percrassa, *spec. nov.*

Shell oblong-cuneate, somewhat oblique, equivalved, not winged; test very thick and perlaceous.

Hinge line, inner margin straight, outer-margin convex; deepest anteriorly (22 mm.), eight to nine moderately deep ligamental furrows, marked by arched transverse striæ, two millimetres, more or less, in width, slightly narrower than the interstitial concave areas.

Anterior margin slightly incurved at the summit of the byssal sinus (the left valve has a slight expansion superiorly), slightly convex in alignment with byssal sinus, thence roundly sloping to the ventral margin, which is narrowly rounded; posterior margin with a slight outward-curving slope. The byssal sinus is in the left valve, very long (30 mm.) and narrow (2 mm. at its widest).

Surface of valves marked by the somewhat crowded edges of imbricating lamellæ.

Dimensions.—Hinge line, 42 mm. long; umbo-post-ventral diameter, 80; sectional diameter, 32 mm.; greatest thickness of test, 15.

Habitat.—Junction-bed of the Miocene at Grangeburn, near Hamilton, Victoria (two pairs of valves in apposition).

This species offers no distinctive features, except perhaps in respect of its convex dorsal margin and its excessively thick test, which, after all, may only be the result of extreme age. It has some analogy with *P. Lamarcki* of the Parisian Eocene.

FAMILY PINNIIDÆ.

GENUS PINNA, *Linnaeus*, 1758.

P. semicostata, *Tate*, 1, p. 122.

MIOCENE.—*Aldinga Bay* (S.A.).

P. cordata, *Pritchard*, 1895, Proc. Roy. Soc., Victoria, vol. VII., p. 228, t. xii., figs. 4, 5.

EOCENE.—*Moorabool Valley* (*Pritchard*).

P. sp., *Tate*, 1886.

EOCENE.—River Murray Cliffs (S.A.); Muddy Creek and Cape Otway (V.).

Known only by fragments of the apical part of the valves; a different species from either of the above is indicated thereby, but the material is insufficient for determinate diagnosis.

FAMILY PHILOBRYIIDÆ.

GENUS PHILOBRYA, *P. Carpenter*, 1872.

P. Bernardi, *Tate*, 1898. This Journal, vol. XXII., t. 4, f. 10, p. 88.

EOCENE.—Muddy Creek, *Belmont*, and *Shelford* (V.).

P. prænuntia, *Tate*, 1898, *op. cit.*, t. 4, f. 9, p. 88.

EOCENE.—*Cape Otway* (V.).

(*To be continued*).



NOTES ON AND DESCRIPTION OF THE MALE OF
 CÆLOSTOMA IMMANE (Maskell), AND OF A
 NEW SPECIES OF A LEAF-MINING MOTH.

By J. G. O. TEPPER, F.L.S., F.I.Sc., &c.

[Read October 3, 1899.]

Coelostoma immane, Maskell.

The female of *Coelostoma immane*, one of the Monophlebidae, is probably the largest sized of all Coccids, was first figured and described by the late F. M. Maskell in the Transactions of the New Zealand Institute, 1891 (p. 49, pl. XI., figs. 9—12), and afterwards mentioned repeatedly in subsequent volumes up to 1898. The male has, however, remained unknown hitherto, it seems, although it is mentioned by Maskell that the species was reported as having been observed near Sydney on some kind of Eucalypts. Nor was the precise locality known where the original type specimens in the South Australian Museum had been collected, as they were received without any note or indication, except a half-obiterated postmark indicating the Far North. Both these points are now cleared up by a parcel of specimens received at the S.A. Museum on September 5th of this year, having been sent by Mr. George Prout from the Wheal Turner Mine, in the neighbourhood of the Yudananutana and Umberatana Stations, north of Port Augusta, to Prof. R. Tate, who courteously handed them over to the Museum Collection.

Some six or seven females, fixed to the twigs of *Acacia aneura* (Mulga), were still fresh, and some of them actually alive. They were of various sizes, the largest measuring 35 mm. in length, and 17 mm. in width; but with them were also about twice as many males enclosed, which were, however, all dead, and unfortunately, more or less distorted and damaged. There were likewise a quantity of eggs which had been deposited *in transitu*.

The antennæ of the females are stout, ten-jointed, 9 mm. long, gradually attenuated from the base to the apex, the joints sub-cylindrical, and each apparently with a narrow white annulus at the base. The body segments are distinctly separated by more or less deep constrictions; hence the margin is sinuate, besides being otherwise sculptured above with mature individuals, the young ones being almost smooth and entire in this respect. The whole body in life is covered thinly with a mealy-white layer of wax, which also covers the twigs and foliage near the specimens, and appears not to be dissolved by strong methylated spirit. In formaline solution the wax forms a more or

less contiguous mass, and separates in larger or smaller flakes imperfectly. When this occurs, the whole of the epidermis is then seen to be marked by minute round pits, from which the waxy meal appears to be exuded. The general colour is a deep blackish-brown, here and there verging into lurid.

Mr. Maskell placed the species in the genus *Cœlostoma* "on account of the absence of a rostrum" (op. cit. p. 51). and says "there is no doubt of its being a Monophlebid," but it appears that this "absence" is only apparent in the Monophlebidæ, for both *Monophlebus Crawfordi* and *Cœlostoma australe* are known to possess a rostrum (sucking tube) of great length, which during life is deeply buried in the tissues of the bark of the twigs on which the insect is located. When, however, the organ is withdrawn it is at the same time retracted into the body; its extreme slenderness and the minuteness of the otherwise unmarked orifice rendering it next to impossible to detect its presence. Mr. A. Zietz informs me that he has frequently detached living Monophlebi from the bark and seen their rostrum retracted, and I have noticed in the present instance that the living insect (*Cœlostoma*) had its body closely and immovably fixed to the twig by its rostrum, but later, when dead, had its forepart raised and the rostrum completely retracted. The "absence" of a rostrum, as a distinction, will, therefore, have to be omitted in future.

The male of *C. immane* is very insignificant in size compared with that of the female, and is provided with two ample wings of similarly simple structure as those of *C. australe*. The body is usually black, also the legs, but more or less covered by the thin whitish meal already mentioned, which also dusts the wings and antennæ of the specimens.

The head contracts posteriorly into a distinct neck. The eyes are brown, large, oval, and provided with very numerous, extremely minute facets. The antennæ are shortly hirsute (?), notably the two apical joints, 12-jointed; the basal joint is very short, much thicker than long, cup-shaped, the second similar, but thinner and longer; joints 3, 8, 9 sub-cylindrical, sub-equal, each about twice the length of the second; joints 4-7 and 10 filiform, subequal, each about twice as long as the preceding; 11 and 12 similar, subequal, together a little longer than the preceding one, the penultimate being the shorter.

The thorax is uneven, shiningly black; the mesonotum exhibits an oval raised median space convex above; scutellum indistinct.

Abdomen rugose, flat, 6 (?) jointed, acuminate, and terminating in a slender, flat filament (? penis) twice or more longer than the body (this is usually absent from dried specimens, or more or less contorted, owing to its extreme slenderness and brittle nature).

The anterior wings are large, rose-coloured, oval, and about two and a-half times longer than wide, but very thin and brittle.

The costal nervure (vein) is very strong, acuminate from the middle, and terminating towards the apex, colour brownish-black, base pink; the main branch vein starts from the costal nervure at about one-third of its length from the base; terminating beyond the middle of the hindmargin, and is dark coloured and prominent above; the second branch is close to the first and parallel with it, but is very fine, pale coloured and *prominent on the underside*; the cubital nervure is short, also very fine, pale coloured and midway between the costal vein and the hindmargin; the membrane itself is translucent, rose coloured, and, in dried specimens, the superior surface resembles certain parts of the skin of the human finger, the depressed fine lines branching from the nervures.

The legs are black, smooth, the anterior much shorter than the second and third pairs, which are much longer than the body, the middle pair being the longest. Femora more or less dilated, tibia linear, tarsi entire (?), claw simple, minute.

The ova are elongate oval, ends subequal, colour orange-red, length 1 mm., diameter 0.5 mm., quite smooth as seen by means of the triple Coddington lens.

Strong methylated alcohol, in which most of the males and a portion of the ova were immersed, became of a pinkish-yellow colour in a few days, while a white paper label became dyed of a rose colour in the liquid.

***Nepticula nigricansella*, sp. nov.**

Metallic brownish-black. Head with long, dense, erect bristles, dull black; face and pronotum resplendent dark bronze in reflected light; antennæ nearly as long as the folded wings, silvery towards apex; forewings with three very narrow, nearly equidistant, metallic bluish-white bands; hindwings black, tips brilliantly metallic; body beneath metallic, blackish, with white hairs fringing the segments sparingly; legs very long, black, with some indistinct pale bands. Length of body—Male, 1.5 mm.; female, 2 mm. Span of wings—Male, 4 mm.; female, 6 mm.

One male and two females, bred from leaves of *Kennedya* (*Hardenbergia*) *nigricans*. Habitat—Unley, Adelaide, S.A.

The leaves, presented on September 4 by Mr. W. H. Grasby, had the underside so completely mined by the larvæ that the entire epidermis became separated from margin to margin in most, and partially so in others. A tiny chrysalis being detected fixed to the upper (still green) part on one of the veins, the leaves were secured in a box with a glass lid. On September 15 the first imago was noticed, and on the 19th two more.

A portion of a Eucalyptus leaf from Mr. A. Zietz exhibits quite similar features, which give the foliage the aspect of being blistered, and shows that there are other species of these, the tiniest of Lepidoptera.

DESCRIPTIONS OF NEW SPECIES OF CORALS
FROM THE AUSTRALIAN TERTIARIES.

By J. DENNANT, F.G.S., Hon. Member.

PART II.

WITH PLATES IX.—X.

[Read October 3, 1899.]

In this communication the descriptions of species belonging to the family Eupsammidæ are continued.

Trematotrochus complanatus, *spec. nov.* Pl. ix., figs. 1a, b.

Corallum small, free, much compressed, especially inferiorly, and contracted slightly at the summit. In general outline it is a flattened cone, of which the laterally rounded base forms the apex. Calice shallow and elliptical, with its diameters in the ratio of 100 to 66.

Septa in six systems with three complete cycles. The primaries are the longest, and are very much stouter than the other orders. The secondaries are usually, but not always, longer and stouter than the tertiaries. All are exsert, entire, and beset laterally with long pointed granules, which give a serrated appearance to their upper margins; the central ends of some septa are also lobed. The primaries, which rise higher in the calice than the remaining septa, are convexly curved superiorly and then descend almost abruptly towards the elongate columella. This is formed of solid tissue with large nodules or papilli on its surface. It varies much in outline for different individuals, and is occasionally almost lamellar, though usually broad and spreading. It is depressed in the calice, but not greatly, and is fused just below its nodular surface to the primary, and still lower down to the secondary septa; its junction with the latter is, however, rarely visible except in worn examples.

The costæ curve inwards at the calice, and are then continued by the convexly curved and exsert septa. They are broad and prominent, especially at the margin, from which they gradually diminish in size to the base. The six primaries are plainly distinguishable on the wall, as they are not only slightly stouter than the secondaries and tertiaries, but also project above them at the margin. The primaries are free right to the base, where they are fused with each other, and also with the united secondaries and

tertiaries. These two orders join very near the base, each pair of tertiary curving and meeting the enclosed straight secondary. The intercostal spaces are narrower than the costæ, and are crossed by slender transverse bars, between which a series of longitudinal openings or pores penetrate the wall. Towards the base of the corallum the pores become very small and barely distinguishable.

Height of corallum, 5 mm.; length of calice, 3 mm.; breadth of calice, 2 mm.

Localities.—Upper Eocene, Spring Creek (type); Middle Eocene, Muddy Creek.

Trematotrochus lateroplenus, *spec. nov.* Pl. ix., figs. 2a, b.

Corallum much like the preceding, but less compressed inferiorly. It is subcylindrical for a short distance from the base, and then expands so as to form a flattish cone with rounded lateral borders. Calice elliptical and shallow; its axes are in the ratio of 100 to 62.

Septa in six systems with four cycles, but the fourth cycle is developed only in the end systems which are correspondingly larger than those at the centre. As in *T. complanatus*, the six primaries are very stout, and rise above the general level of the calice. The secondaries and tertiary are equal, and comparatively slender, while the quaternaries are, as a rule, smaller still. The latter are usually free, and the primaries uniformly so, but the secondaries and tertiary in the lateral, and occasionally also in the central systems, are irregularly fused together close to the columella. The sides of all the septa are studded with sharply pointed granules, and their upper margins have consequently a dentate appearance. Some infilling of the interseptal spaces is due, I think, to the development of stereoplasma and not to true endotheca.

Columella elongate, irregular in outline, and tending to spread laterally in the fossa. Its upper surface is nodular, papillary, or even spongy in texture. It is fused, either directly or by means of thin processes, with the inner margins of the primary, secondary, and occasionally the tertiary septa.

Costæ broad, flat, and continuous with the septa. They are evenly placed round the border of the calice, the greater marginal extent of the four end systems giving room for the extra cycle of costæ developed in them. The base of the corallum is formed by the union of twelve costæ, of which the six primaries remain free to the summit. The secondaries are joined at a short distance from the base by the tertiary, and these again in the lateral systems by the slightly shorter quaternaries. The intercostal spaces are narrow and regularly porous in the manner characteristic of the genus.

Height of corallum, 5 mm.; length of calice, 3 mm.; breadth of calice, 2 mm.

Localities.—Eocene; Shelford (type) and Muddy Creek, Victoria.

GENUS STEPHANOPHYLLIA.

Stephanophyllia implexa, *spec. nov.* Pl. x., figs. 1a, b, c, d.

The corallum is free, circular, and in shape like a crown, with convex upper surface and sub-plane base.

The septa rise almost vertically from the basal margin, and then arch round to a small, shallow, and elongate fossula. They are in six systems, with five complete cycles. The primaries are free and reach almost to the columella; two of them are in a line with this and straight, but the other four curve slightly from it just at their inner extremities. The secondaries are also straight, and equal in length to the primaries; at about three-fourths from the margin they are fused with the tertiaries, either directly or by means of synapticular laminae; for the remaining one-fourth of their length their upper margins are lobed and deeply notched. The other orders of septa are straight for a short distance from the margin, but then describe a remarkable series of curves, each cycle finally uniting with that of the order immediately preceding. The tertiaries curve gently towards the secondaries but, before actually uniting with them, bend round and run parallel with them for some distance. The two quaternaries in each half system are unequal in length, that nearest the primary being much longer than the other. Both bend from side to side, and describe an irregular triple curve before joining the intervening tertiary at distances corresponding to their lengths. The quinquaries curve towards and join the quaternaries, but in each half system all four differ in length. The first and third in order of length unite with the longer of the two quaternaries, and the second and fourth with the shorter. In the case of both sets of quinquaries the shorter of the two is that adjacent to the tertiary septum. Near the wall the septa are slender and equal, but become stouter medially. Their upper margins are strongly serrated by a regular series of transverse granular projections with alternating shallow notches. The serrations are not confined to the edges of the septa, but can be traced vertically downward for a short distance till they gradually cease.

Not only are the septa from the second to the fifth, or highest order, connected in the manner described by a series of tortuous curves, but the chambers so formed are usually closed at their outer ends by synapticular processes which unite adjoining laminae where the intervening spaces are narrowest. The whole calice

is thus subdivided into a large number of chambers, which are repeated symmetrically in the systems. One of my specimens, which has the upper margins of the septa worn down to the level of the synapticulæ, shows this structure of the calice very clearly. In his description of *Stephanophyllia complicata*, a recent species, Moseley calls attention to an analogous symmetrical arrangement of closed calicular chambers formed jointly by curved septa and synapticular processes.* As another instance I may quote *S. elegans*, Michelin, from the Italian Miocene.

The columella is elongate, papillary, and not very conspicuous. From a dissected specimen I judge it to be a fairly compact structure reaching to the base. Some of the secondary septa are joined to it in the specimens examined, but not the primary, which are, superficially at least, separate from it. Pali are not present.

The undersurface, or wall, is very slightly concave and barely projects beyond the superimposed crown-like calice. The costæ are thin, finely granular, well raised ridges, which radiate regularly from the centre to the circumference. At the central point a few costæ are irregularly fused together, but these immediately bifurcate, and so on successively till at the margin there are 96, or 16 in each system. Here they alternate with the septa, and extend just beyond them.

The whole undersurface of the corallum is fenestrated by stout transverse bars alternating with approximately circular holes arranged in regular series in the interspaces of the costæ. These openings or pores are largest at the margin and gradually diminish in size towards the centre. About 20 concentric rows of pores were counted in the large specimen figured.

Diameter of base, 11 mm.; height of corallum, 5 mm.

Locality.—Eocene, Spring Creek, 13 miles south of Geelong, Victoria. Five fairly perfect specimens and a fragment of a sixth.

The three species next to be described cannot be placed in any established genus. They possess the porous wall of the Eupsammidæ, but are defective in the incurving and lateral junction of the septa generally characteristic of that family. In some respects, and especially in the irregular development of their septa, they approach Milne-Edwards and Jules Haime's genera *Leptopsammia* and *Endopsammia*, each of which was founded upon a single recent species. They stand apart, however, from both, and I class them under the following new genus:—

* Challenger Reports, Zoology, vol. II., pp. 198-201.

GENUS NOTOPHYLLIA, *nov.*

Corallum simple, free. Calice elliptical. Columellar lamellar and lobed, knobbed, or indented. Septa moderate in number, with irregular cyclical development; principal orders straight, and the fourth, if present, curved or not. Wall porous, and vermicular or granular. Costæ distinct. Epitheca partial or absent.

Notophyllia semivestita, *spec. nov.* Pl. ix., figs. 3a, b.

The corallum is compressed and tall in relation to its breadth. The anterior and posterior surfaces taper to a thin, laterally projecting, wedge-shaped base, above which the sides are slightly concave. About two-thirds of its upper surface is encircled by a stout banded epitheca, with one or two rudimentary bands below the main portion. Superiorly the epitheca terminates abruptly close to the summit of the corallum, and there stands out almost independent of the wall, being only connected with it by thin rod-like processes, which here and there cross the intervening space. Wall coarsely porous and highly vermicular. The costæ are broad and distinct, especially at the summit of the corallum, where, as prominent continuations of the septa, they fringe the calicular margin. Calice elliptical and superficially shallow with a deep fossa; its axes are in the ratio of 100 to 66. Columella deeply seated, stout, and lamellar, with a lobed upper surface.

Septa exsert and in six systems, with three complete cycles, and some of a fourth; the latter are developed only in the half systems at the extremities of the longitudinal axis; moreover, in the type calice one of these halfsystems shows no fourth cycle. All orders of septa are straight and free, with no sign of incurving in any. The primaries and secondaries are stout and subequal; the tertiaries and quaternaries are also subequal, but much smaller. The two first orders slope gently towards the axial fossa, and then descend abruptly, but do not unite with the columella. All the septa are coarsely granular; near the wall they are cellular, and occasionally perforate, but in the body of the calice they are solid, as well as symmetrically arranged laminæ.

Height of corallum, 15 mm.; length of calice, 8 mm.; breadth of calice, 6 mm.

Locality.—In the Eocene strata three miles west of Gellibrand River, on the south coast of Victoria. A solitary example, but so well preserved that I select it without hesitation as the type of the new genus.

Notophyllia gracilis, *spec. nov.* Pl. x., figs. 2 and 3a, b.

Corallum compressed and variable in height, usually short; some individuals are more compressed inferiorly than others.

The base may be concave, straight, or even convex between its lateral borders. Wall thin, granular, and perforated by numerous sub-circular irregularly scattered pores. There is no epitheca. Costæ broad, distinct, and continuous with septa.

The calice is elliptical and shallow superficially, with a deep fossa; the ratio of its major and minor axes is as 100 to 75.

The columella, which is deeply seated, is a slender, elongate, strongly incised, and perforated lamina. It rises vertically in the calice, and is free from the septa, except near its base, where the primaries are united with it by thin processes.

The septa are slender and unequal, with the primaries slightly stouter and longer than the secondaries; the tertiaries and quaternaries are very delicate laminæ, and do not extend far into the calice; all are granular, and sparsely perforate near the wall; the convexly curved upper edges of the first two orders rise considerably above the margin of the calice. There are six well-marked systems of septa, but those at the ends of the calice are much larger than the more central ones, and show a correspondingly fuller development of the cycles; in the former, three complete cycles are present, and some of a fourth; but, as in *N. semivestita*, the highest cycle is undeveloped in the more central halves of the lateral systems. Normally, there is but a single septum, and that by its size evidently a tertiary, between each pair of the central primaries, but exceptionally, as in one of the calices figured, there are three, viz., a tertiary and two quaternaries. The quaternaries present in any of the systems usually bend towards and unite with the tertiary between them; these two orders of septa consist, however, of such short delicate laminæ that their junction is an inconspicuous feature of the calice. The two calices figured represent fossils from different localities, and serve to illustrate the variation observed in the species; their coralla are practically indistinguishable, and only the better preserved of them is drawn.

The coralla vary in height from 5 to 7 mm. Height of corallum figured, 6 mm. Diameters of type calice, 5.5 mm. and 4 mm. Diameters of calice in variety, 6 mm. and 4.5 mm.

Locality.—Eocene; Shelford (type calice) many examples. Camperdown, Muddy Creek. The variety was collected by Mr Kitson at Altona Bay.

Notophyllia aperta, *spec. nov.* Pl. ix., figs 4a, b.

This coral somewhat resembles *N. gracilis* in shape, but is less compressed. The base is keeled, and either straight or concavely curved in the direction of its longer axis. The calice is elliptical and widely open, but not shallow; the relation of its major to the minor axis is as 100 to 83. Wall stout, vermicular, and highly porous; numerous pores are distinguishable on the in-

terior as well as the exterior surface of the wall. There is no epitheca, and the costæ are broad, well marked, and continuous with the septa. The latter are at the wall broad and spreading, irregular in outline, occasionally branched, and very porous; their projections into the calice taper off, and are straight, free, sharply defined, and imperforate. There are six systems of septa with three complete cycles in those at the ends of the calice, but with two only in the central pair. The secondaries and tertiaries are subequal, and the primaries both longer and stouter; all three orders are exsert and coarsely granular.

The columella rises vertically from the bottom of the fossa, and forms the most conspicuous feature of the calice. It is straight and lamellar, of moderate length, and most irregular as to its surface, which is marginally indented, and laterally ridged, knobbed, and perforated. It is free from the septa except just at the base, where it is apparently connected by thin processes to the primaries.

Height of corallum, 6 mm.; length of calice, 6 mm.; breadth of calice, 5 mm.

Locality.—Eocene at Fyan's Ford, Geelong. One good example (the type) and another smaller and evidently young.

N. aperta is closely allied to *N. gracilis*, but may be distinguished from that species by its stouter wall, coarser septa, more conspicuous columella, and broader and more open calice. The absence of a fourth cycle of septa is, perhaps, unimportant. Possibly other examples may yet be found with this developed.

EXPLANATION OF PLATES.

PLATE IX.

Fig.

1. *Trematotrochus complanatus*—*a*, corallum, 8 diam.; *b*, calice, 10 diam.
2. *Trematotrochus lateroplenus*—*a*, corallum, 8 diam.; *b*, calice, 10 diam.
3. *Notophyllia semivestita*—*a*, corallum, 2 diam.; *b*, calice, 6 diam.
4. *Notophyllia aperta*—*a*, corallum, 3 diam.; *b*, calice, 6 diam.

PLATE X.

Fig.

1. *Stephanophyllia implexa*—*a*, corallum, 3 diam.; *b*, calice, 6 diam.; *c*, section of base, showing one system of costæ, 10 diam.; *d*, a primary septum, magnified.
2. *Notophyllia gracilis*—calice, 6 diam.
3. *Notophyllia gracilis*, var.—*a*, corallum, 3 diam.; *b*, calice, 6 diam.

DIAGNOSES OF FOUR NEW SPECIES OF PLANTS FROM SOUTH AUSTRALIA.

By PROFESSOR RALPH TATE.

[Read October 3, 1899.]

Minuriella annua, Tate, 1899.

Minuria annua, Tate, *m.s.*

In the following description of a new plant, I have embodied the results of a microscopic examination of the floral parts, which might have been omitted if the generic location did not admit of a doubt; but whereas the plant presents a new departure for the genus in respect of habit, it becomes desirable that those features relied on in the classification of the genera of the Tribe Asteroideae should be correctly defined.

A dwarf glabrous annual, erect, up to one centimetre, slightly branched at the base; branches slender, compressed. Leaves somewhat fleshy, 30 to 35 mm. long, alternate; sessile slightly dilated and thin below, narrow linear above, obtuse at the tips. *Flower-heads* erect, singly and laterally disposed along the branches, leaf-opposed, about 7 mills. broad in the longer diameter; pedunculate on stalks up to 4 mills. long. *Involucre* campanulate; receptacle slightly convex, ellipsoid in marginal outline (the diameters as three to four). *Bracts* about 16, chiefly in one row with a few small exterior and basal ones, narrow-oblong, narrowed at the base and slightly dilated upwards, rounded at the tips; of thin texture, firm, but not coriaceous; medially green, with a translucent margin all round, which is more or less lacinate, or sometimes ciliate at the summit.

Ray-florets 20 to 30 anatherous. *Corolla-tube* as long as the pappus (3 mills.), filiform, green, the ligulate blade yellow, at first linear, expanding upwards into a spatulate or narrow oblong tip, nearly as long as the tubular portion. *Pappus* well-developed, 3 mills. long, and slightly exceeding the involucre, consisting of about 25 filiform bristles, not at all dilated at the base, equally strongly and closely denticulated throughout. *Style* linear-lanceolate; style-branches, a little longer than the style, filiform-cylindric (apparently without papillæ), included within the corolla-tube, or but slightly exsert. *Archenes* fertile, narrow-elliptical, attenuated upwards and there truncate; 2 mills. long, silky-hairy, especially on the margins.

Disk-florets bisexual, about 15 in. each head. *Corolla* tubular, filiform, but widening upwards; five-toothed (the segments short, broad, and acutely triangular). The *pappus* bristles more or less

connate to form a tube about the length of the corolla; a few bristles (similar to those of the ray-florets) extend beyond the tube for the whole length of the corolla. *Style* and style-branches nearly two times as long as the corolla; the style-branches nearly terete, with obtuse elongated clavate tips, papillose on the back. *Anthers* obtuse at the base. *Achenes* abortive.

Habitat.—Mount Lyndhurst Run near Farina, South Australia; discovered by Mr. Max Koch, who has had the species under observation for two flowering seasons.

The floral characters presented by this new plant are in the main proper to *Minuria*; and of the five species which are comprised in the genus (restrictively Australian), it makes some approach to *M. suaedifolia* by its yellow flowers and connate pappus of the disk-florets. But the species differs from all of them by its herbaceous habit, and more particularly by its lateral (not terminal) flower-heads; the long corolla-tube of the ray-florets is a further difference, though one of degree only, and therefore not of generic value.

Nevertheless, the species typifies a new section or subgenus, for which I propose the name *MINURIELLA* (diminutive of *Minuria*, in allusion to its dwarf and herbaceous habit).

GENUS ZYGOPHYLLUM.

Before proceeding to the diagnoses of certain new forms in the genus, I will make some general observations on those characters, presented by known species inhabiting Australia, which are employed in the discrimination of the species.

Mueller admits nine species, to which I add two; these may be grouped into two series on the differential characters afforded by the filaments, shape of capsule, and floral taxonomy.

Bentham, in "Fl. Aust.," I., p. 292, employed the first character to distinguish the primary subdivisions; Mueller, "Vict. Plants," the last; and I, in my "Flora S. Aust.," the second. The species included under these several schedules are as follows:—

FILAMENTS.

1. Basal part of filament winged.

Apiculatum, glaucescens, crenatum, iodocarpum, prismatothecum, Kochii, hybridum.

2. Filaments subulate, not winged.

Billardieri, ammophilum, fruticulosum, Howitti.

FRUITS.

1. Capsule obconic, truncate atop.

Apiculatum, fruticulosum, ammophilum, Billardieri.

2. Capsule globose, oval, or oval-oblong.

Prismatothecum, Howitti, glaucescens, crenatum, iodocarpum, Kochii, hybridum.

FLORAL TAXONOMY.

1. Flowers pentamerous.

Apiculatum, iodocarpum, Kochii, hybridum.

2. Flowers tetramerous.

Glaucescens, crenatum, prismatothecum, Billardieri, ammophilum, fruticulosum, Howitti.

Further, the number of seeds in each cell of the capsules is variable; normally one-seeded in *apiculatum, iodocarpum, prismatothecum, Billardieri, fruticulosum*; normally two-seeded in *ammophilum*; normally three- to five-seeded in *glaucescens, crenatum, Kochii, hybridum*.

Again, the foliage conforms with one type, and consists of two leaflets terminating a short common petiole, which passes to a two-lobed leaf, in which the leaflets are continuous with the winged petiole (and in *Z. Howitti* the petioles become connate); this latter condition is a natural transition from the former one, and most of the species exhibit the two conditions. The shape of the leaflet is subject to variation in the majority of the species; the extremes suborbicular, obovate, cuneate, and linear-lanceolate. Micromorphs as regards the corolla are not infrequent.

I have been much concerned as to whether or not the phenomenon of hybridization or that of dimorphism could explain the differential characters of the two new species, but I think that a study of the following tabular summary of the chief differential characters among the Australian species should remove all doubts thereon. I may add that the new species have been under careful observations by Mr. Koch for at least two years, and upon an abundance of living material:—

—	Filaments.		Flowers.		Shape of Fruit.			Direction of Fruit.		Length of Stalks.*		No. Seeds in each Cell.		
	Winged.	Simple.	5-merous.	4-merous.	Obconic.	Not obconic.	Pendulous.	Erect.	Short.	Long.	1.	2.	3-6.	
<i>Apiculatum</i> ...	*	-	*	-	*	-	*	-	*	-	*	-	-	*
<i>Glaucescens</i> ...	*	-	-	-	-	*	*	-	*	-	-	-	-	-
<i>Crenatum</i> ...	*	-	-	*	-	*	-	*	*	-	-	-	-	*
<i>Iodocarpum</i> ...	*	-	*	-	-	*	*	-	*	-	-	-	-	-
<i>Prismatothecum</i> .	*	-	-	*	-	*	-	*	*	-	-	-	-	-
<i>Kochii</i> ...	*	-	*	-	-	*	*	-	*	-	*	-	-	*
<i>Hybridum</i> ...	*	-	*	-	-	*	*	-	-	-	*	-	-	*
<i>Billardieri</i> ..	-	*	-	*	*	-	*	-	-	*	*	*	*	-
<i>Ammophilum</i> ...	-	*	-	*	-	*	*	-	*	-	*	-	-	-
<i>Fruticulosum</i> ...	-	*	-	*	-	*	*	-	*	-	*	-	-	-
<i>Howitti</i> ...	-	*	-	*	-	*	*	-	*	-	*	-	-	-

* The length of the fruiting peduncle in relation to the petiole of the leaf.

Zygophyllum hybridum, Tate, 1899.

A diffuse annual. Leaflets obliquely oblong, entire; petiole somewhat flattened, longer or twice as long as the blade.

Flowers yellow, relatively small, pentamerous, the petals not 6 mm. Stamens ten, the filaments shortly winged. Capsules on erect stalks exceeding the leaves, often violet-coloured; oblong, about 10 mms. long, with five blunt angles; seeds from four to six in a cell, compressed, pyriform in peripheral outline, dark-brown; funiculus affixed at the upper one-third or to near middle of seed, thence decurrent to near the rounded end. The decurrent funiculus occupies a medial furrow, and is conspicuous therein as a white raised line. (This feature is also exhibited by *Kochii* and *iodocarpum*).

Mount Lyndhurst Run, Far North; "grows on loose loamy soil, hence is seen at its best only in very wet seasons" (Mr. M. Koch); also Cootanoorina (Elder Exped. as *Z. glaucescens*, var.).

This new species has many characters in common with *Kochii*, but more particularly differs by its more oblong capsule, and the interspaces between the angles only shallow-concave, so that the angles appear blunt, though actually sharp-edged. It may be confounded with *iodocarpum*, which has, however, a globulose fruit on very short pendulous peduncles.

Zygophyllum Kochii, Tate, 1899.

A diffuse annual. Leaflets oblong-cuneate, a little longer than the somewhat flattened petiole, irregularly two- or three-crenate (as in *Z. crenatum*). Flowers yellow, relatively small, pentamerous, the petals not 8 mm. long. Stamens ten, the filaments shortly and broadly winged. Capsules on pendulous stalks longer than the petioles, but not exceeding the leaves; quadrately-oblong to oval-oblong in outline, about 10 mm. diameter, acutely five-angled, a deep acute sinus between the angles, but not winged. Seeds usually four in each cell.

Near Mount Fitton and Trinity Well (Mr. J. Langley).

This species resembles *Z. crenatum* in several particulars, but differs markedly by its pentamerous flowers and deep acute sinus between the angles of the capsule.

Eriocaulon submersum, Tate, 1899.

Dwarfish, stem undivided; leaves all radical, densely tufted, lanceolate acute-pointed, varying from 20 to 50 mm. long; average examples about six times as long as wide, erect; the cells of the leaves very conspicuous.

Flower-heads ovoid, rarely attaining to more than 5 mm. wide and 4 mm. long, on a scape slightly exceeding the leaves.

Bracts orbicular-oval, concave, relatively large, about 2 mm. long, yellow and shining.

Female flowers: sepals two, white, concave, and somewhat keeled, glabrous, free, equal; petals four, linear-spathulate, the fourth smaller than the others, cohering at the base; style one, with two filiform branches; fruit globulose, minute, pale-brown, and shining.

The species is anomalous in its tetramerous flowers; whilst its glabrous flower-heads and the form of its floral leaves distinguish it, otherwise, from all Australian species.

This is the first record of a member of the Order Eriocaulæ in South Australia, though an undescribed species occurs in the Macdonnell Ranges in the extra-tropical part of the Northern Territory.

The collector, Mr. Max Koch, supplies the following information as to its habitat, &c. :—"About ten miles north from Trinity Well, on the main road to Innamincka, there is a large plain. Here and there are elevations of several feet high, densely covered with sedges: these elevations are the springs. Although they have never been known to go dry, yet not a large quantity of water seems to run away, and there is sufficient to water from one to several thousand sheep. It is in these springs that the *Eriocaulon* grows densely packed together, so that you may stand on them; for beneath them is nothing but a deep bog. The water is glittering between the leaves; the top portion of them and the flower-heads are out of the water. The leaves are succulent, but rigid; the part exposed to the light is of a pale-green colour, the lower part of the leaves is white."

ABSTRACT OF PROCEEDINGS
OF THE
Royal Society of South Australia,
FOR 1898-9.

ORDINARY MEETING, NOVEMBER 1, 1898.

W. L. CLELAND, M.B. (President) in the chair.

BALLOT.—A. Purdie, M.B., Saml. Hughes, B.Sc., and Max Koch were elected Fellows.

EXHIBITS.—A. ZIETZ, Assistant Director Museum, exhibited eleven species of Australian wrens (*Maluridæ*) from Museum. J. G. O. TEPPER exhibited mineral specimens from Coolgardie and galls from Acacia. Prof. TATE two plant specimens from Mount Lyndhurst, collected by Mr. Koch, *Acacia papyrocarpa* and *Cochorus longipes*. W. HOWCHIN a specimen of Eocene limestone from a brick-pit at Southwark, showing casts of *Turritellæ* and other shells. This stone evidently occupied site of old river bed, and had lost by leaching most of its calcareous constituents. A section of the pit gives 20 ft. of brick-earth from the surface, 9 ft. loose river sand and coarse gravel below that, then 16 ft. of tenaceous red clay. At 45 ft. water was tapped. He considered that the occurrence of the old river bed in this unexpected position indicates a change in the line of drainage, and is concomitant with the oscillations of level that have occurred along the seaboard in recent geological time.

ORDINARY MEETING, DECEMBER 6, 1898.

W. L. CLELAND, M.B. (President) in chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited specimens of the bee-flies and their rat-tailed pupa cases (*Enstalis*, sp.) with queen and worker bees. Also galls from *Acacia retinoides* produced by gall midges (*Diplosis*) a number of which were shown, together with parasites bred with them; minute Chalcidid wasps, the minute beetle of the family Carylophidæ and larvæ, and an *Anthrinus* beetle, the larvæ of which must have lived in the interstices of the galls.

PAPERS.—“Nesting Habits of the Australian Rails with Specimens of Eggs,” by A. M. MORGAN, M.B. “New Species of S.A. Chitons,” by W. G. TORR, LL.D., and E. ASHBY. “Further Descriptions of S.A. Coleoptera,” by Rev. THOS. BLACKBURN, M.A.

ORDINARY MEETING, MAY 2, 1899.

W. L. CLELAND, M.B. (President) in chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited specimens of what is known as “pug and cement” from Kanowna, W.A., both containing gold in a fine flaky form very difficult to extract, and which yielded to the “Haycraft” process. Also a very beautiful picture of butterflies, printed in colours true to nature from photographic plates in three colours.

Proposed by Mr. DIXON, seconded by Mr. TEPPER—“That the President, Vice-President, and as many of the Fellows as could attend, represent this Society on a deputation which will shortly wait upon the Government to urge upon it to conserve and add to the forest reserves.” Carried.

Mr. TEPPER, referring to the death of the late Mr. E. Guest, at Yahl, called attention to the valuable collection of moths he had left.

Proposed by Mr. DIXON, seconded by Mr. HOWCHIN—“That the above announcement was received with regret. It was further proposed that the Board of Governors of the Museum have their attention called to the valuable collection of Microlepidoptera he had made, with a view of securing the same for the Museum.” Carried.

PAPERS.—“An Explanation of Diamagnetism,” by RD. KLUMAN. “Notes and Remarks, with List of Dragon-flies of South Australia and Polynesia,” by J. G. O. TEPPER, F.G.S., and M. René MARTIN.

ORDINARY MEETING, JUNE 6, 1899.

W. L. CLELAND, M.B. (President) in chair.

EXHIBITS.—A. ZIETZ, F.L.S., C.M.Z.S., exhibited the Museum collection of Psittacidae. J. G. O. TEPPER, F.L.S., specimens of native silver in fine capillary form, black garnets, and the resin of the courie usually called gum-dammar, with a piece of amber to show the striking resemblance, even to the entombed insect found in each.

Prof. TATE, F.G.S., reported that the Board of Governors of the Museum required more information *re* the late Mr. Guest's collection.

Mr. Tepper handed in list of Lepidoptera from^y Los Angeles, California, for exchanges.

Prof. TATE called attention to *Drosera Whittakerii*, known for the last 40 years by the name of "painter," in allusion to its dye properties.

BALLOT.—T. L. BROWN, Barrister; ANDREW FERGUSSON, Agricultural School, Adelaide; and R. KLUMAN, as Fellows.

PAPERS.—"Older Tertiary Fossils of uncertain age from the Murray Desert," by Prof. TATE, F.G.S. "Description of New Species of Australian Tertiary Corals," Part I., by J. DENNANT, F.G.S.

ORDINARY MEETING, JULY 4, 1899.

W. L. CLELAND, M.B. (President), in the chair.

EXHIBIT.—Dr. STIRLING brought under the notice of the Society a French work on natural history, with description and plate of Emu formerly found on Kangaroo Island, but now extinct, mentioned by M. Peron, naturalist in Baudin's voyage of discovery. Mr. ZEITZ mentioned that he had heard from a resident that the last of the species had been shot some six years ago.

PAPERS.—"On the Manus and Pes of Diprotodon," by Prof. STIRLING, M.D., and A. ZIETZ, Assistant Director of the Museum, and "On the Identity of Phascolomys (*Phascolonus gigas*)," with "Sceparnodon Ramsayi" by the same.

ORDINARY MEETING, AUGUST 1, 1899.

W. L. CLELAND, M.B. (President), in the chair.

EXHIBITS.—Mr. T. S. REID showed some beautiful leaf impressions, and stated that the leaves were first subject to heavy pressure to level down angular portions, then a piece of plate glass covered with printer's ink was laid upon them. The leaves thus covered with ink were ready to be impressed on the paper.

Mr. TEPPER exhibited a case of beetles recently added to the Museum.

PAPER.—"Notes on the geology of Kangaroo Island, with special reference to the evidence of extinct Glacial Action," by W. HOWCHIN, F.G.S.

ORDINARY MEETING, SEPTEMBER 5, 1899.

W. L. CLELAND, M.B. (President), in the chair.

EXHIBITS.—A. ZIETZ, F.L.S., exhibited a substance resembling Coorongite, which under the microscope proved to be the skin of some cetaceous mammal. Prof. TATE remarked that Coorongite had been carefully examined in London, and there shown to be of vegetable origin. Mr. HOWCHIN stated that Coorongite was found at the top of flood line, where occasionally inundation takes place, and suggested a possible connection with the carbon-

aceous mud found in certain wells and springs in S.E. J. G. O. TEPPER, F.L.S., exhibited a specimen of *Chiastolite*, a silicate of alumina, from Murchison district, W.A., showing the dark cross from which it is named.

PAPERS.—“Description of Australian Curculionidæ,” Part I., by ARTHUR M. LEE, Tasmanian Government Entomologist, introduced by Rev. Thos. Blackburn, B.A. “On the Worturpa Telluride,” by A. J. HIGGIN. “Revision of the Australian Liotredæ and Cyclostiimatidæ,” “Miscellaneous contributions to the Molluscan Fauna of Australia,” “Revision of the Mollusca of the Older Tertiaries of Australia,” by Prof. TATE, F.G.S. “Fossil Reptilia of the Lake Eyre Basin,” by A. ZIETZ, F.L.S.

ANNUAL MEETING, OCTOBER 3, 1899.

W. L. CLELAND, M.B. (President), in the chair.

EXHIBITS.—Prof. TATE, F.G.S., showed botanical specimens collected by Mr. Max Koch, *Eriocaulon submersum*, from Public House Springs, Lake Eyre Basin, and *Minuriella amnua*, *Zygophyllum hybridum*, and *Z. Kochii*, from Mt. Lyndhurst run. Mr. E. ASHBY, several species of *Caladenia*. Mr. HOWCHIN the true Coorongite.

ANNUAL REPORT AND BALANCE-SHEET read and adopted.

ELECTION OF COUNCIL.—President, W. L. Cleland, M.B.; Vice-Presidents, Prof. Ralph Tate, F.G.S., and Walter Howchin, F.G.S.; Hon. Treasurer, Walter Rutt, C.E.; Auditor, Edwin Ashby; Members of Council, Prof. Rennie, D.Sc., Prof. Stirling, M.D.; Rev. Thos. Blackburn, B.A., S. Dixon, J. S. Lloyd, and W. H. Selway.

PRESIDENTIAL ADDRESS read by the President, and upon the motion of Prof. TATE, seconded by WALTER HOWCHIN, was ordered to be printed in the Society's Transactions.

PAPERS.—“Definitions of four new species of Flowering Plants inhabiting South Australia,” by Prof. RALPH TATE, F.G.S. “New Tertiary Corals,” Part II., by JAS. DENNANT, F.G.S. “Notes on a description of the male of *Coelostoma immane* (Maskell), and a new species of a Leaf Mining Moth,” by J. G. O. TEPPER, F.L.S.

BALLOT.—A. J. HIGGIN as a Fellow.

ANNUAL REPORT.

The Council has to report that during the past year the work of the Society has included research in the various departments of science as represented by the various papers read before the Society and included in its Transactions.

The membership of the Society consists of 10 Hon. Fellows, 68 Fellows, 7 Corresponding Members, and 1 Associate. Six Fellows have been elected during the year.

It had been decided by the Council to publish a series of "Memoirs" of the Royal Society in royal-quarto size for the purpose of presenting the descriptions of the Fossil Remains of Lake Callabonna in this province in a more suitable form than is permitted by the size of the "Transactions." The first part of the first volume of the "Memoirs" has now been issued. Other parts will appear as circumstances permit.

The Council gratefully acknowledge the timely assistance of the Government of this colony, exercised through its Treasurer (the Hon. F. W. Holder), in making a special grant of money which has removed the principal obstacle to publishing a scientific account of the Callabonna discovery.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£ s. d.	£ s. d.	Cr.	£ s. d.	£ s. d.
To Balance, October 1st, 1898	...	162 19 0	By Cost of Transactions—
“ Subscriptions—	Printing	...	122 10 10
Royal Society	69 11 0	...	Illustrating	...	27 16 8
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Astronomical Section	16 0 0	...	“ Cost of Memoirs—	...	160 11 3
Malacological Section	1 2 4	...	Printing...	...	38 7 6
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	...	5 5 4	Field Naturalists' Section	...	20 0 0
	Astronomical Section	...	27 0 0
	“ Exchanges on Cheques	...	47 0 0
	“ Balance in Savings Bank, Oct. 1st, 1899	...	0 1 6
	105 6 0
	£425 12 5

Audited and found correct,
 EDWIN ASHBY, Auditor.
 28th September, 1899.

WALTER RUTT, Treasurer.

PRESIDENT'S ADDRESS.

Following precedent, the President addresses a few remarks to the Fellows at the Annual Meeting. The work of the past year has already been stated to you in the Report of the Council, and it is only necessary for me to congratulate the Society on the publication of a portion of the work in connection with the Callabonna fossils in quarto form as Memoirs. This has been necessary owing to the large size of the illustrations. Again the Society has to thank the Government for its enlightened generosity in placing a further sum of £100 on the Estimates of the current financial year for this purpose. It is to be hoped that at some future time a former contribution of the Callabonna fossils, namely, the description of the bones of *Genyornis Newtoni*, may also be re-issued in the enlarged form, so as to allow of the whole of the Callabonna work being published on a uniform scale. Fortunately the negatives of the plates have been preserved, so that the expense would be trifling. It will, however, be a matter for regret that the idea of a joint descriptive anthropological work on the Australian aborigines has not advanced beyond the stage of being referred to the meeting of the Australasian Association for the Advancement of Science, to be held in Melbourne next January. There are, no doubt, many difficulties of an organising nature that await solution, but it is to be hoped that the man and the hour will mutually rise equal to the occasion. But if the outlook is not so favourable as might be desired in this matter, there is still ample room for congratulation on the part of Australian Anthropologists, that in closely successive years two works on the Australian Aborigines of supreme importance have made their appearance. Reference is made to "Ethnological Studies among the North-West Central Queensland Aborigines," by Dr. Roth; and to "Native Tribes of Central Australia," by Prof. Baldwin Spencer and Mr. F. J. Gillen, Special Magistrate. All will agree that these works, although of immense value, do not reach finality; but as Pouchet says, in the preface to his work on "The Plurality of Races," "Books are, after all, merely a summary; they are behind-hand even on the day they are published." The learned authors, however, have literally put into practice the advice given by Flourens:—"We can only arrive at the distinction of species by direct and complete personal observation." And as Pouchet, who quotes him, goes on to say:—"The surest method of arriving at conclusive

evidence in anthropology is necessarily travels. Doubtless the study alone of the materials collected from afar is of the greatest possible use. But we repeat, concerning the study of mankind, what we said about the study of animals; the anthropologist must leave his library and go into the great continents, in order to study by means of his own eye-sight. That it must be complete we have endeavoured to show; but the only condition for its being complete is its being direct. . . . We can study philology and craniology in the library and in solitude, assisted by proper documents and sufficient materials—but not anthropology. . . . We must not seek for a pure population in the streets of large cities. We can only study, in these places, individuals, not species. In those parts alone which we must make centres of observation, can we see man indefinitely multiplied among really primitive people still free from inter-mixture, or with the least possible taint of the same. Then we must hasten to seize his general characteristics, and take both his physical and moral portraits.”

In the last Presidential Address the opinion was quoted that the Australian aborigines were not an example of a degenerate race. Prof. Baldwin Spencer and Mr. Gillen endorse this opinion in their introduction, and no other observers can write with more authority or express an opinion carrying more weight. They say: “It is sometimes asserted that the Australian native is degenerate, but it is difficult to see on what grounds this conclusion is based. His customs and organization, as well as his various weapons and implements, show, as far as we can see, no indication of any such feature. . . . And there is at all events no evidence of the former existence of any stage of civilization higher than the one in which we now find them.” Andrew Lang, referring to the Australians, writes:—“The natives are a race without a history, far more antique than Egypt, nearer the beginning than any other people. . . . The soil holds no pottery, the cave walls no pictures drawn by men more advanced; the sea hides no ruined palaces, no cities are buried in the plains; there is not a trace of inscriptions nor of agriculture. The burying places contain relics of men perhaps even lower than the existing tribes, nothing attests the presence in any age of men more cultivated.” Apparently the Australian natives represent one of those primitive types of mankind that were evolved at an early period after the parting of the two great branches of the tree of biology pertaining to the simian and human developments. And the analogy of tree growth may be carried further in the tendency which the larger branches have of producing buds, which may become developed into shoots and twigs of various lengths and strengths. The growth of these off-shoots would depend upon

circumstances, and we may infer that in these primitive types of mankind, the initial force which caused them to bud forth was feeble and the environment uncongenial to the evolution of a higher type. The first of these causes was probably the more effective, as at that period there was not as great a contrast between them and the corresponding developments on the simian branch, as exists at the present day between lowest man and highest ape. So that these early types never became evolved to a more imposing size and importance than that of abortive shoots on the human branch, and never were intended for anything more than local effects of a transitory nature, and were never destined to play any important role in the general evolution of mankind. This supposed initial uselessness does not, however, detract from their interest as anthropological studies. Their want in evolutionary force makes it probable that they still represent a type not far removed from the general anthropological development characteristic of the primeval times, when they first diverged from the general line.

It must always be a matter of considerable difficulty to decide whether the savages inhabiting any particular locality are autochthonous or not. There appear to be a few spots on the surface of the globe whose inhabitants seem to merit this claim. At first sight it seems incredible that a country like India, that has been under the influences of civilizations from the remotest recorded times, should still harbour some of these primitive races. It is known that in the upper basin of the Nerbudda, in the centre of Hindostan, a forest race exists who are called by the ordinary inhabitants "monkey people." They are described as being short, flat-nosed, with pouch-like wrinkles in semi-circles round the corners of the mouth, the arms disproportionately long, and the body of a rusty black colour covered with a reddish hair. Again, it is recorded by Crawford in a paper to the British Association for the Advancement of Science, in 1852, that three naturalists travelling on the northern coast of New Guinea, for scientific purposes, found the trees full of natives, who leaped from branch to branch like monkeys, with their weapons fastened on their backs. Pouchet says:—"This singular race has been noticed in Hindostan by many eye witnesses, and seems to live half its time in trees. We have a right to ask if the confused remembrance of such a race and such habits was not the origin of the tradition which served as a foundation for the poem of Valmiki. Rama goes to the rescue of his wife, Sita, who had been carried off by the evil genius, Râvana; he is assisted in this enterprise by a valiant army of monkeys." In a foot-note the Editor of the "Plurality of Races," Mr. Beavan, barrister-at-law, refers to "*Voyages de Francois Pyrard*," published in 1615;

there it is stated that at Sierra Leone there is a species of animal so strong-limbed and industrious that when properly trained and fed, will work like servants. Also to the "Voyages de Guatier Shoutten aux Indes Orientales" where nearly the same account is given of what was considered to be the orang. They are taken with snares, taught to walk on their hind feet, and to use their fore feet as hands in performing different operations, as rinsing glasses, carrying drink round to the company, turning a spit, &c. To these early travellers it probably did not occur that man could exist in such primitive types, hence they were looked upon as a kind of ape. In more modern times the orang-utan, or men of the woods, of the Malay Peninsula, have been described, and if they are autochthones they probably represent a primordial type of the Mongolian centre, judging from their portraits. In such a case they could hardly have any anthropological associations with the aborigines of Australia. There are, however, some habits which show a strange similarity in the two races. One is the manner of obtaining fire by rapidly rotating two dry pieces of wood together. Another is a mode of burial in which a lateral chamber is made at the bottom of the grave into which the corpse is laid, so that the superincumbent earth, when the grave is filled in, may not incommode the dead and make it irritable. This lessens the chances of the spirit subsequently wanting to injure the relatives or removing itself too quickly to the camp where its mother was born. A supply of food is left for the same purpose. This method of burial is described by the Rev. L. Schultz, late Moravian Missionary at the Finke River, vide Transactions of Roy. Soc. S.A., vol. XIV., part 2; but, as far as I can see, neither by Dr. Roth nor Prof. Baldwin Spencer and Mr. Gillen. A third example relates to a common practice of the orang-utan and a tradition of the Australian aborigines. The orang-utan are inveterate smokers, and if for any reason they have to desist, the partly consumed rolled tobacco-leaf is stuck in a hole in the lobule of the ear ready for future use. The tradition, as given in the "Native Tribes of Central Australia," relates to what are called the Alcheringa ancestors, and the particular incident is mentioned in connection with a tragedy enacted during some circumcision ceremonies. An old man was the offender, and he is decried "as drawing a stone knife from a socket in his skull just behind the ear." Making allowance for the age of the tradition it may be surmised that at that time or subsequently it was a practice to carry small articles of value in perforations of the lobule of the ear similiar to the orang-utan plan.

A characteristic of these primordial types appears to be their tendency to identify themselves with the rest of the natural objects of their particular locality. This may be a survival of a

sentiment of brotherhood to all branches of the biological tree from the time when the idea of the common origin of everything did not appear as incongruous as it might do to the unphilosophic minds of the present age. At that period there would be no conception of a necessary specific difference between the animate and the inanimate. The native idea of the creation of man, according to the "Native Tribes of Central Australia," was that two beings who sat up in the western sky saw, scattered all over the country, various shapeless masses. This offended their sense of good taste; therefore they descended to earth with their stone knives and set to work. A split on each side made the arms, a division at one end made the legs, a transverse gash at the other end sufficed for a mouth, two smaller ones for eyes, poking two fingers into the space between made the nostrils, and, curiously, the final step in this rough surgery was the circumcising of the new made-individual. He became now one of the Alcheringa ancestors, with power to continue the work, a supply of stone knives being left with him for the purpose. As Andrew Lang writes, they deemed themselves akin to all Nature, and called cousins with rain and smoke, with clouds and sky, as well as with beasts and birds. We have only to look at any of the old mythologies to see what a strong tendency there has always been to people any natural object with spiritual beings who had the power of communicating with or otherwise influencing the ordinary human inhabitants. It was only a step from this to the belief in metempsychosis, which appears to have existed in the earliest dawn of the human race, and to have been perpetuated to historical times. The idea in the mind of the native woman as to how conception occurs, and described in the "Native Tribes of Central Australia," is a pure metempsychosis, and is the origin of the system of totems. Scattered all over the country are the spots where the Alcheringa ancestors entered again into the earth. These spots are generally marked by some natural object in which the spirit resides. If a woman happens to be near one of these spots when she first becomes aware of being pregnant she has not the slightest doubt but that the spirit has jumped into her, and will in the process of time be reincarnated in the form of her child, who must then assume the totem characteristic of that particular spirit.

Deep down in the basis of our mental constitution there must still lurk, and, perhaps not erroneously, a strong feeling of kinship to Nature, for if it were not for this, such books as *Æsop's Fables* would never have attained their celebrity nor have maintained their hold on so many successive generations of mankind; nor would *Kipling's Jungle Book* have proved so realistic to modern readers. And we find that the Australian natives are no excep-

tion to this most fundamental characteristic of the human race. A study of the chapters on the origin of the Totem and the Traditions as to Alcheringa ancestors of the "Native Tribes of Central Australia," yields ample and confirmatory evidence of a most interesting nature. And a perusal of "Australian Legendary Tales," collected and translated by Mrs. Langloh Parker, of Bangate, Narran River, N.S.W., leaves the impression that they are Æsop's Fables in an Australian dress. The tales consist of the folk-lore of the Noongahburrah tribe, among whom the authoress lived. The interest attaching to this particular record of legendary lore is largely due to its coming direct from the primitive people, who have handed it down from the remotest antiquity. Another point of interest is the great similarity that exists as regards the essential idea contained in the records of the two works just mentioned, seeing that they relate to distantly separated parts of Australia. Mr. Andrew Lang, in his introduction to "Australian Legendary Tales," writes:—"They are a savage edition of the Metamorphoses, the latter being a very late and very artificial version of traditional tales as savage in origin as those of the Noongahburrah. . . . Man, bird, and beast are all blended in the Australian fancy, as in that of Bushmen and Red Indians. All are of one kindred, all shade into each other, all obey the Bush Law as they obey the Jungle Law in Mr. Kipling's fascinating stories. . . . This is a prevalent feature of our own popular tales. But the Australians do it more natural; the stories are not the heritage of a traditional and dead, but the flowers of a living and actual condition of the mind."

Another feature of these primordial types appears to be what is called their non-plasticity. It is evident that if any race is to be progressive, it must have a capacity for adapting itself to any changes of the environment, and also to being able to form fertile hybrids with any other invading races. The more primitive the type and the more pure bred the race, the less is the power of adaptation. From a national point of view pure breeds are anything but desirable, and it is only those raceless masses—of which the British are an excellent example—the survivors and products of past anthropological baptisms, that ever rise to world-wide renown and influence. As Vogt, writes in his "Lectures on Man":—"The further back we go in history the greater is the contrast between individual types, the more opposed are the characters—the most decided long-heads immediately by the side of the most decided short-heads. Our savage ancestors stand opposed to each other; stock against stock, race against race, species against species. By the constant working of his brain man gradually emerges from his primitive barbarism; he begin

to recognise his relations to other races, with whom he finally interbreeds. The innumerable mongrel races gradually fill up the spaces between originally so distinct types, and notwithstanding the constancy of character, in spite of the tenacity with which the primitive races resist alteration, they are by fusion slowly led towards unity." Or he might have added, improved off the face of the earth. So that everywhere we find that when a primordial type of man is brought in contact with more vitalised or plastic types it speedily appears to melt away and become extinct. The more primitive and purer the type the less is its chance of becoming modified by crossing with other types. This may be explained as due to the premature budding away or divergence from the parent anthropological branch prior to a more perfect general evolution. In other words they were less humanised at the time of their separate evolutionary parting.

The aborigines of Australia are no exception to this rule, and it is simply due to their long protection by isolation that they still exist. For the same reason we see them accompanied still by birds and beasts—the kangaroo, the platypus, the emu—"ancient types," as Andrew Lang says, "rough grotesques of Nature, sketching as a child draws." But for this protection they would now have only been known as we know the smaller marsupials in England within the Oolitic period, and the remains of the autochthones of Europe that preceded and were driven before other invading races. As Nicholson, in his "Manual of Zoology," writes:—"In England, at the time of the deposition of the Stonefield slate, there must have been a fauna and flora very closely resembling what is now seen in Australia. The small marsupials prove that the mammals were the same in order; cones of Araucarian pines, with tree ferns, &c., occur throughout the Oolitic series; spine-bearing fishes like the Port Jackson shark are abundantly represented by genera; and lastly the genus *trigonia*, now exclusively Australian, is represented by species which differ little from those now existing." But whilst a general isolation from other human races has served as a protection, the various local isolations brought about by the physical features of the continent do not seem to have had much effect in producing different sub-types amongst the Australians themselves. The Australian type of face appears remarkably uniform, and it is difficult from an inspection of photographs to decide whether the individual is from the Northern Territory and Gulf of Carpentaria or from the McDonnell Ranges, or from the South coast. As a rule, in other divisions of the animal kingdom, the fact of isolation tends to the development of characteristics which become distinctive and specific. Take such genera as the land mollusca as an example. Schmidt in his "Doctrine of Descent and

Darwinism," refers to the pulmo-gasteropoda of Madeira. He says:—"It is seen that in isolated islands and island groups these earth-bound animals, migrating with so much difficulty have attained an extraordinary diversity. In the Madeira Islands, 134 species of pulmo-gasteropoda were reckoned to exist, of which only 21 were to be found in the Africo-European fauna. These and the 113 other species are mostly confined to narrow districts and single valleys. . . . We must infer that a connection at one time existed between Europe and Madeira, and that these 21 species remained what they were before the separation, while from unknown species still appearing in analogous forms upon the continent emanated the remarkable profusion of new species. They and their comrades on other isolated islands were spared a conflict many sided, and they doubtless afford a favourable example of Wagner's law of migration, as with the difficulties of locomotion and the improbability of a large subsequent arrival, the secluded individuals under even slightly different influences, had had a prospect of diverging from the parent species." The Rev. Mr. Gulick in writing on the Hawaian Land Snails, as the result of 15 years study, also refers to the effects of isolation in producing a very large number of species. For this production of diversity we must assume in the respective genera a large amount of plasticity or power of accommodation to environment, and to a comparatively late appearance in biological evolution. If such an old mollusc as *trigonia* is taken we find a wonderful absence of plasticity, and a marked contrast to what has been said of certain island pulmo-gasteropoda, for it is solely now found living in Australian waters, being represented by six species only, vide W. T. Bednall, vol. I., Trans. Roy. Soc., S.A. The same writer says this "genus was excessively rich in representatives from its advent at the beginning to the close of the Secondary Age in Europe, when it died out altogether; whereas in Australia it has survived throughout the whole period of Secondary and Tertiary times until the present day, though it must be admitted in a very limited degree in regard to number." It has already been referred to as forming one of the Australia-like features of the Stonefield Slate. We see, therefore, on the one hand certain molluscs diverging into numerous species; and on the other hand a mollusc restricted to six species only and to one continent. Applying this to the Australian aboriginal, we infer that he does not possess plasticity, and has only been handed down from a most remote antiquity by propitious and protective isolation.

The conclusion then is that the Australian is not degenerate but primordial, and that this is shown by his still absolutely identifying himself with other natural objects around him; and

also by his non-plasticity, which is shown by the fixity of the physical features of the race as a whole, and absence of characteristic divergences in distantly separated groups. A consequence of this is, that no longer protected by isolation, he must shortly entirely disappear from the face of the earth, for he is an anachronism and archaic. And if anything further is to be done to obtain records of this interesting primitive race it must be done quickly. Therefore those of the Fellows of this Society who will be able to be present at the Science Meetings in Melbourne, during January, 1900, should do their utmost to help formulate and actively set going some workable scheme for making an exhaustive study of the Autochthones of Australia.



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 Cambridge—Philosophical Society Proceedings, vol. IX., part 9;
 vol. X., parts 1-2.
 ——— Fauna Hawaiiensis, vol. I., part 1, *Hymenoptera*
Aculeata.
 Dublin—Royal Dublin Society, Proceedings, vol. VIII., part 6;
 Transactions, vol. VI., parts 14 to 16; vol. VII.,
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 ——— Royal Irish Academy, Proceedings, vol. V., No. 1;
 Transactions, vol. XXXI., part 7.
 Edinburgh—Royal Physical Society, Nests, &c., *Ptelonorhynchine*.
 ——— Edinburgh Geological Society, Transactions, vol.
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 London—Royal Microscopical Society, Journal, parts 4 to 6
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 ——— Royal Society, Proceedings, vol. LXIV., Nos. 403 to
 412; vol. LXV., Nos. 415 to 417.
 ——— Linnean Society, Proceedings, 1898-9.
 ——— Royal Colonial Institute, vol. XXIX.
 ——— Entomological Society, Transactions, vol. 1898.
 ——— British Museum, Catalogue of Birds, vol. XXVI.
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 Manchester—Manchester Liter. and Philosph. Society, vol
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Manchester—Manchester Geological Society, Transactions, vol. XXV., parts 17, 19, 21; vol. XXVI., parts 1 to 3.

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Florence—Società Entomologica Italiana, Bulletins 1-2 (1899).

Milan—Atti della Società Italiana Scienze Naturali, vol. XXXVII., fascil 4

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Pisa—Atti della Società Toscana di Scienze Naturali, vol. XVI.

Turin—Museo di Zoologia ed Anatomia compartita della R., Univer. di Torino, Bolletino, vol. XIII., Nos. 320 to 334.

INDIA.

Calcutta—Indian Museum, vol. IV., pt. 3.

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JAPAN.

Tokio—College of Science, Imperial University Journals, vol. IX., pt. 3; vol. X., pt. 3; vol. XI., pts. 1 to 3; vol. XII., pts. 1 to 3.

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Batavia—Naturkundige Tijdschrift, deel LVIII. (1898).

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Bergen—Bergens Museum, Crustacea of Norway, Isopods, vol. II., pts. 11-12.

Stockholm—Geologiske Föreningens, 1898.

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——— K. Vitter. Antiquitits Akad., 1895.

Stavanger—Stavanger Museum, Year-Book, 1897.

Stockholm—K. Vitterhet. Hist. och Antiq. Akad., vol., 1887-9; vol., 1890-4.

——— Antiquarisk Tidskrift fur Tverige, vol. XIII., 1-3; vol. XIV., 2-3; vol. XV., 1-2; vol. XVI., 1-4.

RUSSIA.

Helsingfors—Der Geographische in Finland, Meddilangen, Finlands, IV.

Moscow—Société Impériale des Naturalistes, Bulletins I. (1898).

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Geneva—Société de Physique et d'Histoire Naturelle, *Compte Rendu*, vol. XV., 1898.

Lausanne—Société Vaudoise des Sciences Naturelles, *Bulletin*, vol. XXXIV., Nos. 129-130 ; vol. XXXV., No. 931.

SOUTH AMERICA.

Buenos Ayres—Academia Nacional de Ciencias, *Bolentino*, tome XVI., No. 1.

Monte Video—Museo Nacional, *Annales* tomo, III., No. 10.

Rio de Janeiro—Observatoire, *Annuaire*, 1898.

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SOUTH AFRICA.

Cape Town—Philosophical Society, *Transactions*, vol. X., parts 2-3.

UNITED STATES OF AMERICA.

Baltimore—John Hopkins University Studies, series XV., Nos. 3 to 12 ; XVI., Nos. 1-4 ; *Circulars*, vol. XVIII., Nos. 137 to 141 ; *Journal of Experimental Medicine*, vol. III., No. 1.

————— *American Chemical Journal*, vol. XIX., Nos. 3 to 10 ; vol. XX., Nos. 1 to 3.

Boston—Boston Society of Natural History, *Proceedings*, vol. XXVIII., Nos. 6 to 12 ; *Memoirs*, vol. V., No. 3.

————— *American Academy of Arts and Sciences, Proceedings*, vol. XXXIII., Nos. 5 to 27 ; vol. XXXIV., Nos. 1 to 7.

Buffalo—Society of Nat. Sciences, *Bulletin*, vol. V., Nos. 1 to 5 ; vol. VI., No. 1.

Cambridge—Harvard Museum Comparative Zoology, *Bulletin*, vol. XXXII., Nos. 7-9.

Cincinnati—Society of Nat. Hist., vol. XIX., No. 4.

Champaign, Illinois—State Laboratory Nat. Hist., *Bulletin*, vols. III-IV.

Chicago—Field Columbian Museum Anthropotical Series, vol. I., No. 4 ; vol. II., No. 3.

- Granville, Ohio—Denison University, Scientific Laboratories,
Bulletin, vol. IX., part 2; vol. X; vol.
XI., parts 1 to 3.
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- New York—N.Y. Academy of Sciences, Transactions, vol. XVI.
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XI., Nos. 1, 2.
- Public Library, Bulletin, vol. II., Nos. 9 to 12;
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- Madison, Wisconsin—Academy of Science, Transactions, vol.
XI.; Wisconsin Geological and Nat.
Hist. Survey, Forestry Conditions,
Instincts and Habits of Solitary
Wasps.
- Massachusetts—Tufts' College Studies, No. V.
- Philadelphia—Academy Natural Sciences, Proceedings, 1897-8.
———— Museum of Philadelphia, State of Nicaragua.
- San Francisco—California Acad. Sciences, Proceedings, vol. I.
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- Salem—Essex Institute, Proceedings, vol. XXVI., Nos. 4 to 12;
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6; vol. XXIX., Nos. 1 to 6.
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- St. Louis—Missouri Botanic Gardens, Report, 1898.
———— Academy of Science, Proceedings, vol. VII., Nos. 17
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Nos. 88, 89 (1898); Monographs, vol. XXX.;
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- Smithsonian Institution, Proceedings U.S.
National Museum, Annual Reports, 1896-7
Bulletin No. 47, pts. 2, 3.
- Academy of Science, Proceedings, vol. I.

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1899.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election

HONORARY FELLOWS.

1857. BARKELEY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
 1893. COSSMANN, M., Rue de Maubeuge, 95, Paris.
 1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Russell-street, Camberwell, Melbourne, Victoria.
 1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer Victoria, The Observatory, Melbourne, Victoria.
 1890. *ETHERIDGE, ROBERT, Director of the Australian Museum of New South Wales, Sydney.
 1853. GARRAN, A., LL.D., Sydney, New South Wales.
 1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
 1855. HULL, H. M., Hobart, Tasmania.
 1855. LITTLE, E.
 1892. *MAIDEN, J. H., F.L.S., F.C.S., Director Botanic Gardens, Sydney, New South Wales.
 1899. MEYRICK, E. T., B.A., Ramsbury, Hungerford, Wiltshire, England.
 1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer New South Wales, Sydney, New South Wales.
 1894. *WILSON, J. T., M.D., Professor of Anatomy, Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
 1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
 1880. *FOELSCHKE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
 1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
 1880. *KEMPE, REV. J., Australia.
 1888. *MASKELL, W. M., Wellington, New Zealand.
 1893. *MCKILLOP, REV. DAVID, S.J., Superior Daly River Mission, Northern Territory.
 1886. NICOLAY, Rev. C. G., Freemantle, Western Australia.
 1880. *RICHARDS, MRS. A., Mount Barker, South Australia.
 1892. *SCHULZ, REV. LOUIS.
 1883. *STIRLING, JAMES, Assistant Geological Surveyor, Victoria.
 1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1887. ADCOCK, D. J., Adelaide, South Australia.
 1874. ANGAS, J. H., Adelaide, South Australia.
 1895. *ASHBY, EDWIN, Adelaide, South Australia.
 1887. BAGOT, JOHN, Adelaide, South Australia.
 1893. *BEDNALL, W. T., Adelaide, South Australia.
 1887. *BLACKBURN, REV. THOMAS, B. A., Woodville, South Australia.
 1884. BOETTGER, OTTO, Adelaide, South Australia.
 1886. *BRAGG, W. H., M.A., Professor of Mathematics, University of Adelaide, South Australia.
 1882. BROWN, L. G., Adelaide, South Australia.
 1883. *BROWN, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
 1899. BROWNE, T. L., Adelaide.
 1898. BROWNE, J. H., North Adelaide.
 1893. BRUMMITT, ROBERT, M.R.C.S., England, Kooringa, South Australia.
 1879. *CLELAND, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, South Australia.
 1895. CLELAND, JOHN B., Parkside South Australia.
 1876. (L) COOKE, E., Commissioner of Audit South Australia, Adelaide. South Australia.
 1895. COOKE, JOHN H., Adelaide, South Australia.
 1880. COX, W. C., Semaphore, South Australia.
 1887. *DIXON, SAMUEL, Adelaide, South Australia.
 1876. DOBBIE, A. W., Adelaide South Australia.
 1896. DRUMMOND, J. H. G., M.D., Moonta.
 1893. DUDLEY, U.
 1890. *EAST, J. J., F.G.S. (Corresponding Member, 1884).
 1871. ELDER, SIR THOMAS, G.C.M.G., Adelaide, South Australia.
 1899. FERGUSSON, ANDREW, Agricultural School, Adelaide.
 1886. FLEMING, DAVID, Adelaide, South Australia.
 1882. FOWLER, WILLIAM, Melton, Yorke's Peninsula, South Australia.
 1889. FRASER, J. C., Adelaide, South Australia.
 1880. *GOYDER, GEORGE, JUN., F.C.S., Government Analyst South Australia, South Australia.
 1887. GRASBY, W. C., F.L.S., Adelaide South Australia.
 1896. GREENWAY, THOMAS J., East Adelaide.
 1890. GREY, REV. WILLIAM, Mount Barker, South Australia.
 1896. HAWKER, E. W., Adelaide.
 1899. *HIGGIN, A. J., University, Adelaide.
 1891. *HOLTZE, MAURICE, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, South Australia.
 1883. *HOWCHIN, WALTER, F.G.S., Goodwood East, South Australia.
 1899. HUGHES, SAMUEL, B.Sc., Registrar of the School of Mines, Adelaide.
 1893. JAMES, THOMAS, M.R.C.S., England, Moonta, South Australia.
 1896. JONES, J. W., Conservator of Water, Adelaide.
 1853. (F) KAY, ROBERT, General Director and Secretary South Australian Public Library, Museum, &c., Adelaide, South Australia.
 1894. KERSHAW, JAMES A., Entomologist National Museum, Melbourne.
 1899. KLEEMAN, RICHARD, Rowlands Flat.
 1899. *KOCH, MAX, Mt. Lyndhurst.
 1884. LENDON, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine University of Adelaide, Honorary Physician Children's Hospital, North Adelaide, Adelaide, South Australia.

1866. LLOYD, J. S., Adelaide, South Australia.
 1888. *LOWER, O. B., F. Ent. S., Broken Hill.
 1885. *LUCAS, R. B., Adelaide, South Australia.
 1896. LUKOWITZ, M. VON, M.D., Adelaide.
 1874. *MAGAREY, S. J., M.D., M.L.C., Adelaide, South Australia.
 1874. MAYO, G. G., C.E., Adelaide, South Australia.
 1888. MOLINEUX, A., F.L.S., Secretary Central Agricultural Bureau, South Australia, Kent Town, South Australia.
 1884. MUNTON, H. S., Brighton, South Australia.
 1859. (L)MURRAY, DAVID, Adelaide, South Australia.
 1896. *PARKER, THOMAS, C. E., Rockhampton, Queensland.
 1893. PERKS, R. H., M.D., F.R.C.S., England, Birksgate, South Australia.
 1883. PHILLIPS, W. H., Adelaide, South Australia.
 1886. POOLE, W. B., Adelaide, South Australia.
 1899. PURDIE, A., M.A., School of Mines, Adelaide.
 1885. *RENNIE, H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
 1876. *RUTT, WALTER, C.E., Adelaide, South Australia.
 1891. SELWAY, W. H., Adelaide, South Australia.
 1893. SIMSON, AUGUSTUS, Hobart, Tasmania.
 1857. SMEATON, THOMAS D., Blakiston, Littlehampton, South Australia.
 1871. SMITH, ROBERT BARR, Adelaide, South Australia.
 1881. *STIRLING, EDWARD C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Honorary Director South Australian Museum, Adelaide, South Australia.
 1876. *TATE, RALPH, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
 1886. *TEPPER, J. G. O., F.L.S., Entomologist South Australian Museum (Corresponding Member, 1878), Adelaide, South Australia.
 1899. *TORR, W. G., LL.D., Way College.
 1894. *TURNER, A. JEFFERIS, M.D., Brisbane.
 1889. VARDON, JOSEPH, J.P., Adelaide, South Australia.
 1878. *VERCO, JOSEPH C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Adelaide, South Australia.
 1883. WAINWRIGHT, E. H., B.Sc., St. Peter's College, South Australia.
 1878. WARE, W. L., Adelaide, South Australia.
 1879. WAY, EDWARD W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Adelaide, South Australia.
 1859. WAY, RT. HON. SIR SAMUEL J., Bart., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, South Australia.
 1886. *ZIETZ, A., F.L.S., Assistant Director South Australian Museum, Adelaide, South Australia.

APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

SIXTEENTH ANNUAL REPORT OF THE
COMMITTEE.

BEING FOR THE YEAR ENDING SEPTEMBER 30TH, 1899.

Evening Meetings.—Nine evening meetings have been held, at which papers, &c., have been given as under:—

1898.

- Oct. 18—"The Birds of the Finnis District," Dr. A. M. Morgan.
 Nov. 18—*Conversazione*: addresses by E. Ashby, W. Howchin, F.G.S., and J. G. O. Tepper, F.L.S.

1899.

- April 18—Easter Encampment of Boys' Field Club at Port Willunga. E. Ashby.
 May 18—"South Australian Orchids," J. G. O. Tepper, F.L.S.
 June 20—"Natural History Recollections of New Zealand," Mrs. S. L. Schourup; "Remarks on *Thelyphonus* sp.," F. R. Zietz.
 July 18—"Comparisons and Contrasts between the Levant and South Australia," W. C. Grasby, F.L.S.
 Aug. 23—"A New Use for Spiders," W. H. Selway, Jun. Replies to questions (question-box), J. G. O. Tepper, F.L.S.
 Sept. 12—"Australian Birds," A. J. Campbell.
 " 26—Annual Meeting, Chairman's Address, E. Ashby.

The most noticeable feature of these indoor gatherings was the *conversazione*, which was the first held for four years, and which attracted a very large attendance. A new departure on that occasion was that of having short addresses at intervals during the

evening, the time between being taken up by an inspection of a large and interesting display of exhibits. This, together with music and refreshments, helped the visitors to spend a pleasant and instructive evening. Another large gathering was that on the occasion of the lecture of Mr. A. J. Campbell, of Melbourne, the well-known expert in ornithology, whose descriptive remarks on "Australian Birds," and photographs of their nests and eggs taken on the spot, and shown by the aid of limelight, were much appreciated. We were indebted to a former member, Mr. W. C. Grasby, F.L.S., for filling up one evening—the first on which the Boys' Field Club (of which that gentleman is President) met jointly with this Section. It will be noticed that Dr. A. M. Morgan gave a paper on "The Birds of the Finnis District," and it may here be mentioned that during the past year a few members specially interested in bird life formed themselves into a separate organization, known as "The Ornithological Association of S.A.," of which Dr. Morgan is the first President. It is to be hoped that this step will not be the means of the members of the Field Naturalists' Section losing the privilege of listening in future to papers on a subject so peculiarly appropriate to a Field Club as that of ornithology.

It will be seen that we had the pleasure of hearing one paper read by a lady member, and it is hoped that her example will be followed by others of her sex, which forms a considerable proportion of our membership.

Exhibits in several departments of Natural History have been shown at these meetings, and have added considerable interest to the proceedings. Opportunity is in this way given to show for the benefit of the members generally what has been found at the various excursions. The attendance at both evening meetings and excursions has been well maintained.

Excursions.—During the year twelve excursions have been held, of which the following is a list:—

1898.

- Oct. 15—Blackwood.
 29—Upper Sturt.
 Nov. 14—Hack's Bridge, River Onkaparinga.
 26—National Park, via Waverley.

1899.

- Feb. 25—Dredging, Port River.
 March 11—"Holmfirth," Fulham.
 April 1—Mt. Lofty (Summit).
 May 13—Botanic Gardens, Museum of Economic Botany.
 June 24—Grange.
 Aug. 19—Blackwood.
 Sept. 1—Gawler.
 23—Teatree Gully.

The longest of these excursions were those to Hack's Bridge and Gawler, both of which were revisited after a lapse of some years. That to Gawler introduced the members to many plants not seen nearer Adelaide. Although most of the names of the other localities are familiar, the excursions have been to different portions of those places or at other times of the year. One of the most pleasant was that to Upper Sturt, via National Park, and back by way of Crafers, when the members were indebted to the hospitality of Mr. and Mrs. J. H. Symon. The summit of Mt. Lofty was visited on April 1st, when Mr. and Mrs. W. B. Sells entertained the members. A visit to "Holmfirth," Fulham, by invitation of Mr. and Mrs. J. F. Mellor, gave a much enjoyed outing at a time of the year when it is difficult to find suitable localities for excursions. Blackwood was visited earlier in the season than usual, under the guidance of Mr. T. C. A. Magarey, to whom, as well as to Mrs. Magarey, the Section is under obligation. One dredging trip was arranged, and a visit to the Museum of Economic Botany was not the least profitable of the out-door meetings. The excursions have been the means of enriching the members' collections, but, as is to be expected, it seldom happens that any absolutely new discovery is made.

Fauna and Flora Protection Committee.—The report from this Committee shows that the questions of the preservation of our forests and a new Birds Protection Bill have been the most important subjects dealt with by it during the past year.

Boys' Field Club.—During the year the question of combining in some way with this club was brought forward, and a sub-committee from each Society drew up resolutions which met with acceptance, and now the junior club has the privilege of holding its meetings in the Royal Society's room, and of attending the meetings of this Section, while it is hoped that the latter will benefit by an acquisition to its membership of those who, to some extent, are thus being prepared for it.

Obituary.—We have lost the unusual number of four members by death during the year, three of them in the same month (March, 1899), viz., Miss Jessie L. Hussey, Mr. E. F. Turner, and Mr. E. Guest, whilst later in the year one of our oldest members (Dr. Whittell) passed away. Dr. Whittell occupied the chair at the inaugural meeting of the Section on November 7, 1883, when Professor Tate delivered a lecture explaining its objects. Miss Hussey was one of our most active and enthusiastic workers, and her death was a great loss, not only to the Section, but to numerous scientific correspondents in various parts of the world. Mr. Guest was specially interested in entomology, and this Section recently passed a resolution in favour of his valuable collection of Microlepidoptera being pur-

chased for the Public Museum. Mr. Turner was not an active member, but his sad and sudden death appealed to the sympathy of the members generally.

Proceedings.—At last the connecting links in the printed volumes of proceedings have been completed, and now some account of each year's work, since the inception of the Section, is recorded in type by the issue of the pamphlet distributed to members a few months back.

Financial.—Owing to the cost of the *Conversazione* and of printing the reports both coming into this financial year, the expenditure has been heavier than usual, viz., £20 5s., while the subscriptions handed to the Royal Society amount to £17. For each of the three preceding years, however, the Section paid to the parent Society £5 more than it received in the way of grants; so that the small deficiency this year is more than counter-balanced, without the Government grant being taken at all into consideration.

Membership.—There has been a considerable increase in the number of members elected during the year. A few of these, however, have not yet gone through the formality of paying any subscription, so that they can hardly be considered full members at present. Owing to death, removal from the colony, or non-payment of subscription, several names have been struck off the roll, which now numbers 95.

EDWIN ASHBY, Chairman.

Adelaide, Sept. 20, 1899.

W. H. SELWAY, Hon. Sec.

ELEVENTH ANNUAL REPORT OF THE NATIVE
FAUNA AND FLORA PROTECTION COMMITTEE
OF THE FIELD NATURALISTS' SECTION OF
THE ROYAL SOCIETY OF SOUTH AUSTRALIA,
26TH SEPTEMBER, 1899.

The Committee have met three times in the past year, but between the meetings much time has been devoted by some of the members to the objects for which they hold office.

Their attention having been specially directed by some letters in the *Register*, signed "Semper Fidelis," to the destruction of trees in the natural forest of Wirrabara, the Secretary was instructed to obtain further particulars; and viewing with alarm the information received, the Committee decided to organise a deputation to the Government on the subject. More than 100 circulars were distributed, mentioning the facts that already out of our forest reserves 65,000 acres had been let on "grazing and cultivation leases," containing no reservation of timber, and that

about 100,000 acres more were included in "grazing leases," of which some of the holders were agitating for conversion into "perpetual leases," with power to destroy the trees. A deputation of about 40, comprising members of the Legislative Council and House of Assembly, and representatives of the Agricultural Bureau, the Australian Natives' Association, the Geographical Society, the Royal Society, the Field Naturalists' Society, the Birds' Protection Society, the Ornithological Association, and others waited upon the Commissioner of Crown Lands on 11th May, and strongly urged upon him the necessity of properly protecting the trees; and the Committee hope that, as a result of their efforts, a large portion of the forests may be saved from destruction.

The Committee having been informed that some persons were permitted to shoot birds upon the Hope Valley Reservoir, the Secretary wrote to the Commissioner of Public Works asking that the use of firearms on the reservoirs of the colony and their enclosures might be strictly prohibited. To this application a courteous reply was received that this request would be complied with and that "the Engineer in-Chief has been given instructions to have notices posted on all water reserves preventing sporting of any kind."

After much delay the Committee are at length able to report that a Birds' Protection Bill has been introduced, by Mr. Playford, into the House of Assembly. The Bill which was prepared last year, but which did not come before Parliament, contained 19 sections, whilst the new one has only 12, having been almost entirely redrawn by the same gentleman, who gave much time and attention to its predecessor. It bears the inscription prepared by "the Committee of the Society for Protection of Birds." With a few amendments this Bill, if carried into law, should give nearly as large a measure of protection to the birds as the Committee could hope for from mere legislation, and with the rapidly growing belief in the usefulness of birds, and desire among land-owners to prevent their destruction, much good should result.

W. H. SELWAY, pro. Chairman.

M. SYMONDS CLARK, Hon. Secretary.

Adelaide, September 25, 1889.



FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF S.A.

RECEIPTS AND DISBURSEMENTS FOR THE YEAR, 1898-9.

DR.	RECEIPTS.	£ s. d.	DISBURSEMENTS.	CR.	
		£ s. d.		£ s. d.	
To Balance brought forward	...	4 8 5	By Printing—Reports	...	5 11 0
“ Subscriptions	...	17 0 0	General	...	3 14 6
“ Grants from Royal Society	...	20 0 0	“ Postages and Sundries	...	5 6 9
			“ Conversazione	...	4 10 3
			“ Attendance	...	1 2 6
					20 5 0
			“ Subscriptions paid over to Royal Society	...	17 0 0
			“ Balance in hand	...	4 3 5
					£41 8 5

Audited and found correct.

J. S. LLOYD,
S. SMEATON, } Auditors,

Adelaide, 26th September, 1899.

W. H. SELWAY, Hon. Sec. and Treasurer.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

SEVENTH ANNUAL REPORT.

During the past year there have been held six general meetings of the Section, at which the attendances, though not large, were fairly representative. The lady members deserve special commendation for the interest they showed in those meetings.

The November meteors — principally the Leonids — have occupied the attention of two meetings, and by favour of the Assistant Government Astronomer members have been supplied with charts of the sky for some distance round their radiant point, with hints for observing these showers when crossing the earth's orbit in November, 1899; when the results (if any) will be furnished to Professor Pickering, of Harvard University, U.S.A.

Besides astronomical matters of general interest, papers on the "Seas of the Moon" and "The Dark Areas and Canals of Mars" have been discussed at considerable length.

At a recent meeting it was decided by resolution to obtain four scientific magazines for use of members. These have been ordered, and will be ready for circulation at no distant date.

The astronomical notes (first published in July, 1892) have regularly appeared during the past year; their high character and usefulness have also been maintained.

The Committee have held six meetings for the conduct of business.

The question-box is still open to those desirous of information on any subject.

Adopted at the annual meeting of the Section held at the Adelaide Observatory on the evening of Tuesday, 24th October, 1899.

C. TODD, President.

W. E. CHEESMAN, Hon. Secretary.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY, S.A.

BALANCE-SHEET FOR YEAR, 1898-9.

	RECEIPTS.	£ s. d.	EXPENDITURE.	£ s. d.
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“ Interest	...	0 10 3	“ Composition Roll	...
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Read at Annual Meeting, held 24th October, 1899.

W. E. CHEESMAN, Hon. Sec.

C. TODD, President.

Audited and found correct.
RICHARD F. GRIFFITHS.

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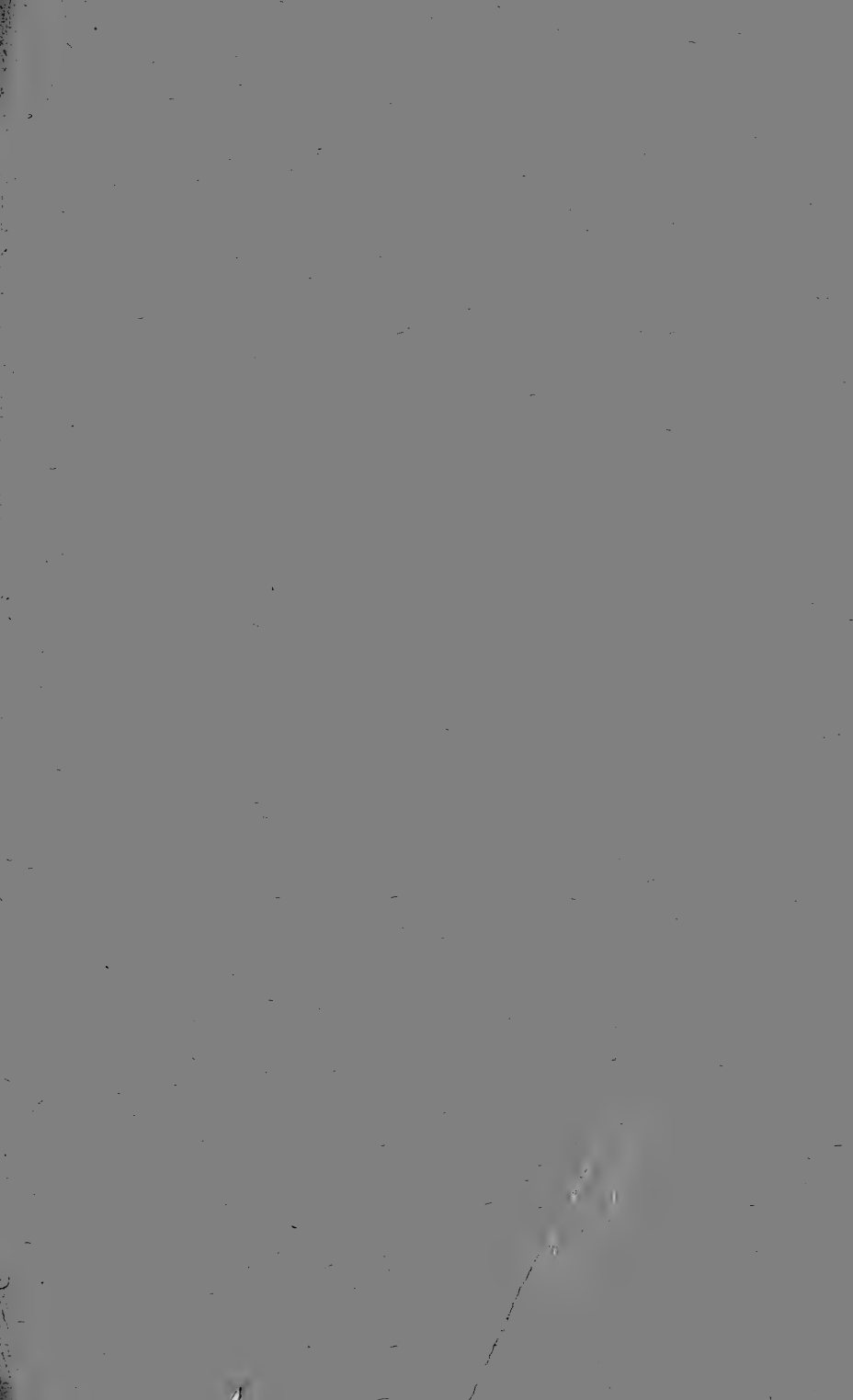
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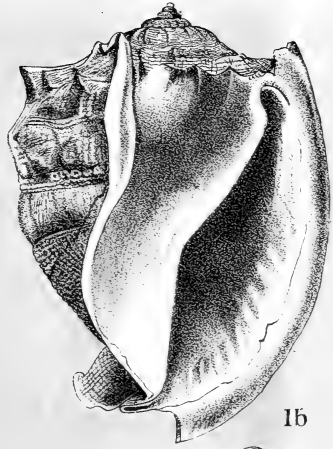
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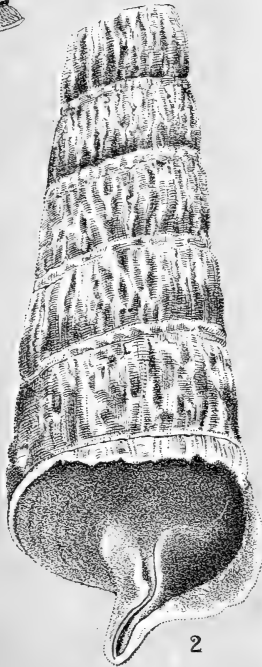
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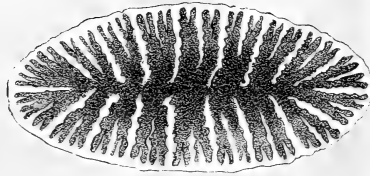


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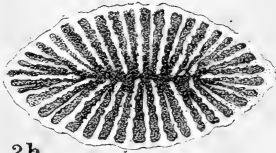
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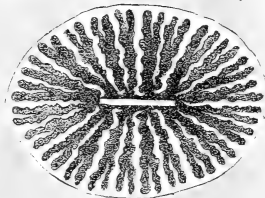
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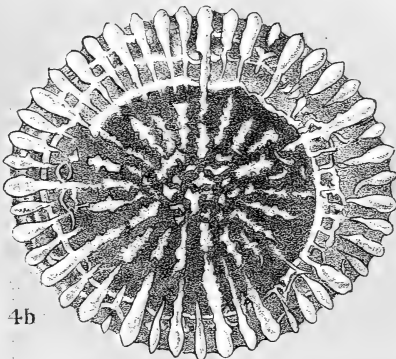
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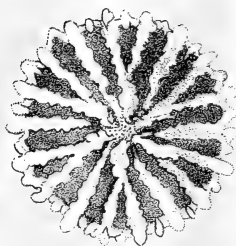
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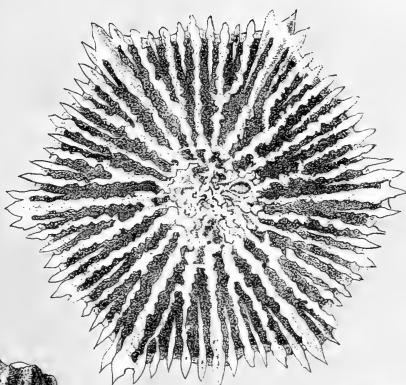
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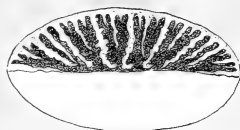
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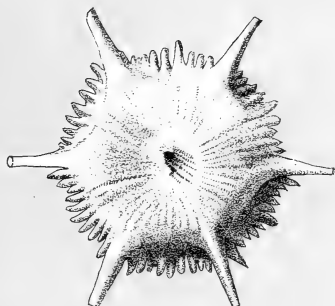
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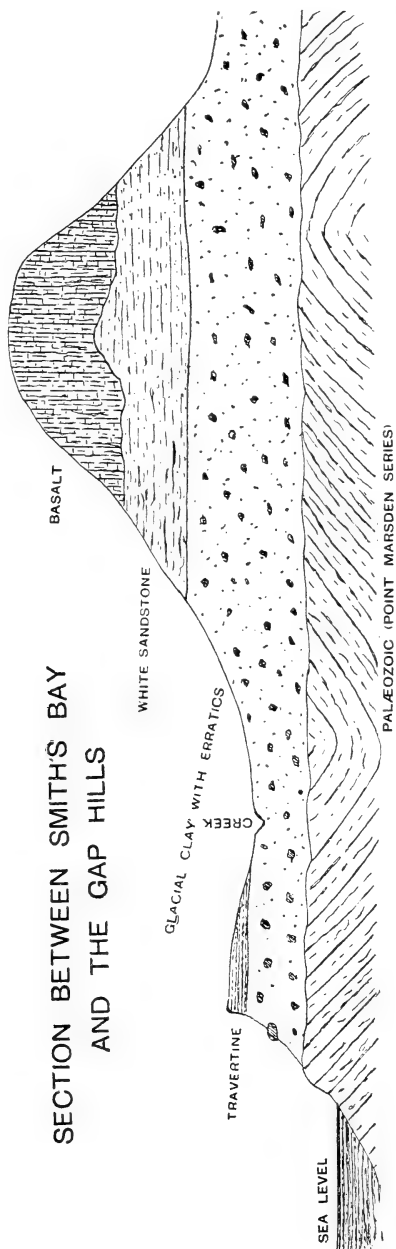


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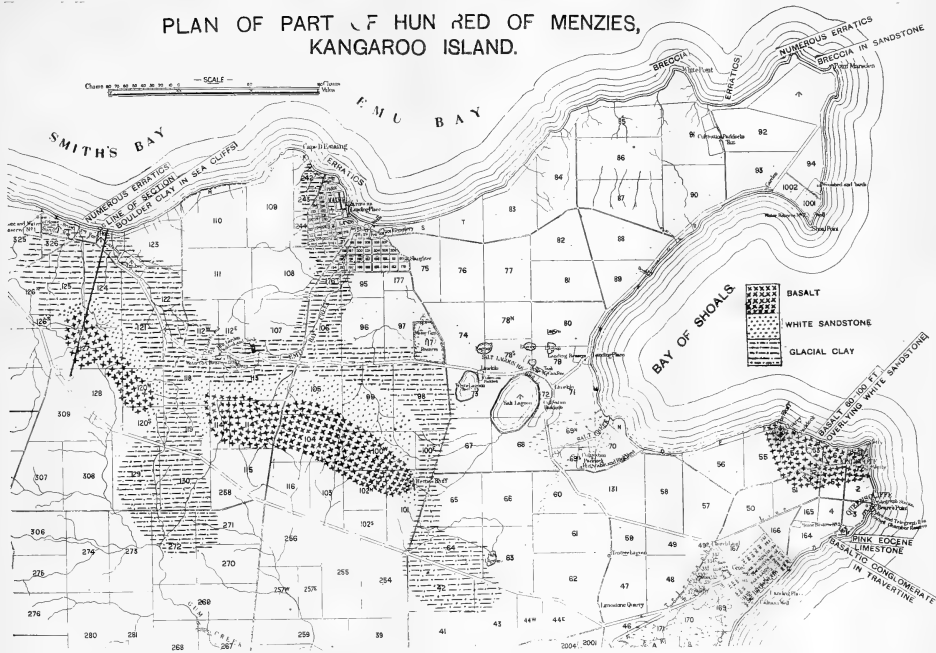


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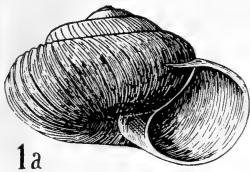
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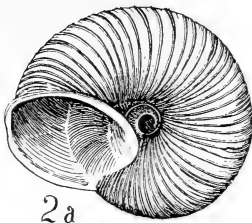
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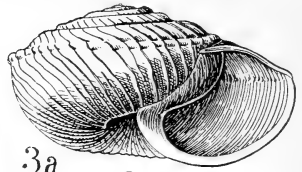




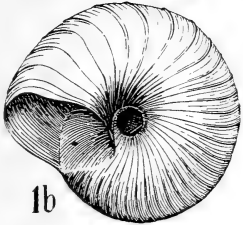
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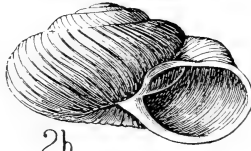
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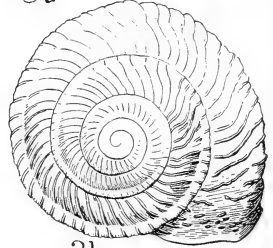
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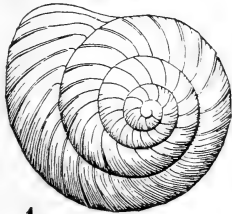
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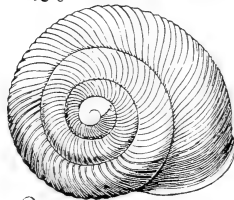
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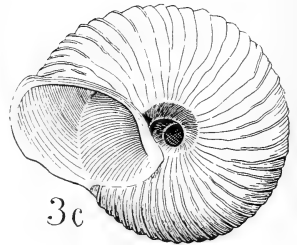
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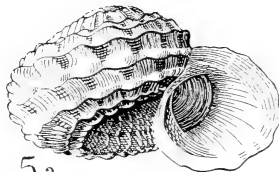
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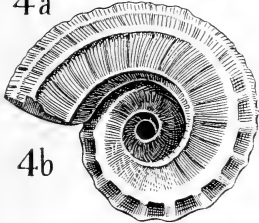
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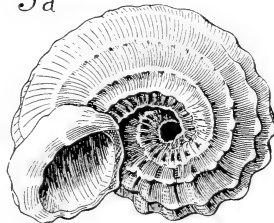
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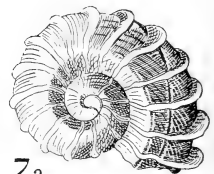
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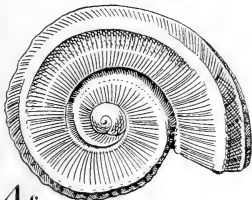
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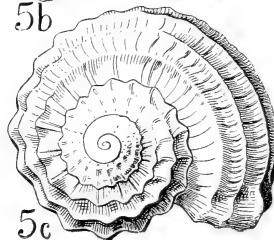
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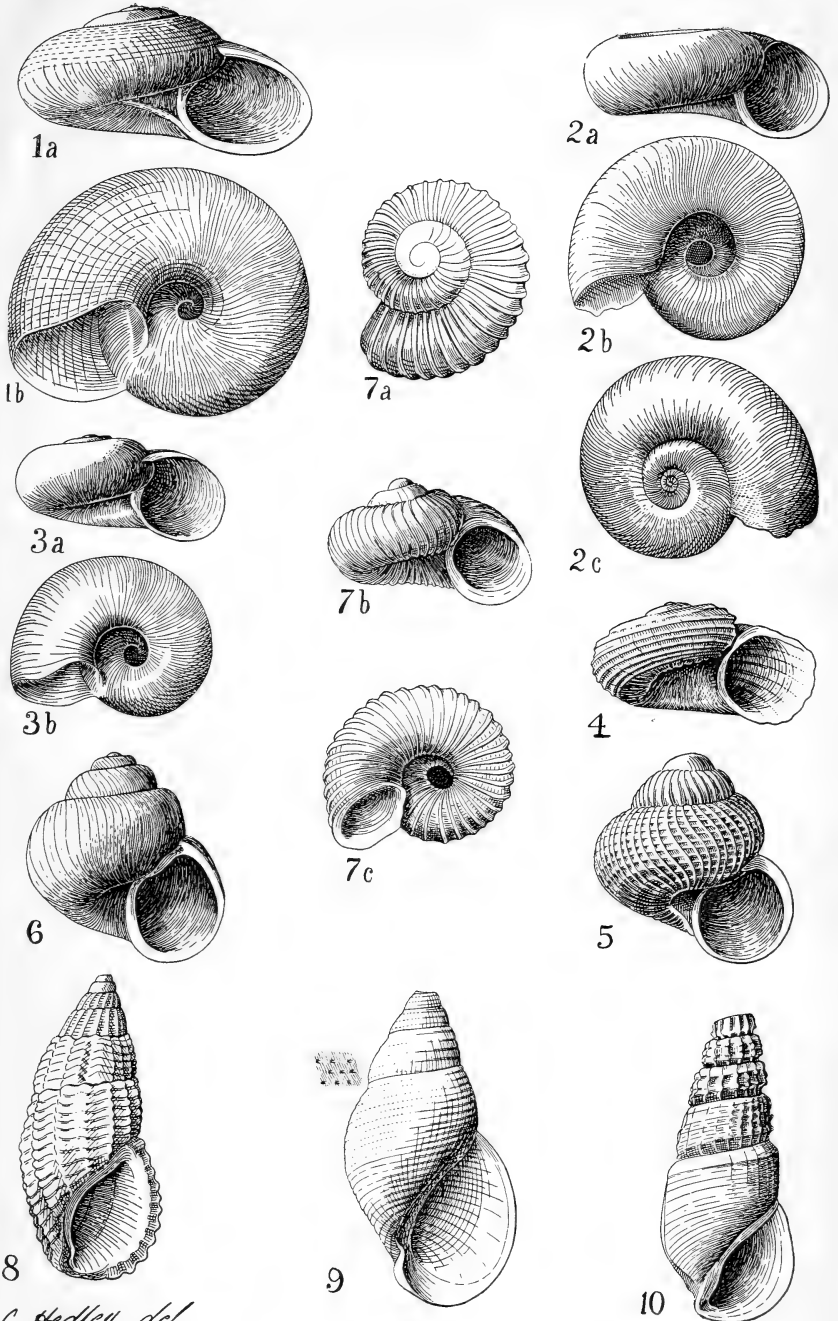
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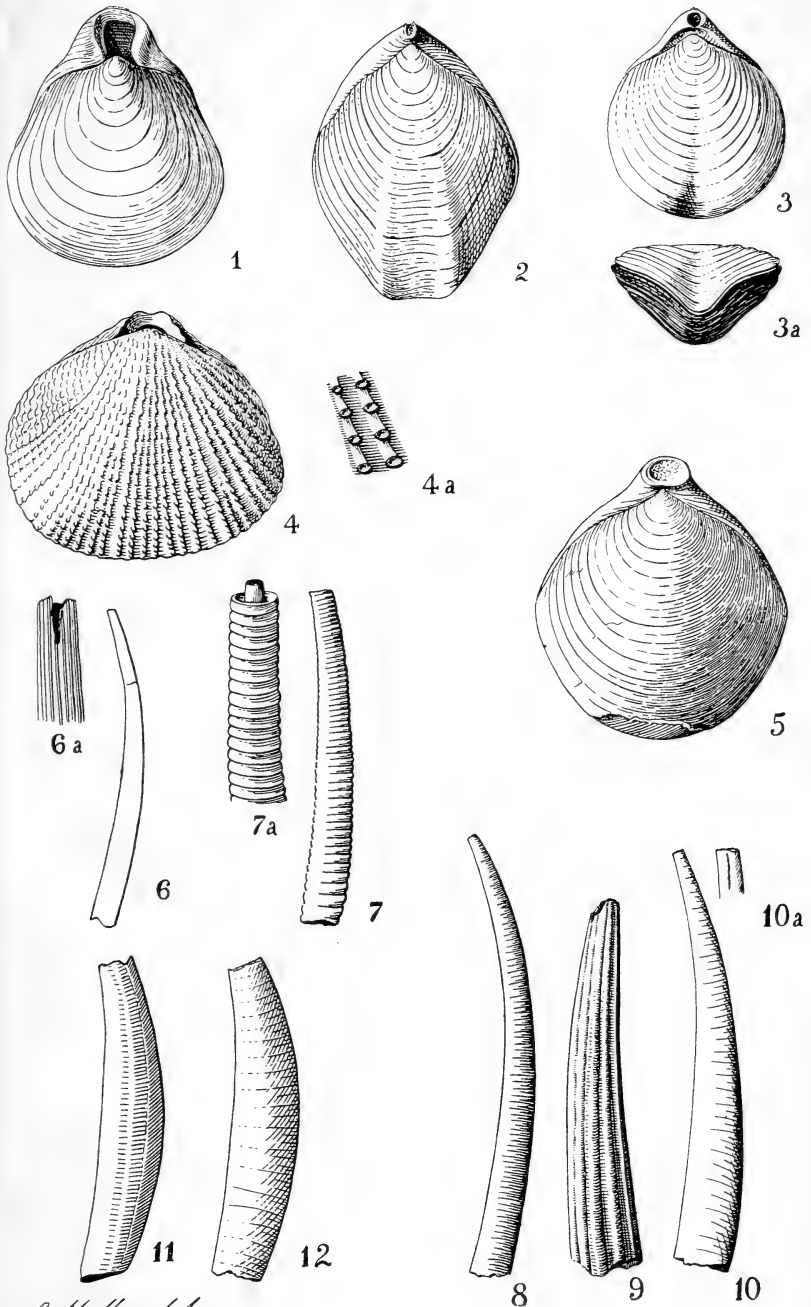
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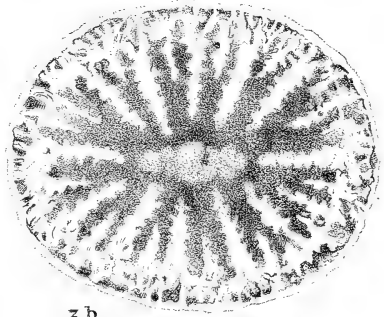


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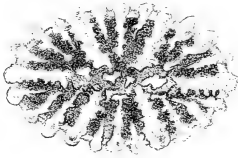




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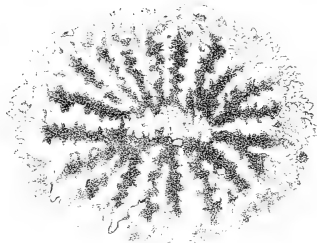
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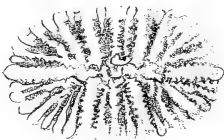
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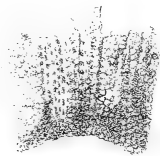
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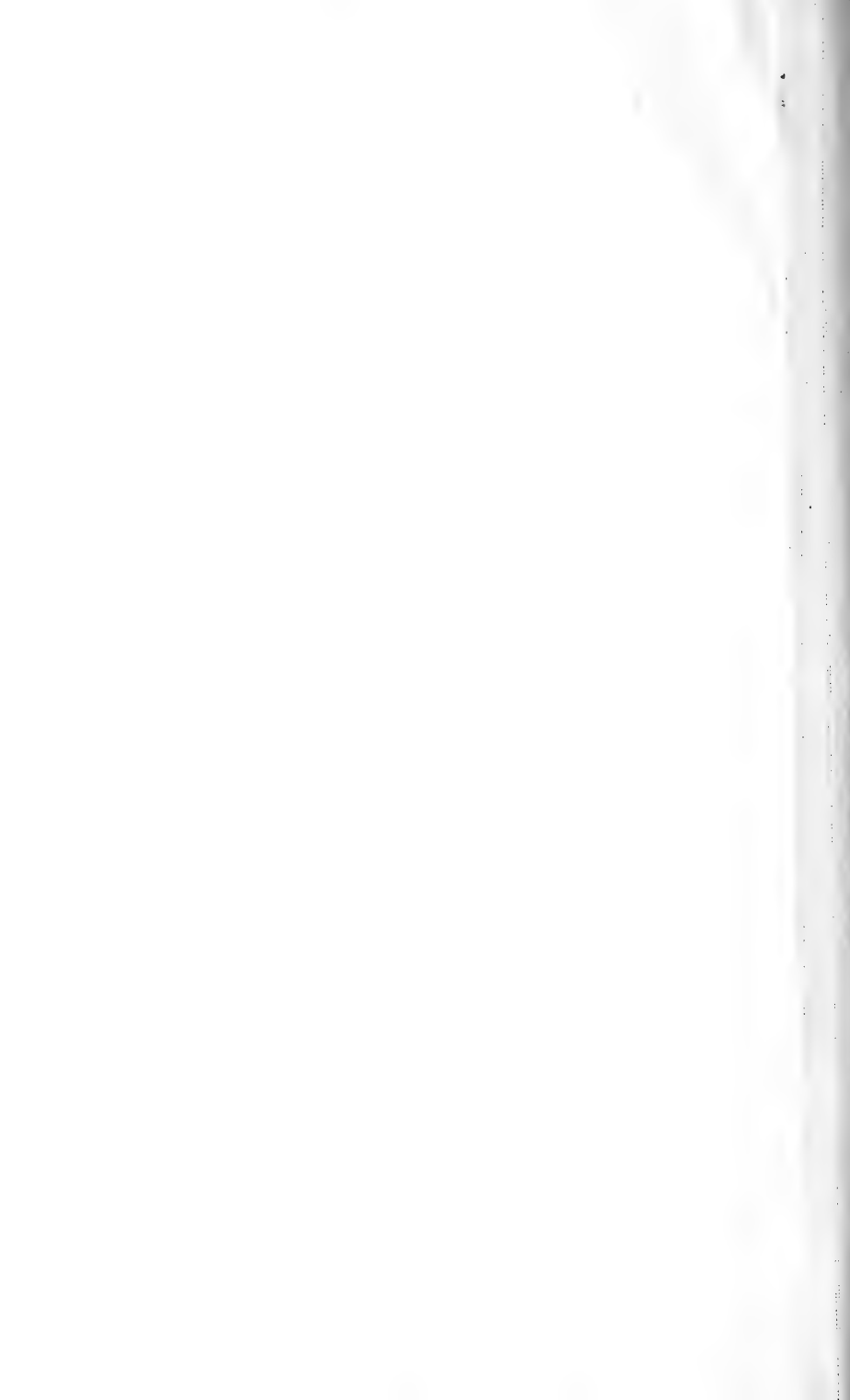
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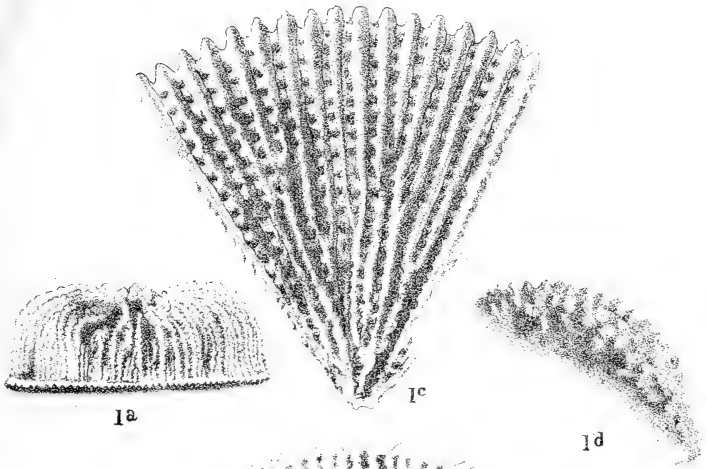


2b



4a

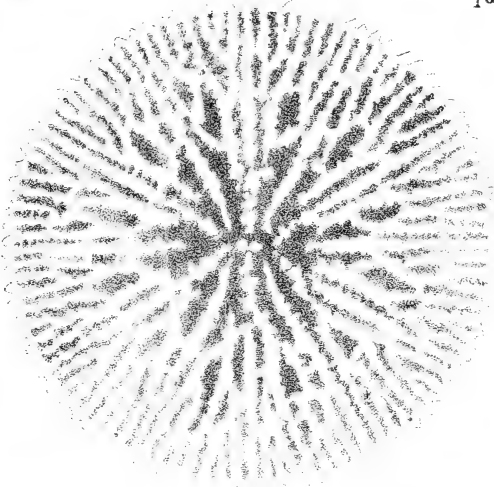




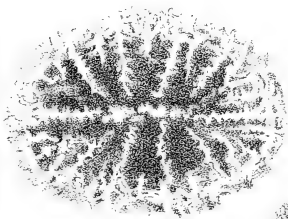
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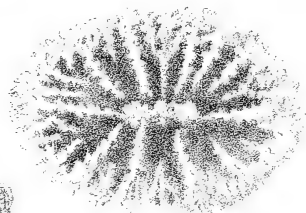
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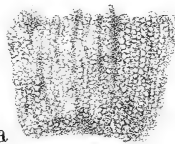
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2

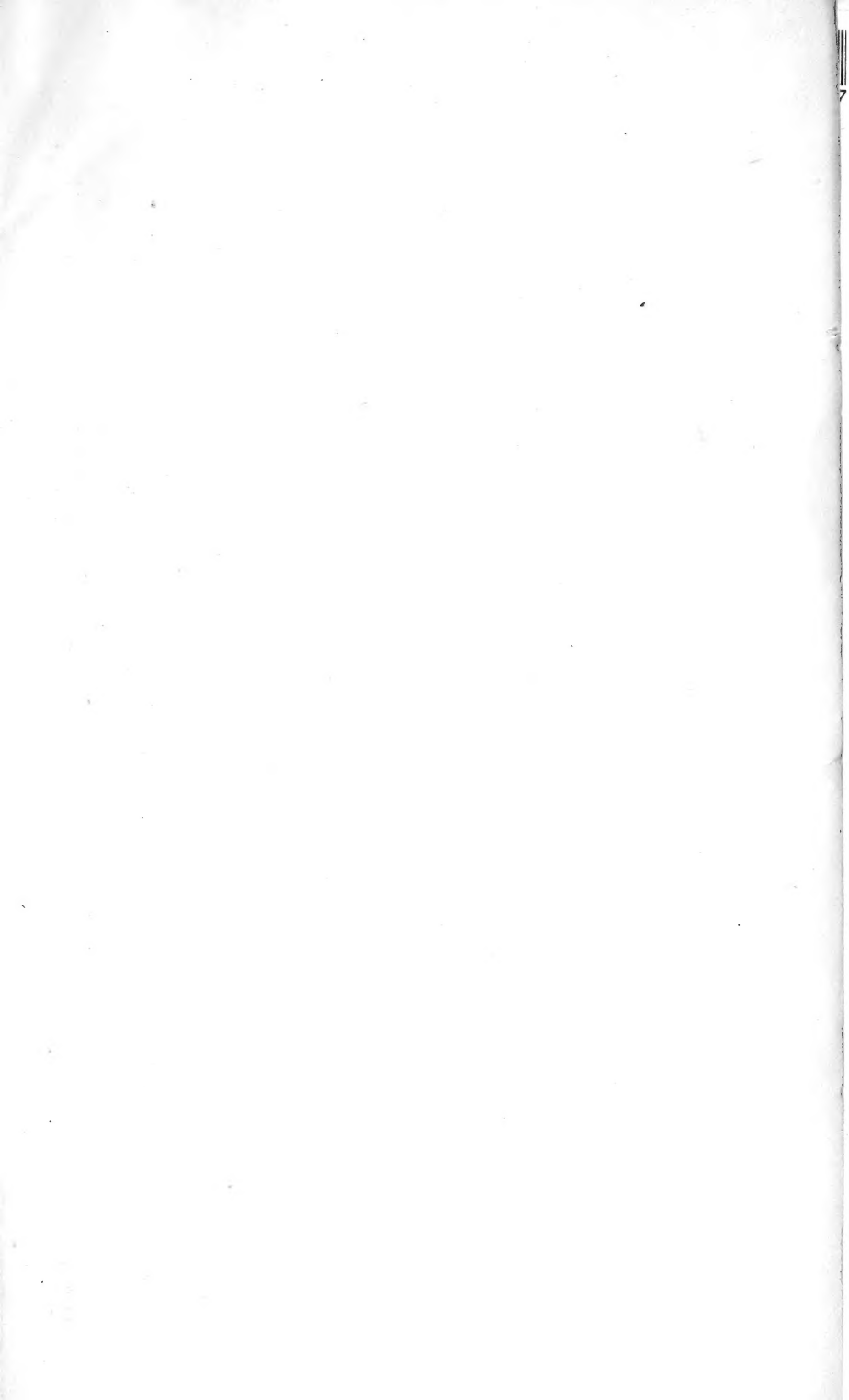


3b



3a





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Date Due

~~5 Dec '49~~

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