





THE
PROCEEDINGS
OF THE
LINNEAN SOCIETY
OF
NEW SOUTH WALES.

(SECOND SERIES.)

VOL. VII.
WITH THIRTEEN PLATES.

FOR THE YEAR 1892.

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CORRIGENDA.

Page 104—The number of this page was inadvertently omitted.

Page 243, last line but one—for *Trigonia carbonaria* read *Trigona carbonaria*.

Page 300, line 10—before *sat brevioribus insert quam* 4^{us}.

Page 333, line 19—for *T. trifolialata* read *T. trifoliolata*.

Page 346, line 25—for *G. tenuopteroïdes* read *G. tenuopteroïds*.

Page 405, line 9—for *Nyggerathiopsis* read *Nyggerathiopsis*.

Page 418, line 12—for *C. anthracinum* read *C. anthracinus*.

Page 452, line 32—for *C. longiusculus* read *C. longiusculus*.

PROCEEDINGS
OF THE
LINNEAN SOCIETY
OF
NEW SOUTH WALES.

WEDNESDAY, 27TH JANUARY, 1892.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

Mr. W. J. Rainbow was elected a Member, and Miss Sarah Hynes, B.A., an Associate Member of the Society.

DONATIONS (SINCE THE MEETING IN NOVEMBER, 1891).

“Department of Agriculture, Brisbane—Bulletin.” Nos. 12 and 13 (November and December, 1891). *From the Secretary of Agriculture.*

“Journal of the Bombay Natural History Society.” Vol. v., No. 3 (1890). *From the Society.*

“Transactions of the Entomological Society of London for the year 1891.” Part 3 (October). *From the Society.*

“Zoologischer Anzeiger.” xiv. Jahrg., Nos. 359 and 375-379 (1891). *From the Editor.*

“Australian Museum—Report of the Trustees for 1890;” “Records.” Vol. i., No. 10 (December, 1891). *From the Trustees.*

South Australia—“Reports on Coal-bearing Area in neighbourhood of Leigh’s Creek” (1891). By the Government Geologist. *From the Author.*

“Annals of the Queensland Museum.” No. 1 (1891). *From the Museum.*

“Agricultural Gazette of New South Wales.” Vol. ii., Parts 10 and 11 (October and November, 1891). *From the Director of Agriculture.*

“Bulletin de la Société Royale de Géographie d’Anvers.” Tome xvi., 1^{re} Fascicule (1891). *From the Society.*

“Gesellschaft für Erdkunde zu Berlin—Verhandlungen.” Band xviii., Nos. 7 and 8 (1891); “Zeitschrift.” Band xxvi., Nos. 4 and 5 (1891). *From the Society.*

Three Conchological Pamphlets. By Edgar A. Smith. *From the Author.*

Journal of the Royal Microscopical Society, 1891.” Part 5 (October). *From the Society.*

“United States National Museum—Proceedings.” Vol. xiv., Nos. 851, 857, 864, 865, 867-879 (1891). *From the Museum.*

“United States Department of Agriculture—Division of Entomology—Insect Life.” Vol. iv., Nos. 1-4 (October and November, 1891). *From the Secretary of Agriculture.*

“Bulletin of the Museum of Comparative Zoology at Harvard College.” Vol. xvi., No. 10 (September, 1891). *From the Curator.*

“The Pharmaceutical Journal of Australasia.” Vol. iv., Nos. 11 and 12 (November and December, 1891). *From the Editor.*

“Journal of Comparative Medicine and Veterinary Archives.” Vol. xii., Nos. 10 and 11 (October and November, 1891). *From the Editor.*

“The Quarterly Journal of the Geological Society.” Vol. xlvii., Part 4, No. 188 (November, 1891); “List of the Society” (November, 1891). *From the Society.*

“Reichenbachia—Orchids illustrated and described.” By F. Sander. Second series, Vol. i., Parts 7 and 8; “Berliner Entomologische Zeitschrift.” Band xxxiv., Heft 1 (1891); “Stettiner Entomologische Zeitung.” lii. Jahrg., Nos. 4-6 (1891). *From the Hon. Sir William Macleay, M.L.C., F.L.S.*

“Journal of the College of Science. Imperial University of Japan.” Vol. iv., Part 2. *From the Director.*

“Iconography of Australian Salsolaceous Plants.” Decade viii. By Baron von Mueller, K.C.M.G., F.R.S. *From the Premier of Victoria, through the Librarian, Public Library, Melbourne.*

“The Victorian Naturalist.” Vol. viii., Nos. 8 and 9 (December, 1891, and January, 1892) *From the Field Naturalists' Club of Victoria.*

“The Perak Government Gazette.” Vol. iv., Nos. 35-39 (November and December, 1891). *From the Government Secretary.*

“Abhandlungen aus dem Gebiete der Naturwissenschaften herausgegeben vom Naturwissenschaftlichen Verein in Hamburg.” Band xi., Heft 2 and 3 (1891). *From the Society.*

“Bulletin de la Société d'Etudes Scientifiques d'Angers.” n.s. T. xix. (1889). *From the Society.*

“Journal de Conchyliologie.” 3^{me} Série, Tome xxx., Nos. 1-4 (1890). *From the Society.*

“Mémoires de l'Académie Impériale des Sciences de St. Pétersbourg.” vii^e Série, Tome xxxviii., Nos. 2 and 3 (1891). *From the Society.*

“The Missouri Botanical Garden—Second Annual Report.”
From the Director.

“Proceedings of the Academy of Natural Sciences of Philadelphia, 1891.” Part 1. *From the Society.*

“Annual Reports of the Board of Regents of the Smithsonian Institution for the years 1888 and 1889.” “The Forest Trees of North America.” By Asa Gray (1891). *From the Smithsonian Institution.*

“Proceedings of the Cambridge Philosophical Society.” Vol. vii., Parts 4 and 5 (1891). *From the Society.*

“Bulletin de la Société Belge de Microscopie.” xvii^{me} Année, No. 10 ; xviii^{me} Année, No. 1 (October, 1891). *From the Society.*

“Journal of the Marine Biological Association of the United Kingdom.” n.s. Vol. i., Nos. 1-3 (1889-90); Vol. ii., No. 2 (November, 1891). *From the Association.*

“Zoological Society of London—Transactions.” Vol. xiii., Part 3 (October, 1891); “Proceedings for the year 1891.” Parts 2 and 3 (August and October, 1891); “Abstracts,” 3rd November, 1891, 17th November, and 1st December, 1891. *From the Society.*

“The Australasian Journal of Pharmacy.” Vol. vi., No. 72 (December, 1891). *From the Editor.*

Queensland — “Annual Progress Report of the Geological Survey for the year 1890.” *From R. L. Jack, Esqr., Government Geologist.*

“Archiv für Naturgeschichte.” lvii. Jahrg., Band i., Heft 2 (1891). *From the Editor.*

“Jahreshefte des Vereins für vaterländische Naturkunde in Württemberg.” xlvi. Jahrg. (1891). *From the Society.*

“Horæ Societatis Entomologicæ Rossicæ.” T. xxv. (1890-1891). *From the Society.*

“Abhandlungen herausgegeben von der Senckenbergischen Naturforschenden Gesellschaft.” Band xvi., Heft 3-4 (1891). *From the Society.*

“University of Melbourne—Calendar for 1892 ; Examination Papers,” November, 1891 (“Matriculation”). *From the University.*

“Journal of Comparative Neurology.” Vol. i., Part 3 (October, 1891). *From the Editor, Professor C. L. Herrick.*

“The Canadian Record of Science.” Vol. iv., Nos. 6 and 7 (1891). *From the Society.*

“Journal and Proceedings of the Hamilton Association.” Part vii. (1890-91). *From the Association.*

“Johns Hopkins University Circulars.” Vol. xi., Nos. 92 and 93 (November, 1891). *From the University.*

“Australasian Association for the Advancement of Science—Inaugural Address.” By Sir Robert G. C. Hamilton, K.C.B., President (Hobart). Fourth Meeting (1891). *From the Association.*

“Transactions and Proceedings and Report of the Royal Society of South Australia.” Vol. xiv., Part 2 (December, 1891). *From the Society.*

“A Summary of the Darwinian Theory of the Origin of Species.” By Francis P. Pascoe, F.L.S., &c. *From the Author.*

“Hooker’s *Icones Plantarum.*” Third Series. Vols. i.-xi., Part 3 (1867-91). *From the Bentham Trustees, Kew Gardens.*

“Mémoires de la Société des Naturalistes de la Nouvelles Russie, Odessa.” Tome xvi., No. 1 (1891); “Mémoires Mathématiques.” T. xiii. (1891). *From the Society.*

“L’Académie Royale des Sciences, des Lettres et des Beaux Arts de Belgique—Annuaire” (1890 and 1891). “Bulletins.” Third Series. Tomes xviii.-xxi. (1889-91). *From the Society.*

“Mittheilungen aus der Zoologischen Station zu Neapel.”
Band x., Heft 1 (1891). *From the Society.*

“Victoria—Reports and Statistics of the Mining Department,
for the quarter ended 30th September, 1891.” *From the Secretary
for Mines.*

“List of Snakes in the Indian Museum.” By W. L. Slater,
M.A., F.Z.S. *From the Trustees.*

“Archives Néerlandaises des Sciences exactes et Naturelles.”
Tome xxv., 3^{me} et 4^{me} Livraisons (1891). *From the Society.*

“Western Australia—Annual General Report of the Govern-
ment Geologist for the year 1890.” *From the Author.*

PAPERS READ.

CONTRIBUTIONS TO A MORE EXACT KNOWLEDGE
OF THE GEOGRAPHICAL DISTRIBUTION OF
AUSTRALIAN BATRACHIA. No. III.

BY J. J. FLETCHER.

This third small contribution records the collections which have come to hand since June last. The subject is not by any means exhausted; but as there is no immediate prospect of further supplies of material, the results so far gained may presently be briefly reviewed; and with this, for the time being, one must be content.

(ii.) *The inland division of N.S.W. (West of the Dividing Range).*

(r) From Lucknow, near Orange (collected by Mr. W. W. Froggatt).

<i>Limnodynastes tasmaniensis</i>	<i>Hyperolia marmorata</i>
<i>dorsalis</i>	<i>Pseudophryne bibronii</i>
<i>Hyla ewingii</i> , var. B.	

Only one species in this collection calls for comment, namely *H. ewingii*, var. B (eleven specimens), characterised, as to most of the specimens, by the presence of even more spots and markings on the flanks and elsewhere than in var. A (*calliscelis*) and than I have ever previously seen. This is the first time, too, that the species has occurred in any of the collections from the inland division, and it is probably to be regarded as a straggler from the coast. Further references to these specimens will be found below.

(s) From Wellington Caves (collected by Mr. W. W. Froggatt).

<i>Limnodynastes tasmaniensis</i>	<i>Pseudophryne bibronii</i>
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(t) From Yass (collected by Mr. W. W. Froggatt).

<i>Limnodynastes tasmaniensis</i>	<i>Crinia signifera</i>
<i>dorsalis</i>	<i>Pseudophryne bibronii</i>
<i>Hyla ewingii</i> , var. B (one specimen).	

Hyla aurea was seen also, but specimens were not brought. As in the collection from Lucknow, *H. ewingii* var., is here associated with some of the widely distributed species which are to be met with in any tolerably complete inland collection.

One or more specimens of a single species from a single station have been received as follows:—*Limnodynastes dorsalis*, Cooma (Dr. Cobb), Cowra (Rev. A. Fletcher); *L. tasmaniensis*, Wentworth, N.S.W. (Mr. A. Sidney Olliff); *Cryptotis brevis*, Gosford (Mr. C. T. Musson). A third instalment of frogs from Dandaloo yielded nothing not previously sent: a supplementary collection forwarded by Mr. Sloane from Emu Plains, Urana, contained specimens of *Hyla peronii*, not previously obtained. Quite recently on the Blue Mts. I have found both *Limnodynastes tasmaniensis* and *Hyla dentata* to occur.

Two collections from South Queensland—one from the coast, the other from inland—may here be recorded.

(a) From Pimpama, S. of Brisbane (collected by Miss A. Harding).

<i>Limnodynastes peronii</i>	<i>Hyperolia marmorata</i>
<i>Cryptotis brevis</i>	<i>Pseudophryne coriacea</i>
<i>Hyla lesueurii</i>	

This collection was obtained during a very unfavourable season, and does not at all satisfactorily represent the batrachian fauna of the district. No peculiar Queensland species are included; otherwise, as far as it goes, it shows a fauna very similar to that of our northern river districts, as was to be expected.

(b) From Waroo, Inglewood, about 60 miles west of Stanthorpe (collected by Mr. A. J. Ewen).

<i>Limnodynastes tasmaniensis</i>	<i>Pseudophryne coriacea</i>
<i>Crinia signifera</i>	<i>Hyla lesueurii</i>
<i>Hyperolia marmorata</i>	<i>latopalmata</i>

Fifty-seven living specimens were kindly forwarded in an ingeniously contrived vivarium by Mr. A. J. Ewen, through the kind mediation of Mr. R. Etheridge, junr., of the Department of Mines. In this collection the burrowers are conspicuously absent; and there are no peculiar Queensland species; but it is noticeable how inland, as well as on the coast, in about this latitude, *P. coriacea* seems to have more or less completely replaced *P. bibronii*, so common further south (recorded by me from eight inland stations, besides Benalla and Ballarat in the southern colony): otherwise, as far as it goes, it is a fairly typical inland collection.

A somewhat more extended and definite knowledge of the geographical distribution of Australian Batrachians appearing to be desirable, the best way of making a beginning seemed to be to obtain from as many localities as possible, more particularly extra-coastal ones, as complete collections as could be got together, and then to record them. Thanks very largely to a number of friends, to whom I freely acknowledge my indebtedness, a start for N.S.W. has been made. Collections from seven coastal stations (in this case rather districts), and from seventeen inland stations—besides four others from which single specimens or specimens of a single species are recorded, circumstances not allowing of collections being made—have been got together, comprising several hundred individuals, and in some cases forming good series. Collections from stations on the South Coast, on the Northern Tablelands, and especially on the Darling, and still further west, are, however, still desiderata; and I should be very glad indeed to receive such, or promises of co-operation in obtaining them.

Every collection recorded, doubtless only more or less, and sometimes even very, incompletely represents the batrachian fauna of the particular locality whence it came. More particularly was this the case when the collectors were unprepared for burrowers, and when the collecting was not continued over a sufficiently long period, preferably over several seasons.

In an interesting paper on "The Distribution of Fresh-water Fishes"* in America, Professor Jordan says: "It is easy to ascertain the more common inhabitants of any given stream. It is difficult, however, to obtain negative results which are really results. You cannot often say that a species does not live in a certain stream. You can only affirm that you have not yet found it there; and you can rarely fish in a stream so long that you can find nothing that you have not taken before." If in this extract for the words "stream" and "fish," wherever such occur, we substitute the words "district" and "collect," we shall have the case not less admirably stated as regards Batrachians.

In spite of the difficulties in the way of getting even approximately complete collections, and in acquiring negative evidence of value, and though many desirable localities are still untouched, already certain conclusions, which further knowledge may extend but cannot otherwise very materially alter, may at this stage quite legitimately be drawn.

It is quite evident that batrachians are to be found in the interior wherever the conditions allow of their existing, not only near the rivers, but at a distance from these wherever there are lakes, lagoons, or swamps, even though these are not always absolutely proof against frequent or long continued droughts. A newspaper reporter quite recently accompanying a Minister of the Crown on a journey to the Bogan just after the breaking-up of a dry season thus describes what he saw between Warren and Coonamble, N.S.W.: "The scenery was of the monotonous order peculiar to the plain country. There were great bare patches of miles in extent without a living thing to be seen except a few

* Trans. American Fisheries Society, 1888, p. 4.

sheep here and there, kangaroos, emus, plain turkeys, bronze-winged pigeons, . . . various kinds of ducks and other game.

. . . The country is indented here and there with shallow depressions in the earth, which are filled with water after the rains, and sometimes form chains of ponds across the country."

At Emu Plains, some eighteen miles from the Murrumbidgee, Mr. Sloane has been good enough to collect for me; in this locality there are swamps, but they dry up every year about December, or exceptionally a month or two later; in fact there is no permanent water except in the station dams; nevertheless frogs are not scarce; and though my friend is a busy man, and natural history tastes in quite another direction occupy his leisure, yet just about the homestead he has been able to collect seven species—only one less than the number at present recorded from Tasmania (*Hyla verreauxii* not being regarded as a distinct species). Here, as elsewhere, provided only that the frogs can live out the more or less lengthy periods of aestivation, in some years more trying than in others, the ponds after rain, wherever the soil is not too sandy, are at times sufficiently permanent and sufficiently numerous, forming chains of ponds across the country as quoted above, to afford a means whereby batrachians may be enabled to migrate from places where they have become established, and so to gain new stations; or to re-people the old haunts should excessively dry seasons prove utterly disastrous. The possibility of spawn being carried to distant localities on the feet of aquatic birds need not be left out of consideration; but I imagine the means of dispersal mentioned to be of prime importance, and that the great river-system of the interior of the colony is the main source of distribution and replenishment.

Secondly, whenever anything at all like a fairly characteristic collection is obtained, it will be found to comprise representatives of all three dominant Australian families. This is exemplified over and over again in the larger collections recorded.

Out of about fifty-four known Australian species New South Wales may be credited with about thirty-four, of which four [*Hyla jervisensis*, *H. dimolops*, *H. nasuta*, and *Hyllella bicolor*],

all from the coastal division, are not represented in my collections, but as a set-off to this two species [*Hyla gracilentata* and *Phanerotis*] have been added to the coastal fauna, and one [*H. rubella*] to the inland fauna. Of the thirty species met with, twenty-five belong to the coastal division, and eighteen* (not including *Limnodynastes fletcheri*, for reasons given below) to the inland division, fourteen species being common to both. The fauna of the coastal division, the conditions being very favourable, is rich for the relatively small area, and is tolerably well known, not many new species in all probability remaining to be discovered: its members may be roughly divided into four groups: (1) the species frequenting the semi-tropical brushes of our northern river districts, or the sequestered gullies of the Blue Mts., or the Illawarra Range, such as *Mixophyes*, *Phanerotis*, *Cryptotis*, *Limnodynastes peronii*, *Hyla gracilentata*, *H. phyllochroa*, and *H. lesueurii*: (2) the swamp and river frogs, such as most of the species of *Limnodynastes*, *Crinia signifera*, and *Hyla aurea*: (3) the largely terrestrial tree-frogs which at least have recourse to water for breeding purposes, such as *H. ewingii*, *H. cerulea*, *H. dentata*, and *H. peronii*: and (4) the terrestrial batrachians *par excellence*, mostly toads, frequenting damp places, but avoiding water, such as the species of *Pseudophryne*, and probably also *Hyperolia marmorata*.

The restriction of some species to the coastal division is explicable on the ground there only are to be found the natural conditions under which they flourish; on the other hand we find some species inhabiting both regions under conditions of humidity, &c., and amid surroundings widely different.

One of the most marked differences between the coastal and inland faunas arises from the absence from the latter of the brush and gully-haunting frogs; the balance is made up of three elements: (1) cosmopolitan species, (2) several peculiar species, of which two [*Notaden* and *Chiroleptes platycephalus*] seem to be characteristic of the plain country, for neither of them has occurred in collections

* Excluding also *Pseudophryne coriacea*, Waroo being just a little north of the northern border of N.S.W.

from the Tablelands, and Mr. J. D. Cox and Mr. A. G. Hamilton, who know the Mudgee District well, never met with either of them, and (3) a few stragglers, sometimes from the east, in collections from the Tablelands, as *Limnodynastes peronii* (one specimen) in the collection from Guntawang, close to the western slope of the Dividing Range, and *Hyla ewingii* var. in the collections from Yass and Lucknow; sometimes, however, apparently from the north, as *Limnodynastes ornatus* at Guntawang, *Hyla rubella* at Dandaloo and Bearbong, and perhaps *H. latopalmata*, though this may be a widely distributed northern inland species at about its southern limit. In any case, the distribution of some of our species cannot be satisfactorily dealt with until more is known of the distribution of Queensland species.

That the Dividing Range does not separate two more widely divergent faunas than, as far as present knowledge goes, have been met with, is not surprising when the faunas of the east and west coasts are contrasted, for it then appears that of fourteen species recorded in the B.M. Catalogue from W. Australia, seven, or 50 per cent., are members of our coastal fauna, and eight (including *Helioporus albo-punctatus*, recorded from the Murray) of our inland fauna. And it may be said generally of any and every colony, that its batrachian fauna consists of an admixture of more or less cosmopolitan forms and of a small number of others characteristic of the region. _____

Hyla ewingii, Dum. & Bibr., was described in the *Erpétologie Générale* (T. viii. p. 597, published in 1841), the habitat being Tasmania; the description adds, "les parties supérieures offrent un gris verdâtre." It is figured in *Voy. au Pôle Sud*, *Batr.* pl. 1. fig. 3, of which Dr. Günther in the first edition of the B.M. Catalogue of Amphibia says, "figure not good." The localities given in the second edition of the same work are Tasmania, Hobart, Melbourne, and Australia, var. A (*H. calliscelis*) being recorded from King George's Sound. Dr. Günther (*Ann. Mag. Nat. Hist.* (3), xx. (1867), p. 57) also records *H. ewingii* from N. E. Australia.

Mr. Krefft (P.Z.S. 1863, p. 389) includes *H. ewingii* among the Batrachians occurring in the neighbourhood of Sydney, and says: "This pretty little *Hyla* is rather a rare species, and I do not think that I ever found more than six or eight specimens of it generally under stones during the cold season." In the same paper he says of *H. verreauxii*: "A rather rare frog, which I have occasionally taken from under the bark of the Tea-tree, and from under rocks in moist localities; never taken during the summer. No specimens from other parts of Australia have as yet come under my notice." In his paper on "Australian Vertebrata, Recent and Fossil" (Industr. Prog. N.S.W. [1871], p. 747), we have a slightly different version: for it is there stated of *H. ewingii* that the Sydney "Museum is in possession of specimens from almost every part of Australia, the west coast excepted," while *H. verreauxii* is said to be "very common almost everywhere on the eastern border."

One of our commonest frogs in the County of Cumberland, equally common also in the three adjacent counties, though I have not seen it from any inland localities, until it occurred in two of Mr. Froggatt's collections noted above, is a little *Hyla*, of which Mr. Boulenger kindly named specimens for me as *H. ewingii* var. *calliscelis*, Peters. It is the little frog whose shrill *twee, twee, twee*, repeated from half-a-dozen to a dozen times or more, may be heard in damp weather even during the winter months, as I have pointed out elsewhere. From its common occurrence Mr. Krefft was no doubt familiar with this frog; but as Peters' description was published only in 1874, Mr. Krefft could not have referred to it under this name in the papers quoted above.

H. dentata, Keferst., is a Sydney frog, and was described in Archiv für Naturgesch., for 1868, but it is not mentioned in the latest of Mr. Krefft's papers published in 1871. It seems to me therefore very probable that when Mr. Krefft referred to *H. ewingii* and *H. verreauxii* as species occurring in the neighbourhood of Sydney and elsewhere on the east coast, he meant to denote the two frogs now known as *H. ewingii* var. *calliscelis*, Peters, and *H. dentata*, Keferst.

To Mr. W. W. Froggatt I am very much indebted for thirty-one specimens of the typical form of *H. ewingii* from the neighbourhood of Ballarat, Victoria. I do not know this frog from any locality in N.S.W., though I have one specimen of a *Hyla* obtained by me under the bark of a tree in a gully on the Blue Mts., which I am inclined to refer to this species: it is larger (52 mm. from snout to vent) than any specimen of *H. kreffli* or *H. ewingii* I have seen, it has the fingers insufficiently webbed to be referred to the former, and is too long in the legs, the tibio-tarsal joint of the adpressed limb reaching beyond the level of the tip of the snout, to quite satisfactorily be placed in *H. ewingii*, with which otherwise it has most in common; if it may correctly be regarded as a very large and unusually long-legged individual of the typical form of *H. ewingii*, then it is the only specimen from N.S.W. known to me; while if it should not strictly be referable to this species, then, as far as my experience goes, *H. ewingii* is represented in N.S.W. only by var. *calliscelis*.

H. ewingii var. *calliscelis* from King George's Sound differs from the typical form "in having the hinder side of thighs with large purplish-black spots on yellowish ground; a purplish-black spot in the groin" (B.M. Cat. 2nd ed. p. 407). In specimens from the County of Cumberland and from the three adjoining counties, the presence of spots seems quite constant either in the groin or on the flanks, frequently they are absent on the hinder surface of the thighs: the concealed surfaces of the legs in living specimens and in such as have not been long in spirits, are of a bright orange; while the dark inguinal spots in the living animal appear on a background tinged with light yellow. Some of Mr. Froggatt's specimens from Lucknow are much more spotted and blotched even than Sydney examples, in six of them "the large well-defined dark spot commencing between the eyes and covering the middle of the back" of the descriptions being not merely a darker shade of the groundcolour "speckled all over with blackish," but partially edged or to some extent invaded by a dark tint like that of the ordinary inguinal spots: none of them have spots on the hinder surface of the thighs, and some of them are not more blotched than Sydney specimens.

The beautiful little *Hyla* brought me alive from Ballarat by Mr. Froggatt, referred to in my last paper (p. 254), has puzzled me not a little: with the general characters of *H. ewingii*, it presented when alive a broad bright green dorsal band edged by a dark narrow band, and with also a lateral linear dark band, in which respects it differs from the thirty-one (spirit) specimens of *H. ewingii* from the same locality; and makes some approach to the specimens from Lucknow, collected and given to me also by Mr. Froggatt, who likewise brought me one of these specimens alive; (this specimen, like every other specimen of *H. ewingii* var. *calliscelis* which I have ever seen, was entirely devoid of any green tint). I do not know how to speak of it except as another variety of *H. ewingii* (var. C).

Limnodynastes tasmaniensis, Gthr., is a widely distributed and variable eastern species represented in my collections, exclusive of Sydney specimens, by about 120 specimens, from fourteen inland and several coastal stations. In the original description (B.M. Cat. 1st ed. p. 33) the toes are said to be "slightly webbed at the base, slightly fringed"; in the second edition of the B.M. Catalogue, Mr. Boulenger says, "toes moderate, slightly fringed." The typical form may be described as having usually no crimson or reddish spots on the upper eyelids, though in young specimens these may occasionally be present and more frequently a vertebral red stripe; three metacarpal tubercles, two metatarsal tubercles, tarso-metatarsal joint of adpressed limb reaching the eye, or between the eye and the nostril; fingers and toes not pointed, toes slightly fringed, slightly webbed at the base (the basal webbing appears to me merely the continuity of the fringe of two contiguous toes, and when the fringe is very slight the webbing is correspondingly slight, and the toes may be said to be almost free); throat of male dusky, tinged with yellow, concealed surfaces of both sexes tinged with yellow, especially in the breeding season. In some of my collections, as from Wentworth, Urana (together with the typical form), Mudgee (together with the typical form, and *L. fletcheri*), and Waroo,

however, there are specimens of what I can regard as only a well-marked variety of this species, with or without recognisable crimson or reddish spots on the upper eyelids, a little longer in the legs (the tarso-metatarsal joint of the adpressed limb reaching the level of the tip of the snout, or not quite so far, or even further), with two or with three metacarpal tubercles, with two or with one metatarsal tubercle (the outer one being either absent or at least not distinguishable), with very often a very distinct basal webbing of the toes, and without pointed fingers and toes. In other words, but that the head is not much depressed and the snout not shorter than usual, some of these specimens might be referred to *L. platycephalus*; while if the fingers and toes were but pointed, some of them might very well be referred to *L. fletcheri*. Of four specimens from Wentworth three have crimson spots, all have a distinct basal webbing, but in two of them the tarso-metatarsal joint of the adpressed limb does not reach beyond the level of the nostril; they have three metacarpal tubercles, but in none of them is there a recognisable outer metatarsal tubercle. From Urana Mr. Sloane, whom I had asked to look out for specimens with crimson palpebral spots, kindly sent me two specimens alive, of which he wrote, "I send you a couple of remarkably robust specimens of *L. tasmaniensis*; I have seen several specimens with reddish markings on the upper eyelids, but the two sent do not show it so strongly marked"; one of these, 60 mm. from snout to vent, is the largest specimen of the species I have seen; they agree substantially with the specimens from Wentworth, but are both a little dusker on the throat and sides of chest; and more spotted on the undersurface of the calf and foot. Of eighteen specimens from Waroo, some have crimson palpebral spots, some have two metatarsal tubercles, while others appear to have but one, and some appear to have but two metacarpal tubercles, some of them are much spotted on the throat, sides of chest and even of the abdomen, and on the undersurface of legs; one specimen is of quite the typical form. From Guntawang, with specimens of the typical form, together with specimens of what might be called *L. fletcheri* if the fingers and toes were

pointed, I have two specimens of the same batch as the two type specimens of the latter sent to Mr. Boulenger; these have the fingers and toes pointed as Mr. Boulenger describes, but I cannot help thinking that there is something abnormal about them—possibly they may, when collected, have been put into too strong spirit,—and that they are of the same species as the specimens without pointed fingers and toes, and that both are simply a variety of *L. tasmaniensis*.

Mixophyes fasciolatus, Gthr., the type specimens of which came from the Clarence River (two specimens appearing to be in the Collection at the time the second edition of the Catalogue was published), is said to have the tibio-tarsal articulation reaching to the tip of the snout, and the “toes two-thirds webbed, so that the three outer phalanges of the fourth toe remain free.” I have before me a fine series of seven large specimens, of which five were obtained for me by Mr. Helms on the Richmond River, and two others subsequently a little further to the north on the Tweed: in all these the tibio-tarsal articulation of the adpressed limb reaches well beyond the level of the snout (say from $\frac{1}{4}$ to 1 inch), while as to the webbing, several may be said to agree with the description, others have a little more webbing, it is thicker, and intensely pigmented, the maximum being reached in a very fine specimen from the Tweed: the difference in size between the type, of which measurements are given by Dr. Günther, and this specimen is very well indicated by the following: in Dr. Günther’s specimen length of body (from snout to vent) 33 lines, length of hind limb 54 lines: in my specimen the corresponding measurements are $3\frac{1}{8}$ inches, and 8 inches (to the tip of the fourth toe along the straightened leg): now in this specimen every toe, even the fourth, is webbed to almost the very tip on at least one side (of the toe), but the toes cannot be said to be fully webbed, because toes 2-4 are not equally webbed on both sides (of the toe). There is in the Macleay Museum from the Richmond River a still larger and finer example than mine,—the largest Australian frog I have yet seen—which is more or less similar

in regard to the more than usually copious webbing ; it is not accessible at present, and I cannot give further particulars about it, but it is the frog exhibited by Mr. Masters at the meeting of this Society in March, 1886 [Proceedings (2), I. p. 238]. Specimens of this species from the Blue Mts. are normally webbed, but are longer in the legs than the type, like my northern river specimens.

In endeavouring to find a place in our systematic lists for such specimens as the above, one has choice of two alternatives ; either to consider that they are representatives of new species and to deal with them accordingly, or, as I think the more desirable course, to treat them as varietal forms, and to note them as such. With the advantages which residence in the country naturally gives in the way of acquiring some knowledge of certain species in their natural haunts, and of obtaining with greater facility perhaps larger series of specimens of other species than naturalists abroad can very often have at their disposal, it has ceased to cause me surprise that I sometimes meet with individuals whose characters refuse to come perfectly and exactly into the line as laid down in the text-books ; or that characters which seem to be of more or less considerable specific importance when only a few specimens have been available, should sometimes turn out to be variable when larger series of specimens are examined.

A MONOGRAPH OF THE *TEMNOCEPHALEE*. Part i.

BY PROFESSOR W. A. HASWELL, M.A., D.Sc.

[This paper will be published in the forthcoming Macleay Memorial Volume.]

NOTES AND EXHIBITS.

Dr. Cox exhibited a specimen of *Purpura textilosa*, a common marine shell on the South Australian coast, brought to him from Brewarrina on the Darling; and he said that at first he was extremely puzzled to account for the means of transport to such a distance from the coast. The true explanation of the matter probably was to be found in the fact that as, instead of carrying lime so great a distance—Brewarrina being fully 1000 miles by river from the sea—it was usual to take up shells from the coast by the river steamers and burn them where required, the specimen exhibited had formed part of such an importation.

Mr. Palmer exhibited a snake (*Hoplocephalus nigrescens*, Gthr.) and a lizard (*Tiliqua gigas*, Sch.) caught yesterday on the Blue Mountains, as they came to drink at a little runnel of water very shortly after it had been caused to flow from a pool higher up by one of his companions, the weather being very hot and dry until the heavy rain accompanying the heavy thunderstorm later on in the afternoon.

Rev. J. M. Curran exhibited some excellent lithographs of rock-sections which had just been executed in Sydney under his supervision.

In reply to an enquiry on the part of Mr. A. Sidney Olliff as to the exact habitat of the splendid Lucanid beetle, *Phalacrognathus Muelleri*, described by Sir William Macleay in 1885 (P.L.S.N.S.W., Vol. x., pp. 135 and 474) from two specimens about which the only information then available was that they came from North Australia, Mr. F. A. Skuse said that specimens had recently been received by the Australian Museum from Russell Scrub, Boar Pocket, near Cairns, Queensland.

WEDNESDAY, 24TH FEBRUARY, 1892

Dr. J. C. Cox, F.L.S., Vice-President, in the Chair.

Mr. L. Osborn Beal, Dunedin, N.Z., was introduced as a visitor.

Professor J. T. Wilson, M.B., Ch.M., Sydney University, was elected a member of the Society.

DONATIONS.

“The Perak Government Gazette.” Vol. v., No. 1 (January, 1892). *From the Government Secretary.*

“The Australasian Journal of Pharmacy.” Vol. vii., Nos. 73 and 74 (January and February, 1892). *From the Editor.*

“The Pharmaceutical Journal of Australasia.” Vol. v., No. 1 (January, 1892). *From the Editor.*

“Zoologischer Anzeiger.” xiv. Jahrg., Nos. 380-381 (December, 1891, January, 1892). *From the Editor.*

“Catalogue of Books added to the Radcliffe Library, Oxford Museum, during the year 1890.” *From the Trustees.*

“Journal of the Royal Microscopical Society, 1891.” Part 6 (December), No. 85. *From the Society.*

“Archiv für Naturgeschichte.” lv. Jahrg. (1889), ii. Band, 1 Heft. (1891); lvii. Jahrg. (1891), i. Band, 3 Heft. *From the Editor.*

“Journal of the Linnean Society of London—Botany.” No. 175 (Vol. xxvi.), Nos. 183-188 (Vol. xxvii.), and Nos. 189-193 (Vol. xxviii.); “Zoology.” Nos. 124-125 (Vol. xx.) and Nos. 145-147 (Vol. xxiii.); “List of the Society, 1890-91.” *From the Society.*

“Agricultural Gazette of N.S.W.” Vol. ii., Part 12 (December, 1891). *From the Director of Agriculture.*

“Royal Society of Edinburgh—Proceedings.” Vol. xvii. (1889-90); “Transactions.” Vol. xxxiv. (1890); Vol. xxxvi., Part 1, Nos. 1-8 (1889-90). *From the Society.*

“Geological and Natural History Survey of Canada—Contributions to Micro-Palæontology.” Part 3. *From the Director.*

“United States National Museum—Proceedings.” Vol. xiv., Nos. 859-860 (1891). *From the Museum.*

“Bulletin of the Museum of Comparative Zoology at Harvard College.” Vol. xxii., No. 1 (December, 1891); “Annual Report, 1890-91.” *From the Curator.*

“American Naturalist.” Vol. xxv., Nos. 298-299 (October and November, 1891). *From the Editor.*

“Johns Hopkins University Circulars.” Vol. xi., No. 94 (December, 1891). *From the University.*

“Journal of Comparative Medicine and Veterinary Archives.” Vol. xii., No. 12 (December, 1891). *From the Editor.*

“Canadian Record of Science.” Vol. iv., No. 8 (1891). *From the Society.*

“Department of Agriculture, Brisbane—Bulletin.” No. 14 (December, 1891). *From the Secretary for Agriculture.*

DONATIONS.

“Transactions of the Canadian Institute.” Vol. ii., Part 1, No. 3 (October, 1891). *From the Institute.*

“Australasian Association for the Advancement of Science—Address by the President of Section A.” (Hobart, 1892.) *From the Association.*

“Supplementary Appendix to Travels amongst the Great Andes of the Equator.” By Edward Whympfer; “Coleoptera.” By A. Sidney Olliff. *From the Author.*

“Memoirs of the Geological Survey of N.S.W.—Palæontology.” No. viii., Part 2. “Contributions to a Catalogue of Works, &c., of the Australian and Tasmanian Aborigines.” By R. Etheridge, Junr. *From the Hon. the Minister for Mines.*

“Journal of Conchology.” Vol. vi., No. 12 (October, 1891). *From the Conchological Society of Great Britain and Ireland.*

“Transactions of the Entomological Society of London for the year 1891.” Part 4 (December). *From the Society.*

“Société Botanique de Lyon—Bulletin Trimestriel.” No. 1, Janvier-Mars, 1891. *From the Society.*

“Académie Royale Danoise des Science et des Lettres, Copenhague—Bulletin pour 1891.” No. 2 (Mars-Mai). *From the Society.*

“Verhandlungen des Naturhistorischen Vereines der preussischen Rheinlande Westfalens und des Reg.-Bezirks Osnabrück.” xlvii. Jahrg., Zweite Hälfte. *From the Society.*

“Société Zoologique de France—Bulletin pour l'Année 1891.” Tome xvi., No. 8; “Mémoires.” Tome iv., Nos. 3 et 4. *From the Society.*

“Zoological Society of London—Abstract.” January 5, 1892. *From the Society.*

“Queensland—Report on the Moondilla Gold Field, 1891.” By R. L. Jack, Government Geologist. *From the Author.*

“Records of the Geological Survey of India.” Vol. xxiv., Part 4 (1891). *From the Society.*

“Bericht über die Verwaltung und Vermehrung der königlichen Sammlungen für Kunst und Wissenschaft zu Dresden in den Jahren 1888 und 1889.” *From Professor A. B. Meyer.*

“Technical Education Series, No. 8—Report on a Beetle destroying boots and shoes in Sydney.” By W. W. Froggatt. *From the Curator, Technological Museum, Sydney.*

PAPERS READ.

NOTES ON SOME SPECIMENS OF PLANTS COLLECTED
AT KING GEORGE'S SOUND BY MR. H. WILLIS.

BY THE REV. W. WOOLLS. PH.D., F.L.S.

Some time since I forwarded to the Linnean Society, with Notes, 38 specimens of plants collected at King George's Sound by the Rev. R. Collie, F.L.S., and in so doing I endeavoured to explain, by the assistance of my late friend Mr. C. S. Wilkinson, F.G.S., the probable reason why the flora of Western Australia differs so much from that of the eastern portion of the continent. That eminent geologist was of opinion that, during the Miocene period, the condition of Australia was very different from what it now is, as probably the *ocean occupied all that low country between Spencer's Gulf and Western Australia*; whilst during the Cretaceous period about *two-thirds of Australia must have been under the ocean*. Supposing, therefore, that Eastern and Western Australia at some very remote period were separated by water, and that, in the course of many generations, the conditions of soil and climate have been considerably modified in both regions, it may be presumed that the western or purely Australian plants became very much localised, whilst the eastern flora, in addition to the few species which have immigrated to it from the west, has been mixed with plants of an Asiatic or Polynesian type. An examination of 35 species, which have recently been collected at King George's Sound, will show how few have travelled eastwards:—

(1) DILLENIACEÆ.

1. *Hibbertia furfuracea*, Benth.

(2) POLYGALÆÆ.

2. *Comesperma confertum*, Labill.

(3) TREMANDRÆÆ.

3. *Tetratheca setigera*, Lindl.

(4) RUTACEÆ.

4. *Boronia crenulata*, Sm.
5. *B. heterophylla*, F.v.M.

(5) GERANIACEÆ.

6. *Pelargonium Rodneyanum*, Lindl.

(6) STERCULIACEÆ.

7. *Thomasia quercifolia*, J. Gay.

(7) THYMELEÆ.

8. *Pimelea rosea*, R.Br.
9. *P. imbricata*, R.Br.

(8) LEGUMINOSÆ.

10. *Isotropis striata*, Benth.
11. *Oxylobium callistachys*, Benth.
12. *Chorizema angustifolium*, Benth.
13. *Burtonia scabra*, R.Br.
14. *Daviesia flexuosa*, Benth.
15. *Eutaxia myrtifolia*, R.Br.
16. *E. virgata*, Benth.
17. *Vicia angustifolia*, Roth. (introduced).
18. *Acacia hastulata*, Sm.

(9) MYRTACEÆ.

19. *Melaleuca thymoides*, Labill.
20. *Agonis linearifolia*, Schau.

(10) UMBELLIFERÆ.

21. *Xanthosia rotundifolia*, DC.

(11) PROTEACEÆ.

22. *Adenanthos obovata*, Labill.
23. *A. barbiger*, Lindl.

(12) COMPOSITÆ.

24. *Helipterum Manglesii*, F.v.M.
25. *Helichrysum bracteatum*, Willd.

(13) GOODENIACEÆ.

26. *Dampiera alata*, Lindl.
27. *D. leptoclada*, Benth.

(14) SOLANACEÆ.

28. *Anthocercis viscosa*, R.Br.

(15) EPACRIDÆ.

29. *Andersonia sprengelioides*, R.Br.
30. *Astroloma compactum*, R.Br.
31. *Lysinema fimbriatum*, F.v.M.
32. *Leucopogon carinatus*, R.Br.
33. *Dracophyllum capitatum*, R.Br.

(16) HÆMODOURACEÆ.

34. *Conostylis setigera*, R.Br.

(17) JUNCACEÆ.

35. *Xerotes micrantha*, Endl.

(1) The genus *Hibbertia*, according to Baron Mueller's census, contains 87 species, and of these one half are purely western plants, and have never emigrated from that Colony. Only one, *H. stricta*, R.Br., is common to the Australian Colonies and Tasmania. *H. furfuracea*, Benth., or *Pleurandra furfuracea*, R.Br., is strictly a western species, and not nearly allied to any of the eastern species. Though the flowers resemble those of *H. diffusa*, R.Br., the two plants are very distinct in habit, the one

being an erect shrub of several feet in height, and the other being a small prostrate plant, whilst the position of the stamens and the number of the carpels differ materially.

(2) *Comesperma confertum*, Labill., is peculiar to W. Australia, though in appearance it resembles *C. ericinum*, DC., which is common to the eastern Colonies and Tasmania, and has the keel-petal horned and the sepals not obtuse. Of the 24 species of the genus 16 occur in W. Australia, 11 being peculiar to that Colony, and the other 5 extending to S. Australia, Victoria, N. S. Wales, Queensland and Tasmania. *C. scoparium*, Steetz, *C. volubile*, Labill., and *C. calymega*, Labill., are the only species which have travelled from the west to N. S. Wales.

(3) *Tetralthea setigera*, Endl., belongs to a genus almost exclusively W. Australian, only two species, *T. ericifolia*, Sm., and *T. juncea*, Sm., being known in E. Australia, and these so different in character from the majority of the species as to suggest a long series of ages for their differentiation, that is to say, presuming that the genus which is strictly Australian had its origin in the western part of the continent. Of the small order Tremandrea, the genera *Platythea* and *Tremandra* are unknown in the east, as well as any species of *Tetralthea* which have the ovules solitary in each cell, and seeds glabrous and shining.

(4) Of the genus *Boronia*, which is known to have about 60 species in Australia (Census, F.v.M.), more than half (33) are limited to the west. *B. serrulata*, Sm., is peculiar to N. S. Wales, but it is nearly allied to *B. crenulata*, Sm., differing chiefly in its larger and more numerous flowers, the structure of its style, and the hairiness of its filaments. *B. heterophylla*, F.v.M., belongs to a section of the genus exclusively western, and is characterised by having the sepaline anthers different from the petaline ones. The well known *B. megastigma*, Nees, is of the same section. Whilst the species of *Boronia* are almost equally divided between the west and east, N. S. Wales has a much larger share of the species of *Eriostemon* and *Phcalium*, and it is remarkable that only one species, *E. difformis*, Cunn., is common to the Australian

colonies. Some genera of the Rutaceæ are endemic in the east, and others are common to that part of Australia, tropical Asia, and the isles of the Pacific.

(5) *Pelargonium Rodneyanum*, Lindl., is not peculiar to W. Australia, as it occurs in Victoria, N. S. Wales, and S. Australia. In Mitchell's Expeditions, vol. ii. p. 144, it is stated that near the Murray he discovered "a beautiful new species of the Cape Pelargonium, which would be an acquisition to our gardens." This he named "*P. Rodneyanum* in honour of Mrs. Riddell, of Sydney, granddaughter of the famous Rodney." Baron Mueller has figured this species amongst his Victorian plants. Perhaps it may be regarded as one of those plants which had their origin in Africa (a region famous for its Pelargoniums), as Mr. Bentham considered it nearly allied to *P. reniforme*, Curt., from the southern part of that continent.

(6) *Thomasia quercifolia*, J. Gay, with 19 species of the genus is of western origin, and only one species, *T. petalocalyx*, F.v.M., and that nearly approaching *T. angustifolia*, Steud., has travelled to S. Australia and Victoria. Of the Sterculiaceæ, numbering 126 species, more than half (66) are endemic in W. Australia (Census, F.v.M.), but the following genera are not represented in that region, viz: *Sterculia*, *Tarrietia*, *Heritiera*, *Ungeria*, *Helicteres*, *Methorium*, *Melhania*, *Melochia*, *Dicarpidium* and *Abroma*.

7) *Pimelea rosea*, R.Br., and *P. imbricata*, R.Br., with 21 other species of the genus, are limited to W. Australia. According to Mr. Bentham, *Pimelea* occurs only in Australasia; one species, *P. longifolia*, Banks and Sol., being common to Australia and New Zealand, and 9 others peculiar to the latter. *Drapetes*, *Wickstræmia* and *Phaleria* do not occur in W. Australia; but *Drapetes* is represented in Tasmania and Victoria as well as in New Zealand, whilst the others have species in the Oriental Archipelago, the isles of the Pacific and E. Australia.

(8) Of the great order Leguminosæ comprising 1065 species (Census, F.v.M.) more than a third are endemic in W. Australia,

and the following genera do not extend to any of the other colonies, viz: *Jansonia*, *Latrobea*, *Euchilopsis* and *Labiichea*.

- (a) *Isotropis striata*, Benth. This species and 4 others are limited to W. Australia. Only one extends to S. Australia and N. S. Wales.
- (b) *Oxylobium callistachys*, Benth., formerly *Callistachys lanceolata*, Vent., is an ornamental plant, and differs in appearance from the species generally. Of the genus, 17 are peculiar to W. Australia, and 7 occur in N. S. Wales.
- (c) *Chorizema angustifolium*, Benth., with 13 species of the genus, is limited to W. Australia. *C. parviflorum*, Benth., is the only one which extends to the east.
- (d) *Burtonia scabra*, R.Br., belongs to a genus principally western.
- (e) *Daviesia flexuosa*, Benth., is one of a large genus, 41 species of which are limited to the west, and 13 occur in N. S. Wales.
- (f) *Entaxia myrtifolia*, R.Br., and *E. virgata*, Benth., are western species. *E. empetrifolia*, Schl., is common to W. and S. Australia, Victoria, and N. S. Wales.
- (g) *Vicia angustifolia*, Roth., is an introduced plant.
- (h) *Acacia hastulata*, Sm., is a small shrub known only from King George's Sound.
- (9) *Melaleuca thymoides*, Labill. The genus *Melaleuca* has in all Australia 101 species, about 70 of which are western and 18 occur in N. S. Wales. *Agonis linearifolia*, Schau., resembles a *Leptospermum*. When the *Flora Australiensis* was published, *Agonis* was regarded as peculiarly western; but Mr. F. M. Bailey discovered one in Queensland (1888) *A. lysicephala*, F.v.M.; and *A. Scortechiniana* is found to be common to N. S. Wales and Queensland (1881).
- (10) *Xanthosia rotundifolia*, DC., differs very much from the species near Sydney, as it is nearly glabrous. The genus is confined to Australia, 13 being western and 5 eastern species. Three extend to Tasmania.

(11) *Adenanthos obovata*, Labill., and *A. barbiger*, Lindl., are Proteaceous shrubs. With two exceptions the species (14) are limited to W. Australia. The genus is remarkable for its peculiar style, and is not closely allied to any other.

(12) *Helichrysum bracteatum*, Willd., is a composite found in all the Australian colonies, and with *Helipterum Manglesii*, F.v.M. (*Rhodanthe Manglesii*, Lindl.), is often seen in gardens.

(13) *Dampiera alata*, Lindl., and *D. leptoclada*, Benth., belong to a genus comprising 38 species, of which 27 are limited to W. Australia. Only seven occur in N. S. Wales and one in Tasmania.

(14) *Anthocercis viscosa*, R.Br., with eight other species, is limited to W. Australia, and has the reputation of being poisonous. Four species are found in N. S. Wales and one in Tasmania. The genus *Anthocercis* is nearly allied to *Duboisia*, of which *D. Hopwoodii*, F.v.M., is the famous "Pitury" of the blacks. According to Mr. F. M. Bailey, F.L.S., they chew the leaves of it as white men do tobacco.

(15) (a) The genus *Andersonia* is limited to W. Australia and has 20 species. *A. sprengelioides*, R.Br., is very common at King George's Sound.

(b) *Astroloma compactum*, R.Br. (referred by Baron Mueller to *Styphelia*), is nearly allied to *A. humifusum*, R.Br., a species found in most of the Australian colonies. According to the Flora, there are 18 species of the genus, three only extending to the East.

(c) *Lysinema fimbriatum*, F.v.M., is remarkable with the other four species of this western genus for having its filaments free from the base.

(d) *Leucopogon carinatus*, R.Br., belongs to the section "Striate" of the genus. The Baron joins *Leucopogon* with *Styphelia*, but according to the Flora it reckons 120 species, of which 78 are western. It is worthy of remark that *L. Richei*, R.Br., a species growing near the coast, is common to five of the Australian colonies and Tasmania.

(e) *Dracophyllum capitatum*, R.Br., occurs only in W. Australia, to which may be added *D. squarrosum*, R.Br., *D. Drummondii*, Benth., *D. phlogiflorum*, F.v.M., *D. gracile*, R.Br., and *D. parviflorum*, F.v.M. Two species are indigenous in Tasmania, one in Queensland, and one (*D. Fitzgeraldi*, F.v.M.) in Lord Howe's Island.

(16) *Conostylis setigera*, R.Br., belongs to a genus having 32 species, all peculiar to W. Australia. It is worthy of notice that the only species of Hamodoraceæ in N. S. Wales are *Hemodorum planifolium*, R.Br., and *H. teretifolium*, R.Br.

(17) *Xerotes micrantha*, Endl., is a species found in S. and W. Australia, Victoria, and N. S. Wales. The genus comprises 32 species, of which 19 are limited to W. Australia and 11 occur in N. S. Wales. The only *Xerotes* found out of Australia is one in New Caledonia.

It is remarkable, on looking over a few specimens gathered promiscuously at King George's Sound, that *Pelargonium Rodneyanum*, *Vicia angustifolia*, *Helichrysum bracteatum*, and *Xerotes micrantha* are the only species found on the eastern part of the continent, and of these one is probably of African and the other of European origin. The rest of the species stand, as it were, isolated, and illustrate the remark of Sir J. D. Hooker that, in reference to the flora of Australia, "there is a greater specific difference between two quarters of Australia (South-eastern and South-western) than between Australia and the rest of the globe; and that the most marked characteristics of the flora are concentrated at that point which is geographically most remote from any other region of the globe." Western Australia is rich in the number of its species. Baron Mueller reckons 3560, and of these the great majority are "purely Australian, without any admixture of any other element," whilst in the eastern colonies the number of such plants is proportionately less. It appears, therefore, that in Western Australia the flora of the continent had its origin, and that whilst certain species have migrated to the east, they have become associated with those from other parts. Why so few

species, comparatively speaking, have left their original source is a problem not yet solved, and it is doubtless the result of causes which remain to be explained in reference to geological periods long past. Whatever may be the cause, it is a fact that in the great orders Leguminosæ, Myrtaceæ and Proteaceæ, many of the western genera are either wholly unrepresented or only partially represented in the east. For instance, the large genera *Gastrolobium* and *Jacksonia* have very few species out of Western Australia, whilst at least four genera are not represented in any other part of Australia. In the Myrtaceæ, also, a similar unequal distribution appears. The large genus *Verticordia*, with the exception of one species in Queensland and Northern Australia, is exclusively western; and *Calycotrix*, with its numerous species, has only two representatives in N. S. Wales. *Actinodium*, *Pileanthus*, *Wehlia*, *Astartea*, *Hypocalymma*, *Balaustion*, *Conothamnus*, *Regelia*, *Phymatocarpus*, *Calothamnus*, *Lamarchea* and *Eremcæ* are limited to the west; and in *Eucalyptus* not more than six or seven species are common to both regions. Again, in the Proteaceæ, *Simsia*, *Synaphea*, *Franklandia*, and the large genus *Dryandra*, no species have migrated eastward; whilst in *Petrophila*, *Isopogon*, and *Banksia*, the eastern species are few. In the large order of the Compositæ, 206 occur in the west and 296 in N. S. Wales. Only three genera, with one species each, viz., *Pithocarpa*, *Decazesia* and *Trichocline*, are peculiar to W. Australia. It must be remarked in reference to this order that the species are more widely distributed than any other, being easily conveyed by the nature of their seeds, and being in many instances mere weeds suited to all climates. Notwithstanding these considerations, however, many of the western species are truly local, whilst the number of the eastern composites has been augmented by plants from Asia, Australasia and Polynesia. In the Epacrideæ, *Oligarrhena*, *Needhamia*, *Conostephium*, *Coleanthera*, *Lysinema*, *Cosmelia*, *Sphenotoma* and the large genus *Andersonia*, nine of the species occur in the East; whilst amongst Monocotyledonous plants, all the species of the Hæmodoraceæ, with the exception of very few, are strictly limited to the west. It would be easy to pursue the

subject further, and to show from Baron von Mueller's valuable "Census of Australian Plants" (to which I am so much indebted for the numbers and distribution of species) how correctly Sir J. D. Hooker concluded, more than thirty years ago, that Western Australia is the centrum and cradle of plants purely Australian, and that in Eastern Australia the flora is not so rich in endemic species, or so free from an admixture of such as may be regarded as of foreign origin. At the present time it is impossible to explain these phenomena, but it is probable that the progress of geological science may hereafter bear testimony to the causes which have led to the differentiation of the Australian flora.

NOTE.—Since these remarks were written, I have received from the same locality *Banksia coccinea*, R.Br., *B. attenuata*, R.Br., *B. ilicifolia*, R.Br., *Callistemon speciosus*, DC., and *Scævola attenuata*, R.Br., none of which species extend to Eastern Australia.

ON PANAX GUM.

BY J. H. MAIDEN, F.L.S., &C.

Panax is a genus of the Araliaceæ, several species of which order are more or less acrid or aromatic. But the recorded instances of gum or resin being found in any of them are extremely few, and in no case, so far as I am aware, has the composition of the exudation been dealt with, much less an analysis given.

In the common English ivy (*Hedera helix*), there is stated to be contained "the gum-resin called Hederine, used by varnish-makers, and said to be depilatory and emmenagogue." (Lindley, *Medical and Economical Botany*.)

"An aromatic gum-resin comes from *Aralia racemosa*, *spinosa*, and *hispida*. (Lindley, *Vegetable Kingdom*.)

Meryta Sinclairii, Seem., of New Zealand, "is charged with a peculiar resin in all its parts." (Kirk's *Forest Flora of New Zealand*.)*

All the above quotations refer to resins or gum-resins.

We now come to *gums* in the Araliaceæ, and the two references I give are all I can find of gums in this natural order, and they both refer to *Panax*, the genus to which all the gums I have been able to obtain up to the present also belong.

"*Panax Colensoi* exudes a gum very similar to gum arabic, and occasionally used for adhesive purposes." (*Report New Zealand Exhibition, 1865*.)

* Since the above was written I have received from Mr. W. W. Froggatt a quantity of a gum-resin from *Astrotriche floccosa*, DC., belonging to this natural order. It has a very pleasant perfume, and appears to be an interesting substance. It exuded from sickly shrubs whose stems had been wounded by a small *Curculio*.

“*Panax sambucifolius* in Novam Angliam extendit. Truncus cum ramis gummifluus.” (Mueller, *Fragm.* vii., 95.)

It would appear, therefore, that the Araliaceæ exude both gums and resins. It is a fact not generally known that the same natural order, the same genus, and even the same species may exude both a gum and a resin, and some writers have even doubted the exactness of their own observations when they have found both a gum and a resin in closely related plants. I hope to show in another place, chiefly by citing Australian instances which have come under my own notice, that the occurrence of both a resin and a gum in the same genus and even species, is by no means uncommon.

Returning to *P. sambucifolius*, I have not yet obtained gum from the normal species, but from a variety, viz., *P. sambucifolius*, var. *angusta*, or, according to Baron von Mueller's nomenclature, *P. dendroides*, var. *angusta*.

This plant is found on the banks of the Snowy River, amongst boulders of rock, attaining a height of about 8 feet, with a diameter of two inches when grown in tree shape; mostly, however, the plant is shrubby, with a number of thin stems.

The gum was obtained from old sickly plants. When obtained fresh it has a peculiar sweetish odour, and when placed in the mouth it has a pleasant flavour, reminding one strongly of a rose jujube. It dissolves wholly in the mouth in a few minutes, and except for the perfume already alluded to, it might readily be taken for one of the readily soluble Wattle gums.

Nevertheless when I first received it I was informed that in a local family it had the reputation of being injurious, and even poisonous. The gum is credited with having caused vomiting and serious symptoms which lasted three or four days in a young man who had eaten the gum as freely as one would Wattle gum.

Nothing in my analysis shows any poisonous substance in the gum, and as this is the only instance which has come under my notice of alleged poisoning by *Panax* gum, the sufferer may have been under a misapprehension. At the same time, it must be

borne in mind that vegetable substances of an injurious nature (*e.g.*, the poisonous principle in *Macrozamia* seeds) are sometimes not capable of detection by ordinary chemical processes.

My sample has the appearance of an inferior gum arabic; it breaks with a dull conchoidal fracture; the colour varies from amber to colourless.

After 24 hours in cold water a portion of the gum remained undissolved, and had swollen a good deal. After separating the solution, this insoluble substance was treated with very dilute potash; it readily dissolved, and on acidifying with acetic acid and adding alcohol, arabin was precipitated, showing the insoluble portion to have been metarabin. The gum soluble in cold water was proved to be arabin. The composition of this sample of gum is:—

Arabin	...	...	...	...	68·8
Metarabin...	...	...	...	...	16·1 (by difference)
Ash	...	...	...	...	2·0
Water	...	...	...	...	13·1
					100·0

I have received (also from Mr. William Bäuerlen, collector for the Technological Museum) a sample of gum from *Panax murrayi*, obtained from Lindendale, Lismore, where it is known locally as "Pencil Cedar," and where it attains a height of 40-60 feet, and a stem-diameter of 9 to 24 inches. It was collected in January, 1892, and was analysed a month later.

This gum is brittle, like that of *P. sambucifolius*, var. *angusta*, and not viscous like that of *P. elegans*. Its taste is not pleasant; it has not much odour, not resembling *P. elegans* in this respect. It is fairly light in colour, although portions are as dark as ordinary glue.

In cold water it wholly dissolves to a clear transparent liquid, not opalescent like that of *P. sambucifolius*, var. The aqueous solution has an odour different from that of the others, and not so pleasant. It is difficult to describe.

On the addition of alcohol of specific gravity $\cdot 834$, the gum is precipitated as an opaque white substance, and is arabin. The composition of the gum is :—

Arabin	...	...	...	...	85·1
Ash	...	...	...	...	2·3
Water	...	...	...	...	12·6
					100·0

Two specimens of gum from *Panax elegans* may now be described separately.

1. Found at Lismore. Diam., 1 foot. Height, 50-60 feet. Gum gathered April, 1891, and analysed the following February.

Both gums are rather dark in colour, and resemble Wattle gum. They are in irregular lumps of about half an inch in thickness. Both are plastic after months of keeping. Both are mainly soluble in water, the insoluble portion largely swelling up in that liquid. The odour of the aqueous solution of No. 1 sample of *P. elegans* resembles that of carrots in a remarkable degree. This is noteworthy, and reminds one of the close affinity of the Araliaceæ and Umbelliferæ.

2. *Panax elegans*. Sample from Ballina, N.S.W.

This specimen has been partly described under No. 1. In aqueous solution it has an aroma which reminds one of hops.

The following analysis gives a good idea of the composition of both gums of *P. elegans*.

Arabin	...	...	...	...	70·2
Metarabin	..	...	...	...	9·8 (by difference)
Ash	...	...	...	...	3·3
Water	...	...	...	...	16·7
					100·0

Conclusions.

Panax gums closely resemble Acacia gums in composition. They both contain gums wholly soluble in cold water, and consisting entirely of arabin, and gums partially soluble in water,

though containing varying proportions of metarabin, which substance causes them to swell in cold water. The gum of *P. murrayi* would form a valuable substitute for gum arabic, and it would be a valuable minor industry for this country if it were procurable in large quantities.

All the gums possess some odour, obtained from the barks, and isolation of the odoriferous bodies could be best carried out by analysis of the bark. This odoriferous principle in the Araliaceæ, and reminding one of the Umbelliferae, has long been known. "Most of the species have a very strong smell of aniseed and celery,—hence the name of 'Celery-tree' is given to *Panax* (*Nothopanax*) *elegans* by the Queensland colonists." (Seemann, *Flora vitiensis*, 114).

The ash of *Panax* gums principally consists (in my samples) of lime, magnesium, and potassium, with a trace of iron, and although the bases were present principally as carbonates, both sulphuric and phosphoric acids were found. Quantitative determinations of the different constituents of the ash were not made, with the exception of phosphorous pentoxide, the percentage of $P_2 O_5$ in the ash of *P. elegans* being .969.

The gums may therefore be considered as principally the calcium, magnesium and potassium salts of arabic acid.

NOTES AND EXHIBITS.

Dr. Woolls sent for exhibition the plants from King George's Sound referred to in his paper, and flowering specimens of *Capparis Mitchellii*, Lindl., and *C. lasiantha*, R.Br., both from the Namoi, with the kindly intimation that they might afterwards be added to the Society's herbarium.

Mr. Fletcher exhibited a collection of interesting plants from the Blue Mountains, which Dr. Woolls had kindly determined. Also living adult and young specimens of *Peripatus*—the former part of a collection of about one hundred specimens obtained last month on the Blue Mountains, the later part of their progeny, amounting to at least two hundred specimens, subsequently born in captivity; also the prematurely born young of an accidentally injured female, advanced embryos extruded during the drowning of the mothers, and dissected females showing the oviducts crammed with embryos. In view of this fresh evidence, therefore, he again emphatically protested against the sweeping generalization of Dr. Dendy, to which extensive publicity has been given, and which has appeared in at least four scientific journals, that *Peripatus leuckartii*, Säng.,—in the wide sense in which Dr. Dendy uses that term, namely, to include the N.S.W. *Peripatus*—“is really oviparous,” as well as against Dr. Dendy's inferences and conclusions with regard to certain young specimens exhibited at a Meeting of this Society in October, 1888.

Mr. Froggatt exhibited (1) a series of specimens illustrating the life-history of the butterfly *Ialmenus evagoras*, Don., the larvæ of which he had recently obtained at Maitland on the foliage of *Acacia decurrens*, and had noticed that they were visited by numberless ants, attracted by a sugary excretion: (2) a large arboreal spiny grasshopper recently obtained by Mr. Bäuerlen, botanical collector of the Technological Museum, at Ballina, Richmond River, much resembling in appearance the rough and thorny creeper upon which it is found: and (3) a small collection of rare

beetles obtained either by Mr. Bäuerlen at Ballina or by the exhibitor at Allalong, near Maitland, and including *Monohammus* sp., *Hebecerus crocogaster*, Boisd., *Stenoderus ostricilla*, Newm., *Phaolus Macleayi*, Pasc., *Xylonychus* sp., *Amphirhoe decora*, Newm., *Penthea solida*, Pasc., *Prophanus cupreus*, Gray, and *Brenthis* sp.

Dr. Cox exhibited a noteworthy collection of starfishes, remarkable sponges, and fine specimens of Gorgonias brought up by pearling divers from considerable depths off the extreme north-west coast of Australia, for the opportunity of exhibiting which he was indebted to Mr. Gibbins, who had taken much trouble to bring specimens.* Also specimens (♂ and ♀) of the prawn *Palaemon ornatus*, Olivier, which has recently and suddenly appeared in great numbers in the Hunter River, and is now coming into the market for edible purposes, though in his experience such had never been previously the case. Also good photographs of angler-fishes, and of a "siamese-twin" shark (*Acanthias antarctica*) from New Zealand.

Mr. A. G. Hamilton sent for exhibition a specimen of a large hairy caterpillar infested with several hundreds of parasitic mites, found by him at Illawarra.

Mr. Maiden exhibited a series of specimens of *Capparis nobilis*, the "Wild Lemon," of the Richmond River; also specimens of *Phebalium Billardieri* taken from a tree of the unusual dimensions of 35 feet high and 8 inches in diameter of trunk; also a twig of *Notelaea longifolia* with a leaf of the unusual length of 10½ inches from tip to articulation, and illustrating the specific name; also the *Panax* gums referred to in his paper.

* Mr. Whitelegge subsequently kindly furnished the subjoined list of these specimens:—ASTEROIDEA—†*Linckia miliaris*, M. & T.; †*Pentaceros nodulosus*, Perrier; †*Goniodiscus pleyabella*, M. & T.; †*Nardoa novae-caledoniae*, Perrier; †*Anthenea tuberculosa*, Gray; *Echinaster purpureus*, Gray; GORGONACEA—*Ctenocella pectinata*, Pall.; *Juncella gemmacea*, M. Ed. & H.; †*Iciligorgia orientalis*, Ridley; †*Callipodium australiense*, Ridley: PORIFERA—*Ianthella flabelliformis*, Gray (very large, 28 inches high and 30 wide); *Thrinacophora* sp.

† Uncommon.

WEDNESDAY, 30TH MARCH, 1892.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

Mr. G. A. McKay was introduced as a visitor.

The President announced that the Council had under consideration the question of the proposed Macleay Memorial Volume, and that a committee had been appointed to make the necessary preliminary arrangements.

DONATIONS.

“Archives Néerlandaises des Sciences Exactes et Naturelles publiées par la Société Hollandaise des Sciences à Harlem.” Tomes i.-xix.; xx., Parts 1 and 2; xxiv., Parts 4 and 5; xxv., Part 2 (1866-91). *From the Society.*

“Tijdschrift voor Entomologie uitgegeven door de Nederlandsche Entomologische Vereeniging.” xxxiii. Dl. (1889-90), Afl. 3-4; xxxiv. Dl. (1890-91), Afl. 1-2. *From the Society.*

“Tijdschrift der Nederlansche Dierkundige Vereeniging.” 2^{de} Serie, Dl. i.-iii., Afl. 1-2 (1886-91). *From the Society.*

“Zoologischer Anzeiger.” xv. Jahrg., Nos. 382-384 (Jan.-Feb., 1892). *From the Editor.*

“Bulletin de la Société Belge de Microscopie.” xviii^{me} Année (1891-92), No. 2. *From the Society.*

“Perak Government Gazette.” Vol. v., Nos. 2-4 (Jan.-Feb., 1892). *From the Government Secretary.*

“Bolletino dei Musei di Zoologia ed Anatomia comparata della R. Università di Torino.” Vol. vi., Nos. 104-111 (1891). *From the Museum.*

Australian Museum—“Records ; Contents and Index, Vol. i.”; “Catalogue of Marine Shells of Australia and Tasmania.” Part 1 (1892). By J. Brazier, F.L.S. ; “List of Cephalopoda in the Collection of the Australian Museum.” By J. Brazier, F.L.S. *From the Trustees.*

New South Wales : Public Instruction—“Report of Curator of Technological Museum for 1890.” *From the Curator.*

“Transactions of the Royal Society of Victoria.” Vol. ii, Part 2 (1891). *From the Society.*

“Smithsonian Institution—United States National Museum—Annual Report, 1888-89.” pp. 1-277, 447-589, 609-728, and Appendix, pp. 1-50. *From the Museum.*

“Museum of Comparative Zoology at Harvard College—Bulletin.” Vol. xxii., Nos. 2-3 (1891-92). *From the Curator.*

“United States Department of Agriculture—Division of Entomology.” Vol. iv., Nos. 5-6. *From the Secretary of Agriculture.*

“Bulletin of the American Geographical Society.” Vol. xxiii., No. 4, Part 1 (1891). *From the Society.*

“Journal of Comparative Medicine and Veterinary Archives.” Vol. xiii., No. 1 (Jan., 1892). *From the Editors.*

“Verhandlungen der Gesellschaft für Erdkunde zu Berlin.” Band xviii. (1891), Nos. 9-10. *From the Society.*

“Quarterly Journal of the Geological Society.” Vol. xlvi., Part 1, No. 189 (Feb., 1892). *From the Society.*

“Annales de la Société Géologique de Belgique.” Tome xviii., 2^{me} Livn. ; Tome xix., 1^{re} Livn. (1891-92). *From the Society.*

“Victorian Naturalist.” Vol. viii., No. 11 (March, 1892). *From the Field Naturalists' Club of Victoria.*

Western Australia.—“Report on the Goldfields of the Kimberley District” (1891). *From the Author, the Government Geologist.*

“Cambridge Philosophical Society—Proceedings.” Vol. vii., Part 5 (1892); “Transactions” Vol. xv., Part 2 (1891). *From the Society.*

“Iconography of Australian Salsolaceous Plants.” Decade ix. (1891). By Baron von Mueller, K.C.M.G., F.R.S. *From the Premier of Victoria, through the Librarian, Public Library, Melbourne.*

“Zoological Society, London—Abstract of Proceedings” 2nd Feb., 1892. *From the Society.*

“Pharmaceutical Journal of Australasia.” Vol. v., No. 3 (March, 1892). *From the Editor.*

“Agricultural Gazette of New South Wales.” Vol. iii., Parts 1 (Jan.) and 2 (Feb. 1892). *From the Director of Agriculture.*

“Geological and Natural History Survey of Canada—Annual Report.” New Series, Vol. iv. (1888-89). *From the Director.*

“Société des Sciences de Finland—Acta” Tome xvii. (1891); “Oefversigt af Förhandlingar.” Vol. xxxii. (1889-90); “Bidrag till Kännedom till Finlands Natur och Folk.” H. xlix.-l. (1890-1891). *From the Society.*

“Kaiserliche Leopoldino-Carolinische deutsche Akademie der Naturforscher—Leopoldino.” xxvi. Heft (1890); “Nova Acta.” Band liv., Nr. 5; lv., Nr. 3; lvi., Nr. 2 u. 3 (1890-91). *From the Society.*

“Transactions of the Entomological Society of London for the year 1891.” Part 5 (Feb., 1892). *From the Society.*

“Entomologisk Tidskrift utgifven af Entomologiska Föreningen i Stockholm.” Arg. xii. (1891). *From the Society.*

“Revista de Sciencias Naturaes e Sociaes Orgão da Sociedade Carlos Ribeiro.” Volume Segundo, No. 7. *From the Society.*

“Bulletin de la Société Royale Linnéenne de Bruxelles” Nos. 1-4 (Nov., 1891, Feb., 1892). *From the Society.*

Sydney Free Public Library—“Report from Trustees for 1891.” *From the Trustees.*

STUDIES IN AUSTRALIAN ENTOMOLOGY.

No. V.—NOTES ON THE SUBFAMILY BROSCINI (CARABIDÆ),
WITH DESCRIPTIONS OF NEW SPECIES.

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In a former paper (P.L.S.N.S.W., 1890 (2), v. p. 189) I divided the Australian BROSCINI into two main divisions, viz. :—

- i. With temporal ridge very indistinct.
- ii. With temporal ridge distinct.

Further consideration and study of the subfamily induces me to think this grouping misleading. To arrange the genera of any subfamily into natural groups one requires a knowledge of at least all the important genera constituting such subfamily found in all parts of the world. I have only a knowledge of the Australian genera. These genera have very different values from a classificatory point of view, a circumstance which occurs in all branches of Entomology; this is a difficulty in the way of drawing up tables of genera, especially partial ones, because the genera must theoretically be considered as of equal value, though practically they may not be so. Taking the Australian BROSCINI, we find three distinct types, represented by the genera *Promecoderus*, *Eurylychnus*, and *Percosoma* respectively. The genera of the first group, or type, have been arranged by me (l.c. p. 190) in a table that may be taken as useful as far as it goes. These genera, with *Eurylychnus*, are differentiated from the others by the presence of a setigerous puncture in the scrobe of the mandibles. The *Percosoma* group (*Percosoma*, *Lychnus* and

Percolestus) are without a puncture in the scrobe of the mandibles.* This feature also appears to be wanting in the New Zealand forms.

In the present paper I take the genus *Promecoderus* first, because I have already treated of it; the other genera I take in what seems to me the order of their affinity as leading from *Promecoderus*.

PROMECODERUS CASTELNAUI, n.sp.

♂. Shining black (sometimes with a bronzy tint on elytra), legs black, antennæ and palpi piceous black. Head large, smooth; frontal impressions broad, shallow; clypeal suture hardly marked; vertex lightly transversely impressed behind; eyes not very prominent, inclosed behind; post-ocular prominences small. Prothorax cordate, about as broad as long (4×4 mm.), convex, very slightly declivous behind; sides rounded, not dilatate, shortly narrowed behind; marginal border narrow, hardly sinuate on the sides before the base, not crossing the middle of the base; basal angles sharply defined, but hardly right angles; median line distinct. Elytra oval ($8 \times 4\frac{1}{2}$ mm.), convex, lightly rounded on sides, declivous to peduncle behind the scutellum, striate; the dorsal striæ distinct, none on the sides, first four distinct, but only the 1st reaching the apex. Last four ventral segments with a round fovea on each side. In ♂ the four basal joints of anterior tarsi dilatate and spongiose below, and with two basal joints of middle tarsi spongiose below; last joint of tarsi narrow, not flattened.

Length, ♂ 14, ♀ 16; breadth, ♂ $4\frac{1}{2}$, ♀ 5 mm.

* I would note that the form of the anterior margin of the prosternum may prove of value in dividing the Australian BROSCINI. It is edged with a continuous border in *Promecoderus* (all species), *Cerotalis* (all species), *Adotela* (4 species which I have examined), and *Gnathoxys* (I have only been able to examine a single example of *Gn. tessellatus*, Macl.). In *Eurylychnus* the border is entire in *E. olliffi*, Bates, while *E. blagayii*, Casteln., and *E. victorie*, Sl., have only obsolete traces of it at each side. There is no border to the anterior margin of the prosternum in *Percosoma*, *Lychmus*, and *Percolestus*.

Hab.—New South Wales; Narrabri (Musson), Warialda District (Sloane).

I received both ♂ and ♀ from Mr. Musson, who took them at Narrabri, and formerly I had a ♀ taken by myself in the Warialda district. I believe this to be the insect to which de Castelnau refers when he says, under the name *P. striato-punctatus*, he has a specimen from the Darling River*; however, apart from the inappropriateness of the name *striato-punctatus*, I hardly think this species will be found to extend to Victoria. I have already expressed the belief that *P. striato-punctatus*, Casteln., = *P. nigricornis*, Casteln.† This species is allied to *P. comes*, Sl., from which it differs in its narrower form, in the prothorax being proportionately broader in comparison with the elytra, in its larger head, blacker colour, and in the marginal border of the elytra not being entire on the base, &c.

PROMECODERUS CONCOLOR, Germ.

When reviewing the genus *Promecoderus* two years ago I followed de Castelnau, who had been followed with doubt by M. Putzeys in his *Revision des Broscides de l'Australie*, and maintained *P. howitti*, Casteln., as a species distinct from *P. concolor*, Germ. Since then I have obtained a larger series of specimens from different localities, which convinces me that they must be regarded as one species, and that *P. anthracinus*, Macl., and *P. politus*, Sl., must also be placed as synonyms of *P. concolor*. I further sink *P. lucidicollis*, Casteln., to the rank of a variety, and regard *P. oblongus*, Casteln., as a synonym of *P. lucidicollis*. M. Putzeys gives the dimensions of *P. oblongus*, Casteln., as $12 \times 4\frac{1}{2}$ mm.

The synonymy will, therefore, be:—*P. concolor*, Germ., = *P. suturalis*, Casteln.; *P. lucidus*, Putz., (these agree with the typical form of *P. concolor*); *P. howitti*, Casteln.; *P. anthracinus*, Macl.; *P. politus*, Sl. (the last three are identical, but do not seem to me

* Trans. Roy. Soc. Victoria, 1868, viii. p. 168.

† P.L.S.N.S.W. 1890, (2), v. p. 210.

to warrant being regarded as even a variety); var. *P. lucidicollis*, Casteln., = *P. oblongus*, Casteln.

I have specimens of a small *Promecoderus*, from the Namoi River, which is so closely allied to *P. lucidicollis*, Casteln., that I cannot find characters to separate them. Had I been able to maintain *P. lucidicollis* as a good species, I should still have regarded the Namoi form as entitled to rank as a variety; I now have to include it under *P. concolor*, and propose for it the name var. *namoyensis*; the following is a description:—

P. namoyensis, ♂. bronzed black, shining, undersurface black with a metallic tinge, legs piceous black, tarsi, palpi and 1st joint of antennæ piceous. Head smooth, with a broad shallow impression across vertex behind the eyes; eyes prominent, inclosed behind; post-ocular prominences weak. Prothorax smooth, subconvex, a little flattened on the disc, about as long as broad ($3\frac{1}{2} \times 3\frac{1}{2}$ mm.), truncate in front and behind; sides rounded, somewhat dilatate in middle, narrowed behind; marginal border narrow, not crossing middle of base; median line lightly impressed. Elytra oval ($6\frac{1}{2} \times 4$ mm.), subconvex, a little flattened on the disc, smooth, with the stria next the suture lightly marked.

♀. More parallel; the prothorax and elytra more convex; the elytral striae more distinctly marked.

Length $11\frac{1}{2}$, breadth 4 mm.

Hab.—New South Wales; Narrabri (Musson), Gunnedah (Sloane).

The ♂ differs from *P. lucidicollis*, Casteln., in having the prothorax and elytra more depressed; the ♀ has, however, almost exactly the same facies. Both sexes are duller coloured, and have the elytral striae more noticeable than *P. lucidicollis*; the marginal border does not cross the middle of the base as it does, with rare exceptions, in that species; the transverse impression behind the eyes is a noticeable feature in the present variety, but is wanting in *P. lucidicollis*. The tarsi and the foveæ of the ventral segments are similar in both.

PROMECODERUS AMBIGUUS, n.sp.

Lævigata, form comparatively short, elytra much broader than prothorax.

Shining, upper-surface bronzed-black, with a greenish tinge, undersurface rather piceous, legs piceous black, tarsi and palpi brown. Head large, without impression across vertex behind the eyes; clypeus slightly rugulose; clypeal suture distinct, ending in a short foveiform impression on each side; the lateral channel from above eye to base of mandible straight, not oblique; eyes round, prominent, inclosed behind; post-ocular prominences rather inconspicuous, about half the length of eyes; mentum with strong median tooth. Prothorax convex, almost as long as broad ($3\frac{1}{2} \times 3\frac{3}{4}$ mm.), truncate in front and behind, widest about the middle; sides dilatate in middle, shortly narrowed behind; marginal border narrow, not sinuate before basal angles, stronger and entire on base; a broad lightly marked transverse impression a little in front of the base; median line fine, very lightly impressed. Elytra rather convex, short, oval ($8 \times 5\frac{1}{4}$ mm.), rounded on the sides, broadest a little behind the middle; shoulders rounded; suture lightly impressed; lateral border narrow; marginal punctures as usual. Ventral segments smooth, four last with a broad shallow round fovea on each side. Posterior trochanters long and pointed at apex.

Length 13, breadth $5\frac{1}{4}$ mm.

Hab.—Northern Territory of South Australia.

A single specimen in my collection received from the Rev. Thos. Blackburn of Adelaide. The last ventral segment has one puncture on each side of the anus (therefore I believe it to be the ♂), and the anterior tibiæ are without spongiöse tissue below. In these respects, and in the form of the posterior trochanters it resembles *P. distinctus*, Sl., which is its nearest ally among previously described species. I have not been able to compare them, but would note the more metallic colour of the undersurface in *P. distinctus*.

In the following notes I have not attempted to give a complete diagnosis of the previously described genera, but the short note on each will be sufficient for their determination.

Genus *EURYLYCHNUS*, Bates.

This genus has been formed by Mr. H. W. Bates [Ent. Mo. Mag. 1891 (2), II. p. 285], whose lamented death has been reported since these notes were written, for the reception of a small insect belonging to the *Broscini* from Mt. Kosciusko, which he has named *E. olliffi*.

The leading characters of the genus, as I regard it, are the following :—

Head with strong frontal impressions; a strong transverse impression behind the eyes; eyes round and prominent, a single supra-orbital puncture above each. Mandibles stout, sharply hooked at apex, a setigerous puncture in the scrobe. Antennæ moniliform. Palpi thick, apical joint truncate. Elytra striate. Anterior thighs short, dilated, but without dentiform projection below in ♂; anterior tarsi with three basal joints obliquely produced externally, and in the ♂ either clothed below with spongiöse tissue or not.

I know of three species belonging to this genus which may be divided as follows :—

a. Elytra with scutellar striole: size large *E. blagravii*, Casteln.

aa. Elytra without scutellar striole: size small.

Prothorax subcordate, gently narrowed behind. Prosternum without a border along anterior margin..... *E. victoriae*, Sloane.

Prothorax orbiculate, very shortly narrowed behind. Prosternum with a complete border along anterior margin..... *E. olliffi*, Bates.

EURYLYCHNUS BLAGRAVII, Casteln.

Mecodema blagravii, Casteln., Trans. Roy. Soc. Victoria, 1868, VIII. p. 161; *Percosoma blagravii*, Putz., Stett. Ent. Zeit. 1868, p. 323; Bates, Ent. Mo. Mag. 1891 (2), II. p. 286.

In his note on this species, Mr. Bates says:—"If the male prove to have the soles of the dilated joints of the anterior tarsi furnished with a hair-pad, the species will belong to *Eurylychnus*, from which it differs only in the elytra having a scutellar striole." I took a number of specimens of both sexes under logs in the brushes at Burrawang in Nov., 1890, and am able to state with certainty that the male has no "hair-pad" on the lower side of the joints of anterior tarsi. The tarsi are so much alike in both sexes that I cannot determine the sex by their means; nevertheless, I do not consider a new genus necessary for its reception. So-called genera which rest on a single character of doubtful value, appertaining to only one sex, seem to me too artificial for practical workers in zoology; though, no doubt, rigid cabinet specialists may find them indispensable.

This species has been very carefully described by M. Putzeys, but to complete my notice of the genus *Eurylychnus*, I append the following description founded on specimens from Burrawang.

Form robust, convex. Black, legs reddish. Head large, with strong transverse impression behind eyes; frontal impressions strong, curved, diverging backwards, widening internally at clypeal suture,—this well marked,—a raised space between frontal impressions and lateral channel on each side; eyes round, prominent. Labial palpi subsecuriform (broader in ♂ than in ♀). Prothorax lightly convex, almost as long as broad ($5 \times 5\frac{3}{4}$ mm.), very slightly emarginate in front,—the anterior angles being broadly rounded and a very little advanced; sides almost parallel on anterior part to behind the middle, lightly rounded to anterior angles, shortly narrowed behind; lateral border narrow, reflexed, shortly sinuate before base, thickened at the rather prominent basal angles; base sinuate; median line lightly marked; a short strongly marked longitudinal fovea in front of each basal angle;

a single marginal puncture on each side, placed just before where the sides begin to narrow behind. Elytra convex, oval ($11 \times 6\frac{1}{2}$ mm.); strongly and regularly striate; interstices convex; scutellar striole very short; lateral border narrow, reflexed, interrupted near the peduncle on each side; about six punctures along each margin, those of the middle part widely placed, round, and foveiform. Prosternum not bordered along anterior margin. Ventral segments impunctate—excepting last with a single setigerous puncture on each side of anus in both sexes.

Length 21, breadth $6\frac{1}{2}$ mm.

Hab.—N. S. Wales; Mt. Kosciusko (Helms), Burrawang: Victoria; Marysville, Otway Ranges (Sloane); Harrietville District (Blackburn).

EURYLYCHNUS VICTORIÆ, n.sp.

Form light. Black, legs and mouth parts reddish. Head large; a strong transverse impression behind the eyes; frontal impressions strongly marked, rugulose; a narrow groove with raised external edge extending from above each eye to base of mandibles; space between this groove and frontal impressions raised; eyes prominent, inclosed behind; post-ocular prominences weak. Prothorax not convex, subcordate, nearly as long as broad ($3\frac{1}{4} \times 3\frac{3}{4}$ mm.), truncate in front, lightly sinuate behind; sides lightly rounded on anterior half, lightly narrowed behind; lateral border narrow, sinuate before the base, thickened and forming a small protuberance at the basal angles; median line strongly marked; one marginal puncture on each side, placed slightly before the middle. Elytra lightly convex, oval ($7 \times 4\frac{3}{4}$ mm.), truncate at base, striate; striæ entire and well marked; interstices equal, not convex; no scutellar striole; lateral border narrow, reaching from peduncle to apex; a few widely placed punctures along margin. Prosternum with anterior margin not bordered. Joints of anterior tarsi a little obliquely produced externally.

Length 14, breadth $4\frac{3}{4}$ mm.

Hab.—Victoria.

This species I received from Mr. W. Kershaw, as coming from near Melbourne.

I do not know the sex of the specimen described, but its affinity seems more to *E. blagravi*, Casteln., than to *E. olliffi*, Bates, therefore I think it likely the anterior tarsi are similar in both sexes.

Its smaller size, less dilatate prothorax, and less strongly striate elytra at once distinguish it from *E. blagravi*, while from *E. olliffi* its more elongate form, and less globose prothorax, separate it readily.

EURYLYCHNUS OLLIFFI, Bates.

E. olliffi, Bates, Ent. Mo. Mag. 1891 (2), ii. p. 286.

A single specimen is in my collection, taken at Burrawang on 10th Nov., 1890, on which the following description is founded:—

♂. Form short, robust, head small. Black, legs and parts of mouth reddish. Head small, smooth; a strong transversal impression behind eyes; frontal impressions strong, diverging behind; clypeal suture strongly impressed; a narrow lateral groove with raised external edge, extending from back of each eye to base of mandibles, space between this groove and frontal impression raised; eyes round, prominent, without post-ocular prominences. Prothorax short ($3 \times 3\frac{1}{2}$ mm), rather depressed on disc, declivous on sides, broadest about middle, lightly emarginate in front,—the anterior angles being broadly rounded, margined, and slightly advanced; sides lightly rounded on anterior half and a little narrowed to the front, shortly and decidedly rounded behind; lateral border narrow, reflexed; a small protuberance extending vertically downwards in the form of a ridge on each side, just before the basal angles,—these obtusely rounded; median line very strongly impressed, not reaching either margin; the marginal channel widening inwards on each side a little before the basal angles, thus causing the posterior part of the prothorax to appear sinuate; three setigerous marginal punctures on each side, the 1st just behind the anterior angles, 2nd about middle, 3rd just after the prothorax begins to narrow behind. Elytra shortly oval ($6\frac{1}{2} \times 4\frac{1}{2}$ mm.), rather depressed on disc, declivous on sides and behind, striate; striæ strongly marked on disc, very

indistinct on declivous part of sides ; obsolete towards apex ; no scutellar striole ; lateral border broad, reflexed, widened and flattened on each side near the peduncle ; about six widely placed setigerous punctures along each margin. Prosternum with an entire border along anterior margin. Ventral segments strongly divided, last segment with a single puncture on each side of anus. Anterior tarsi broad, three basal joints obliquely produced on external side and clothed below with spongiose tissue.

Length 12, breadth $4\frac{1}{2}$ mm.

Hab.—New South Wales ; Mount Kosciusko (Helms), Burrawang (Sloane).

The three remaining genera form a natural group characterised by having the mandibles without a setigerous puncture in the scrobe, and the prosternum not bordered along its anterior margin.

The following is a brief summary of the features that may be used to separate them from one another :—

Form short ; prothorax subquadrate, hardly at all narrowed behind. Head without a transverse impression behind eyes. Antennæ moniliform, short, thick..... *Percolestus*.

Head with a transverse impression behind eyes, and deep frontal grooves. Antennæ moniliform..... *Lychmus*.

Form elongate ; prothorax subcordate, greatly narrowed behind. Head without transverse impression behind eyes or deep frontal grooves. Antennæ subfiliform, not thick..... *Percosoma*.

PERCOLESTUS, n.g.

Head moderate, lightly impressed on each side behind the eyes ; eyes spherical, prominent ; temporal ridge obsolete ; one supra-orbital puncture on each side.

Mandibles short, broad, arcuate, obtusely hooked at apex ; inner edge not dentate ; scrobe without setigerous puncture.

Maxillæ short, not projecting beyond labrum, hooked at apex.

Labrum short, sexsetose, truncate, anterior angles rounded.

Mentum short, deeply emarginate ; lobes broadly rounded in front ; median tooth strong, bifid at apex.

Palpi : labial thick, penultimate joint bisetose, last joint elongate, longer than penultimate, cylindrical, truncate ; maxillary with penultimate joint short, conical, last elongate, thick, truncate.

Antennæ short, moniliform, 1st and 3rd joints about equal in length, 1st thick, cylindrical, 3rd with apical half globose, then suddenly constricted, the basal half narrow, cylindrical, 2nd joint short, conical.

Prothorax short, the angles rounded ; one marginal puncture on each side, about middle.

Elytra short, broad.

Legs : ♂. Anterior femora short, thick, without a dentiform projection below ; anterior tibiæ short, strongly excavate below, outer edge finely serrate near apex ; anterior tarsi short, the joints short, broad, a little obliquely produced externally, without any spongiose tissue below.

PERCOLESTUS BLACKBURNI, n.sp.

Form short, robust. Black, shining ; undersurface more polished ; palpi piceous. Head short, broad, convex, smooth, not constricted behind eyes, lightly and broadly impressed on each side behind the eyes, the impressions becoming obsolete on vertex ; a light impression on each side of the clypeus, hardly reaching behind clypeal suture ; clypeus subtruncate ; eyes globular, prominent, not inclosed in prominences behind ; prothorax subconvex, subquadrate ($4\frac{1}{4} \times 5$ mm.), a little narrower behind than in front, truncate in front and behind ; sides shortly rounded to anterior angles,—these not advanced,—more gently rounded to basal angles,—these not marked,—lateral border narrow, reaching the base ; median line very fine, not reaching either margin ; a single marginal puncture on each side, placed a little behind the middle. Elytra convex, shortly oval (9×6 mm.), lightly striate ; striæ very fine, those near the suture more distinct ;

interstices flat, no scutellar striole; lateral border narrow, reaching from peduncle to apex; a few punctures along the margin, sparingly placed on anterior half and becoming closer towards apex. Prosternum with anterior margin not bordered. Ventral segments smooth, without punctures, except a single one on each side of the anus.

Length $16\frac{1}{2}$, breadth 6 mm.

Hab.—Victoria (taken by Rev. Thos. Blackburn in the mountains above Harrietville, Upper Ovens River).

This species may be separated at a glance from all the other Australian *Broschini* by its short, broad prothorax, which is broadly rounded, but hardly at all narrowed behind.

Genus LYCHNUS, Putzeys.

This genus, founded by M. Putzeys (Stett. Ent. Zeit. 1868, p. 324) for the reception of a Tasmanian species which he named *Lychnus ater*, is closely allied to *Percosoma*; so closely, indeed, as to suggest that it might be regarded with advantage as a section of that genus. However, I have not sufficient material at my command to justify me in uniting it with *Percosoma*, and in deference to previous workers who have considered *Lychnus* a good genus, I still maintain it distinct. The species as yet recorded belong to Tasmania, but their affinity is rather to the Victorian species of *Percosoma* than to those from Tasmania.

Its distinguishing characters are:—Antennæ moniliform; head with strong frontal impressions, and a strong transverse impression across the vertex at the back of the eyes. In the ♂ the anterior thighs are dilatate in the middle, with the lower side forming a strong obtuse projection.

In 1878 Mr. Bates described two species, *L. strangulatus* and *L. striatulus*, as new. He expresses himself as being doubtful if *L. ater*, Putz., could have had the transverse impression across the head that is so conspicuous a feature in his two species, because M. Putzeys does not allude to it either in his diagnosis of the genus or in his description of *L. ater*. This

doubt seems to have been one reason for his thinking neither of his species could be *L. ater*, Putz. It appears to me that M. Putzeys thinking this genus thoroughly specialised by the moniliform antennæ, and the form of the anterior thighs in the ♂, must have regarded this feature of small importance, and so omitted to mention it. I have a specimen from the north of Tasmania which seems undoubtedly to be *L. strangulatus*, Bates; it agrees thoroughly with M. Putzeys' description of *L. ater* (apart from the transverse impression at back of head). I therefore think the names synonymous, and in this belief have united them.

The puncturation of the elytral striæ mentioned by M. Putzeys in his description of *L. ater*, and referred to by Mr. Bates in his remarks, is to my mind of no value, being, in all probability, caused by long immersion in spirits of wine.

LYCHNUS ATER, Putzeys.

L. ater, Putz., Stett. Ent. Zeit. 1868, p. 325; *L. strangulatus*, Bates, Cist. Ent. ii. 1878, p. 317.

♂. Form elongate, not convex. Black. Head not large; a strong transverse impression behind eyes; frontal impressions strong, curved, diverging backwards; a narrow lateral groove from above each eye to base of mandible; eyes rather prominent; post-ocular prominences strong, almost equalling eyes in size. Prothorax depressed on disc, cordate, a little wider than long ($4\frac{1}{2} \times 5$ mm), truncate in front and behind; sides almost parallel on anterior part from behind anterior angles to posterior marginal puncture, decidedly narrowed, but not sinuate, to base; lateral border narrow, extending from anterior angles to slightly behind basal angles,—these obtuse—; median line lightly marked; a marginal puncture on each side about the middle, three other setigerous punctures on the margin just behind each anterior angle. Elytra not convex, oval ($9\frac{1}{2} \times 6$ mm.), striate; striæ shallow, lightly impressed; interstices not convex; shoulders rounded; base declivous to peduncle; lateral border narrow, slightly reflexed, extending from peduncle to apex; a row of setigerous

punctures along margin, very thinly placed on anterior part, much more closely on apical third. Anterior thighs short, dilatate in middle, lower side strongly and obtusely produced.

Length 18, breadth 6 mm.

Hab.—Tasmania.

LYCHNUS STRIATULUS, Bates.

L. striatulus, Bates, l.c. p. 318.

To render my notes complete I append Mr. Bates's description of this species, which is unknown to me.

"*L. strangulato* simillimo, differt tantum statura minori elytrisque distinctius striatis interstitiis convexis. Niger, minus nitidus; elytris oblongo-ovatis, paullo angustioribus et supra minus planatis. Long. 17 mm. ♂."

"Differs from *L. strangulatus* only in being smaller, proportionately narrower, and in the elytra being more distinctly striated, or rather the feebly or not at all incised striæ are separated by convex interstices. The striæ have no traces of puncturation. In its narrower, more oblong and convex form it resembles the ♀ of *L. strangulatus* more than the ♂; but both the specimens before me are clearly males, having the broad, subdentiform dilatation of the undersurface of the anterior tibiæ [query femora?]."

"Central Tasmania (Simson). Coll. A. Fry and H. W. Bates. Mr. Janson has a third example."

Genus PERCOSOMA, Schaum.

The type is *P. carenoides*, White, a well-known Tasmanian species. The species I associate in this genus fall naturally into two groups, the Australian and the Tasmanian; the former differ greatly from the latter, though not sufficiently, I think, to warrant the formation of a genus for their reception. Of the two Australian species as yet recorded, I only know both sexes of *P. montanum*, Casteln., and in this species the ♂ has the anterior thighs with a strong dentiform projection on the lower side as in *Lychnus*.

The following is a table of the species.

- a.* Lateral border of prothorax not interrupted posteriorly, reaching basal angles. A single setigerous puncture above each eye..... Australian species.
 Sides of prothorax gently narrowed behind, not emarginate before basal angles..... *P. montanum*, Casteln.
 Sides of prothorax sharply narrowed behind, emarginate before basal angles..... *P. concolor*, Sloane.
- aa.* Lateral border of prothorax interrupted posteriorly, not reaching basal angles. Several setigerous punctures above each eye, placed in an elongate fovea, one or more punctures on vertex outside this fovea..... Tasmanian species.
 Elytra very finely striate, interstices flat..... *P. carenoides*, White.
 Elytra strongly striate, interstices convex near sides *P. sulcipenne*, Bates.

The two Tasmanian species, *P. carenoides*, White, and *P. sulcipenne*, Bates, resemble each other in the very large head with long jaws, and in the shape of the prothorax, which is broadest towards the front and greatly constricted near the base, with broad lateral margins interrupted before the base. In all these points they differ from the two Victorian species, *P. montanum*, Casteln., and *P. concolor*, Sl., which have the head moderate in size, the jaws not very elongate, and the prothorax more gradually narrowed behind, with the lateral margins narrow and not interrupted before the base.

The Tasmanian species are said to be without the strong triangular projection on the lower side of the tibiæ in the ♂; but in *P. montanum*, Casteln., (the only species of which I am sure I know both sexes), we find this feature more prominent than even in the described species of *Lychnus*, to which genus it was sup-

posed to be confined. In all the species the anterior tarsi are nearly similar in both sexes, and without spongiose tissue on the lower side.

PERCOSOMA MONTANUM, Casteln.

Meocdema montanum, Casteln., l.c. p. 163.

Percosoma montanum, Putz., Ann. Mus. Civ. Genov. 1873, iv. p. 316.

Form narrow, elongate. Black, shining. Head not large, smooth; a broad transverse impression behind the eyes, hardly at all marked across the vertex; frontal impressions light, short; eyes prominent, inclosed behind, projecting beyond post-ocular prominences,—these not strong. Antennæ subfiliform, not tapering. Prothorax not convex, narrow, cordate, about as long as broad ($5 \times 5\frac{1}{4}$ mm.), truncate in front and behind; sides lightly rounded on anterior half, gently narrowed, but not sinuate, towards base, lateral border narrow, extending from anterior to basal angles,—these slightly obtuse; median line lightly marked; a single marginal puncture on each side, placed at about half the length, just before the sides begin to narrow. Elytra convex, oval, narrow ($11\frac{1}{2} \times 6\frac{1}{4}$ mm.), very lightly striate (the striæ hardly visible to the naked eye); shoulders rounded; base declivous to peduncle, apex broadly rounded; lateral border narrow, reaching from peduncle to apex; a row of round punctures a little within the margins, these more closely placed towards apex. A single puncture on each side of anus in both sexes.

Length 21, breadth $6\frac{1}{4}$ mm.

♂.—With anterior thighs not canaliculate below, dilatate in middle, with strong obtusely pointed triangular projection on lower side.

♀.—With anterior thighs lightly canaliculate below, dilatate in middle, the outer edge of the channel on lower side slightly produced.

Hab.—Victoria; Yarragon, Gippsland (Sloane), Dandenong Ranges (French).

I have no doubt this is *P. montanum*, Casteln. M. Putzeys in his remarks on de Castelnau's specimens of this species says of

the eyes, "moins grand que les tubercules post-oculaires," and further on says, "Corselet un peu plus long que large." Neither of these remarks is applicable to my specimens, in which the eyes are larger than the prominences inclosing them behind, these being weakly developed, and the prothorax slightly broader than long. The dentiform projection on the lower side of the anterior thighs in the ♂ is not mentioned either by de Castelnau or M. Putzeys.

PERCOSOMA CONCOLOR, n.sp.

Form elongate. Black, shining. Head not large; a broad transverse impression behind eyes, lightly marked across vertex; frontal impressions feeble, broad, short; eyes rather prominent, inclosed behind; post-ocular prominences not large or protuberant; antennæ subfiliform. Prothorax not convex, cordate, nearly as long as broad ($5 \times 5\frac{1}{4}$ mm.), truncate in front, lightly sinuate behind; sides lightly rounded on anterior half, obliquely narrowed behind, lightly sinuate towards base; lateral border narrow, extending from anterior to basal angle, a little thickened at basal angles, these rather obtuse; median line lightly marked; a transverse impression on each side a little in front of the base; several setigerous punctures along anterior half of margin, the posterior one placed just behind where the sides begin to narrow. Elytra lightly convex, oval, wider than prothorax (12×7 mm.), finely striate; the interstices flat; shoulders rounded; base truncate, lightly declivous to peduncle; apex broadly rounded; lateral border narrow, reaching from peduncle to apex; a few sparsely placed punctures a little within the margin. Ventral segments lightly rugose towards sides, last with one puncture on each side of anus.

Length 22, breadth 7 mm.

Hab.—Victoria; Marysville District (Track to Yarra Falls, Best).

A single specimen in my collection received from Mr. D. Best, of Melbourne. I have not ascertained the sex of my example, but judging from the fact that the anterior thighs are as in the ♀ of *P. montanum*, I believe it to be a ♀. Its broader form and the shape of the prothorax at once distinguish it from *P. montanum*.

PERCOSOMA CARENOIDES, White.

Broscus carenoides, White, Voy. Ereb. and Terr. p. 5, pl. 1, fig. 8.

Mecodema percoides, Casteln., l.c. p. 163.

P. carenoides, Putz., Stett. Ent. Zeit, 1868, p. 321.

This is a well known species; the following description will enable it to be identified:—

Black, shining, thighs and mouth parts reddish. Head very large, smooth; jaws long, greatly hooked at apex; clypeus usually with three setigerous punctures on each side; eyes not very prominent, inclosed behind; post-ocular prominences small; several setigerous punctures, placed longitudinally in an elongate fovea, above each eye, and, just outside this fovea, a single large puncture on each side of vertex. Prothorax cordate ($6 \times 7\frac{1}{2}$ mm.), lightly rounded on anterior part of sides, broadest a little behind anterior angles, sharply constricted and transversely impressed a little before the base,—the sides being straightened to meet the base; lateral margins broad, interrupted at basal constriction; a row of punctures along each lateral margin from anterior angle to basal constriction; median line lightly impressed. Elytra not convex, oval ($14 \times 8\frac{1}{4}$ mm.), very finely striate; the interstices flat; the 5th stria with about a dozen punctures along its course, these more closely placed near base and apex, smaller towards apex.

Length 26-28, breadth $8\frac{1}{4}$ mm.

Hab.—Tasmania.

PERCOSOMA SULCIPENNE, Bates.

P. sulcipenne, Bates, Cist. Ent. ii. 1878, p. 317.

I have a single specimen of this fine species which is found in the N. W. parts of Tasmania. The following is a brief description.

Form elongate, robust. Black, opaque, head very large, not narrowed or transversely impressed behind, rugulose in front; jaws long and hooked at apex; eyes round; a rounded prominence behind each eye about as large as the eye and equally prominent; several setigerous punctures, placed in an elongate foveiform depression, above each eye, and three large punc-

tures, placed in a transverse row, on each side of the vertex about level with post-ocular prominences. Prothorax cordate, very little broader than long (8×9 mm.), broadest just behind anterior angles, gradually narrowed to near the base, then constricted, the sides being straightened to meet the base; lateral margins broad, not reflexed, extending from anterior angle to posterior constriction, then obsolete; a row of setigerous punctures along their length; anterior margin longitudinally striolate; median line distinct; disc transversely striolate; basal part rugulose. Elytra oval ($17 \times 10\frac{1}{2}$ mm.), rather convex, declivous towards apex, striate; striæ fine near the suture, the interstices not convex, those towards the sides strong, the interstices convex, 5th stria with three strong punctures on basal third. Posterior trochanters long, acute.

Length 35, breadth $10\frac{1}{2}$ mm. (Mr. Bates's measurements are 26-30 mm.; so my specimen seems an unusually large one.)

A brief epitome of the facts relating to the distribution of the Australian *Broschini* may prove of interest, though I can make no attempt to draw any conclusions from these facts.

The subfamily *Broschini* is represented in the Australian fauna (excluding New Zealand) by 80 species, divided among 9 genera as follow:—

Promecoderus (36 species) has its metropolis in the dividing ranges of South-eastern Australia.* Twenty-two of the species are from that part of Australia lying south of a line drawn from Brisbane to Port Lincoln; of these only *P. concolor* (from South-western N. S. Wales, Victoria, and South Australia) and *P. blackburni* [from South Australia, Port Lincoln, and York Peninsula] are found far removed from the mountain ranges. Three species, of normal form, are from Tasmania and the islands in Bass Strait. Four species, of normal form, from West Australia (of these *P. divinoides*, *P. dyschirivoides*, and *P. scauroides* are very "close" species). Four other species constitute a group (the *P. brunnicornis* group*) peculiar to Tasmania; two species (*P. distinctus* and *P.*

* For a table grouping the species, see P.L.S.N.S.W. 1890 (2), v. pp. 193, 195.

ambiguus) are of a very distinct type confined to West and North Australia; the remaining species, *P. gracilis*, is an isolated species ranging from Bathurst, N. S. Wales, to South Australia.

Cerotalis (5 species), two are from south-western Australia, of one the exact habitat is unknown; one is said to be from Victoria; the last is from the Dawson River, Queensland, and is very distinct from the others.

Adotela (14 species) seems to be found over most of the Australian continent, except the south-east. On the eastern side of the continent, Gayndah in Queensland is the furthest south that the genus is known to extend; inland a species is found on the Darling River; on the south coast Wallaroo, S.A., is the most easterly point from which a species is recorded.

Gnathoxys (14 species) has no species recorded from Queensland or Victoria. In N. S. Wales two species are found (*G. tessellatus* is found about Sydney); South Australia has four species recorded from it. The other eight species are distributed between King George's Sound, Swan River, and Port Essington.

Brithy sternum calcaratum, the only species of the genus, is from Peak Downs, Queensland.

Eurylychnus (3 species) is peculiar to the mountains of south-east Australia, its range extending from the Shoalhaven River, N. S. Wales, to the Otway Ranges, Victoria.

Percolestus blackburni, the only species of the genus, is an isolated form from the mountains at the source of the Ovens River, Victoria.

Percosoma (4 species) has two species in Victoria and two in Tasmania. The species from the mainland are closely related and differ greatly from those of Tasmania, the latter also being nearly related to each other.

Lychnus (2 species) is peculiar to Tasmania.

It may be noted that the last three genera are more nearly related to the New Zealand types of *Broschini* than to the other Australian genera. All the species of *Broschini* found in Australia are apterous.

NOTES ON AUSTRALIAN COLEOPTERA, WITH
DESCRIPTIONS OF NEW SPECIES.

BY THE REV. T. BLACKBURN, B.A., CORR. MEM.

PART XI.

CARABIDÆ.

LEBIIDES.

TRIGONOTHOPS LONGIPLAGA, Chaud.

I have recently received from various localities examples scarcely separable from this species, and an examination of these and of specimens from Tasmania of *T. pacifica*, Er., appears to me to point strongly to the conclusion that *T. longiplaga*, Chaud., cannot be considered other than a variety of *T. pacifica*. De Chaudoir distinguishes it by the following characters—(a) head less narrowed behind the eyes, (b) prothorax less short and a little less rounded laterally, (c) elytra more elongate and less strongly striated, with flatter interstices, (d) spots on the elytra more yellowish, the anterior one sending out a narrow prolongation to the base.

Of my Victorian examples,—which I know were taken in company and are certainly conspecific *inter se*,—only one presents all the characters attributed to *longiplaga*; they all agree in having the anterior elytral spot prolonged to the base, but two of them have the prothorax distinctly shorter than the other, and of these one has the elytra distinctly wider than the other. The elytra are striated a little less strongly than in one of my Tasmanian examples of *T. pacifica*, but I have another Tasmanian example which is striated quite as strongly as the Victorian specimens, but presents no other character distinctive of *longiplaga*.

From S. Australia I have three examples, all taken near Port Lincoln. In these the anterior elytral spot is prolonged forward still more widely and conspicuously than in the Victorian form, one of them even having nearly the whole basal margin filled by it. These S. Australian specimens, moreover, have the front margin of the prothorax more or less distinctly straighter than in the Tasmanian and Victorian forms, in consequence of which the front angles of the prothorax are more defined, being obtuse but not altogether rounded off. This form might perhaps be conveniently named, thus:—

T. pacifica, Er., var. *lindensis*; prothoracis angulis anticis minus rotundatis; elytrorum plaga anteriori antrorsum usque ad basin late producta.

From W. Australia I possess a single specimen which may possibly represent a separate species, though I fail to detect any good distinction except in respect of characters that in the forms alluded to above certainly appear to be liable to slight variation. Compared with *T. pacifica* this insect has a slightly shorter prothorax, but I can find no other structural difference. The anterior elytral spot is quite as in *pacifica*, but the hinder spot is as in *T. flavofasciata*, Chaud., *i.e.*, is a fascia occupying the entire apex of the elytra and is of even width, but zigzagged on its anterior margin. I think it must be regarded with hesitation as a var. of *T. pacifica*. It may be thus characterised:—

T. pacifica, Er., var. (?) *occidentalis*; differt prothorace paullo breviori, elytrorum macula postica fasciam formanti apicem totam complenti, antice dentata.

I may add that the variations mentioned above are undoubtedly not sexual characters; nevertheless, as I have not seen both sexes of all the forms alluded to, there remains a possibility that an examination of these might reveal specific characters.

Of the other described species of the genus *T. lineata*, Dej., is very different from all the above mentioned forms; *T. dimidiata*, Chaud., I have not seen, but it is evidently a very distinct form; *T. plagiata*, Germ., is identical with *lineata*, Dej.; *T. flavofasciata*,

Chaud., is extremely like some vars. of *T. pacifica*, Er., and in my opinion is of doubtful validity; *T. nigricollis*, Macl., is probably a good species; there is nothing in the description of *T. pallidicollis*, Macl., to distinguish it from *T. pacifica*; Sir W. Macleay's three species from N. W. Australia are said to have the posterior elytral spot "near" the apex, which seems to distinguish them from all the forms of *Trigonothops* known to me, the posterior elytral spot in all these being *at* the apex.

I may add that the description of *Dromius tridens*, Newm., points to the probability of its being a *Trigonothops*, and that there is nothing in the brief description inconsistent with its being founded on the same species as *T. pacifica*, Er., in which case Newman's name would have priority.

DEMETRIAS TWEEDENSIS, sp.nov.

Elongatus; rufo-piceus, subtus dilutior; prothorace capiti longitudine latitudineque æquali, longitudinaliter profunde sulcato, transversim subrugato, latitudine longitudini æquali, antice leviter emarginato postice subbisinuato, antice quam postice manifeste angustiori, angulis anticis haud productis, latitudine majori sat longe ante medium posita, lateribus leviter arcuatis ante basin sinuatis, angulis posticis extrorsum directis parum acutis; elytris sat fortiter punctulato-striatis, ad apicem emarginato-truncatis, truncaturæ angulo externo obtuso interno sat acuto, interstitiis convexis sparsim subtiliter punctulatis, interstitio 3^o postice punctura singula instructo. [Long. 5, lat. 1 $\frac{3}{8}$ lines.

This seems to be a genuine *Demetrias*, though on a casual glance it has much the appearance of a *Xanthophaea*, but the form of its palpi and other characters connect it with the former genus. It is very like a species from the Richmond River (N.S.W.) which seems likely to be *D. rufescens*, Macl., but is much larger and differs in the form of the prothorax, which is by measurement fully as long as wide (to a casual glance it looks longer), and evidently narrower across the front margin than across the base,

its widest part being evidently further from the front and its sides at this point being subangulate. The anterior narrowing of the prothorax as compared with the width at the base will at once separate the present species from *D. brachinoderus*, Chaud.

N. S. Wales; Tweed River; given to me by Mr. Olliff.

HOMETHES ANGULATUS, sp.nov.

Oblongus; niger, antennis (basi testacea excepta) palpisque fuscis, pedibus (geniculis et ad apicem summum tibiis tarsorumque articulis infuscatis exceptis) mandibulisque testaceis; prothorace transverso, latitudine majori longe ante medium posita, lateribus fortiter angulatis lineis binis fere rectis formatis; elytris sericeo-tesselatis, leviter striatis, ad basin late rotundatim (quam *H. sericei*, Er., multo minus fortiter) productis. [Long. $3\frac{1}{2}$, lat. $1\frac{1}{4}$ lines.

Much like *H. sericeus*, Er. (which is said, probably correctly, to be identical with *H. elegans*, Newm.). Compared with it, the present species is narrower and more parallel; its prothorax distinctly more transverse, the greatest width nearer to the front, the lateral margin formed by two nearly straight lines which meet in an angle evidently more defined than the lateral angulation in *H. sericeus*; the elytra very much less strongly produced forward at the base.

From *H. guttifer*, Germ., and *marginipennis*, Macl., the absence of a pale elytral margin *inter alia* distinguishes this insect; *H. emarginatus*, Chaud., has joints 6-9 of the antennæ white; *H. micans*, Germ., and *velutinus*, Macl., have the prothorax at its widest at (or close to) the middle. Apart from colour, this species is very near *H. guttifer*, Germ., but the prothorax is at its widest a little nearer to the front, and has a more marked angle at its widest point; also the projected front of each elytron is subangular, not evenly rounded. The colour difference has nothing to do with sex.

S. Australia; Port Lincoln district.

HOMETHES GRACILIS, sp.nov.

Elongato-oblongus ; niger, antennis (articulo basali fere nigro, articulis 4-6 et 9-11 infuscatis, exceptis) palpis mandibulis pedibusque (horum geniculis et ad apicem summum tibiis tarsorumque articulis infuscatis exceptis) testaceis ; prothoracis latitudine longitudini æquali, latitudine majori paullo ante medium posita, lateribus ab angulis anticis fere ad medium leviter divergentibus hic vix angulatis hinc ad basin arcuatim convergentibus ; elytris sericeo-subtesselatis, leviter striatis, ad basin anguste modice productis, interstitio 3° guttulis obscure rufis seriatim ornato.

[Long. 4, lat. $1\frac{1}{5}$ lines.

A very elongate graceful species, probably in general facies resembling *H. emarginatus*, Chaud.; but that species *inter alia* is described as having joints 6-8 of the antennæ white, and does not appear to have the 3rd interstice of the elytra marked with pale spots. Its narrow form will, I think, separate this insect from all others of the genus hitherto described, as also will the basal joint of the antennæ black in strong contrast to the next following joints. *H. velutinus*, Macl., is only slightly described, but it is not said to be a particularly narrow species ; moreover, the description of the antennæ does not make them agree with the species before me, and it is implied that the legs are entirely of a testaceous colour.

S. Australia ; McDonnell Ranges.

HOMETHES PARVICOLLIS, sp.nov.

Ovalis ; niger, antennis fusco-piceis (articulo basali 3° que subtus testaceis exceptis), mandibulis apice rufescentibus, pedibus (geniculis sat late et ad apicem summum tibiis tarsorumque articulis infuscatis exceptis) pallide flavis ; prothorace parvo quam latiori fere longiori, latitudine majori longe ante medium posita, lateribus fortiter angulatis lineis binis fere rectis formatis ; elytris sericeo-tesselatis, leviter striatis, ad basin leviter latissime rotundato-productis.

[Long. $4\frac{1}{2}$, lat. $1\frac{3}{5}$ lines.

Remarkable for the great amplitude of its elytra as compared with the prothorax. The latter is by measurement just barely longer than wide, and is not at all wider than the head; its lateral angles though very obtuse are extremely well marked, not in the least rounded off. The elytra become gradually and slightly wider hindward from the base to near the apex; the front margin of each elytron is gently and very widely rounded forward, a character which will at once separate this species from all its named allies, unless it be one or two in whose descriptions the shape of this part is not mentioned, but they are very different in respect of other characters. From *H. emarginatus*, Chaud., the colour of the antennæ will *inter alia* separate it, from *H. velutinus*, Macl., the nearness of the widest part of the prothorax to the front of that segment. The dark antennæ and palpi are a noticeable character.

N. S. Wales; near Sydney.

HOMETHES ROTUNDATUS, sp.nov.

Late ovalis; niger, antennis palpis mandibulis pedibusque totis testaceis; prothorace quam longiori sat latiori, quam caput multo latiori, fere hexagonali, latitudine majori paullo ante medium posita; elytris late rotundato-ovalibus, quam conjunctim latioribus vix sesquolongioribus, sericeo-tesselatis, leviter striatis, ad basin modice sat anguste productis.

[Long. $3\frac{3}{5}$, lat. $1\frac{3}{5}$ lines (vix).

Remarkable for the strongly rounded sides and great width of its elytra, which are by measurement scarcely half again as long as they are together wide,—at a glance they appear even wider, or something near circular. Apart from this character the entirely testaceous antennæ (joints 5 and 6 scarcely infuscate), palpi, mandibles and legs will, I think, separate this species from all previously named in the genus.

N. S. Wales; Blue Mountains.

DROMIUS YARRÆ, sp.nov.

Oblongo-ovatus; nitidus; piceo-niger, elytris cæruleo-cupreoque-subiridescens, antennis palpis mandibulis pedibusque sordide testaceis, femoribus coxis et metasterno medio fere albidis; capite prothoraceque alutaceis haud manifeste punctulatis; illo fere æquali antice obscure transversim impresso; prothorace sat transverso, antice posticeque subtruncato, canaliculato, lateribus ab angulis anticis (his sat rotundatis) retrorsum ad basin leviter arcuatim angustatis, angulis posticis obtusis; elytris obsolete striatis, interstitiis planis, interstitio 4° foveis nonnullis magnis fere obsolete notato. [Long. $1\frac{1}{5}$, lat. $\frac{3}{5}$ line.

This species is very like a *Metabletus* in general appearance, but its mentum appears to be toothed, although it is difficult to be quite certain without dissection in the case of so minute a species, and I have seen only a single example. It is certainly congeneric, I think, with *Dromius humeralis*, Macl., from which it differs (apart from colour) by its elytra less elongate, less parallel, and at their widest behind the middle, as well as by the much more obtuse hind angles of the prothorax.

Victoria; Upper Yarra; sent by C. French, Esq.

SAROTHROCREPIS POSTICALIS, Guér.

I am confident that this is only a var. of *S. corticalis*, Fab.; I have taken it frequently in company with typical examples of that insect, and I can find no character whatever to distinguish it except the absence of a forward prolongation of the elytral fascia, and even in respect of that character there are intermediate forms. In both forms the prothorax is very similar in shape, being much narrower across the front margin than at the base, with the sides diverging considerably from the front to (or nearly to) the middle and thence converging slightly with a fairly strong sinuation to the base, which is widely and distinctly (but not very strongly) lobed hindward in the middle, the hind angles being very sharp and with a slight outward direction. I am not sure that the

prothorax of *S. posticalis* is not a little more narrowed in front than that of typical *S. corticalis*, but the character is certainly too slight to be regarded as specific. The prothorax of the male in both forms is a little less transverse than of the female and seems to be at its widest slightly nearer to the front; and the male has a slight excision at the end of the apical ventral segment. The above remarks are founded on the examination of a fairly long series from S. Australia, Victoria, and Tasmania.

SAROTHROCREPIS (LEBIA) CALIDA, Newm.

I believe this species to be identical with *S. corticalis*, Fab.

ECTROMA OBSOLETUM, sp.nov.

Oblongum, postice latius; testaceum, elytris a basi retrorsum indeterminate fusco-3-vittatis, vittis postice ad fasciam subobsoletam subapicalem fuscam attingentibus, corpore subtus fusco-adumbrato; antennarum articulo basali 3° longitudine aequali; prothorace sat transverso, antice subtruncato quam postice parum angustiori, lateribus parum arcuatis postice vix sinuatis, angulis posticis fere rectis (apice summo subrotundato); elytris striatis, striis obscure punctulatis.

[Long. 3, lat. $1\frac{3}{10}$ lines.

I have no doubt this species is congeneric with *E. civicum*, Newm., but as my example is a female there remains a possibility that the discovery of the male might prove it to be a *Sarothrocrepis*. In colour and markings it is not unlike a washed-out specimen of *Sarothrocrepis corticalis*, Fab., but is smaller than any example I have seen of that species, has the basal joint of the antennæ longer, the prothorax of quite a different shape, &c., while its general form is much more elongate, with the elytra gently wider from the base nearly to the apex and with their lateral margins nearly straight. In respect of most of the above mentioned characters it agrees with the insect mentioned below, which I take to be *E. (Lebia) beneficum*, Newm., but differs from it by its more robust form, longer and stouter legs, less strongly transverse

prothorax, and by the absence of the dark patch or spot which in the latter species seems to be invariably present on either side of the scutellum.

N.S. Wales; Blue Mountains.

ECTROMA BENEFICUM, Newm.

I do not know any species to which the very brief description of this insect applies quite satisfactorily. De Chaudoir states that it is a congener of *E. (Lebia) civicum*, Newm., and also that *Lebia duponti*, Putz., is conspecific with it. There appears to me to be probably a clerical or printer's error in the description of the latter, which states that a pale vitta runs from the shoulder towards the suture of the elytra, and then turns and runs up the elytra again "versus marginem," and also that independently of this the margin is entirely testaceous. It is difficult to understand how there can be room for all this marking outside the shoulder. If "versus marginem" were "versus suturam," the description would apply very satisfactorily to one of the varieties of an extremely variable species which is clearly, I think, congeneric with *Lebia civica*, Newm., and is very widely distributed in Australia. I believe that *Lebia benefica*, Newm., and *Cymindis inquinata*, Er., are both varieties of this species. Also I believe *Sarothrocrepis liturata*, Macl., to be another variety of the same. I fear it is impossible, however, to arrive at any certainty regarding Newman's and Erichson's species mentioned above.

The species before me, and of which I take the above mentioned to be varieties, is inconstant in size and markings. It varies from long. $2\frac{1}{3}$, lat. 1 line to long. 3, lat. $1\frac{2}{5}$ lines. A darkly coloured example (such as *Lebia duponti* might have been founded on) has the head, prothorax and the antennæ rufo-testaceous (the prothorax, however, having a somewhat semicircular blackish mark on the middle portion of its front). The elytra may be regarded as blackish,—in which case the lateral margins (narrowly), the apex (widely) and two vittæ which unite on the base and also on the disc at about half the length of the elytra (enclosing an oblong

black space) are testaceous; or the elytra of this variety may be regarded as testaceous, having a short blackish vitta (not quite touching the base) on either side of the scutellum, and also a large common black blotch (not quite touching the lateral margins nor extending into the hinder fifth part of the elytra, convex and also dentate hindward and being in the front half of its length divided into three branches, which narrow forward to the front margin of the elytra,—one on the suture and one close to the lateral margin on either side) which occupies the greater part of the surface.

An example coloured as above, but in which the juxta-scutellar vitta should connect at its hind apex with the sutural extension of the large black blotch (I have not seen an example in which it quite connects) would agree with the description of *Lebia benefica*, Newm.

Through a long series of specimens before me the dark colouring of the elytra gradually fails, the difficulty being to find two examples quite identical. First the sutural extension of the large blotch is much narrower and then disappears, then the juxta-scutellar vitta dwindles to a small spot, then the lateral extensions of the large blotch become more slender and then are abbreviated in front, then the solid part of the dark blotch begins to fade out both in front and behind till it becomes quite a narrow fascia sending out three short extensions in front and with its hind margin convex and dentate hindward, then this fascia becomes broken into a number of short disconnected longitudinal lines (placed however so as to be evidently fragments of the same fascia), and finally these lines dwindle down to a single small spot placed at the point which in a full-coloured example is the centre of the solid part of the dark blotch. In this last named variety the elytra are entirely testaceous except a small dark spot on either side of the scutellum and another on the suture a little in front of the apex. *Cymindis inquinata*, Er., is probably one of these latter varieties in which the solid part of the dark blotch has become much reduced, and traces of its lateral extensions remain as short isolated lines.

The undersurface is testaceous, with the sides and apex of the abdomen more or less widely black. The legs are entirely testaceous.

The description of *Dromius tridens*, Newm., is so meagre and vague that several widely separated species (including this) would come very near fitting it. I have not, however, seen any example of this species so large as *D. tridens*, and this, together with Newman's calling it a *Dromius*, points strongly to *D. tridens* being a *Trigonothops* (in spite of De Chaudoir's saying that it is congeneric with *Lebia benefica*, Newm.),—probably *T. pacifica*, Er.

I have examined the type of *Sarothrocrepis liturata*, Macl. (from N. W. Australia), and cannot distinguish it from examples of this species taken on the south coast of Australia.

In all the numerous varieties I have seen of this insect there is a conspicuous isolated dark spot or blotch on either side of the scutellum and at least some trace of a more or less semicircular dark mark on the front of the prothorax.

The prothorax is very strongly transverse in the female and considerably less so in the male, its sides moderately (female) or but little (male) rounded, its greatest width at (female) or just in front of (male) the middle, its front margin very little narrower than its base, its hind angles obtuse.

The specimens before me are from Port Lincoln, Adelaide, Melbourne, the Victorian Alps, Central Australia, and N. W. Australia.

COPTODERIDES.

PHILOPHLÆUS MONTICOLA, sp.nov.

Sat depressus; pubescens; ferrugineus; elytris fusco-piceis, lateribus (sat anguste) apice (obscurè angustissime) et vittis singulis dorsalibus latis ferrugineis; his in quinta parte apicali deficientibus; prothorace quam longiori minus quam duplo latiori, antice fortiter emarginato, postice sat fortiter lobato, ad latera utrinque 5-setoso, lateribus mox ante medium

subangulatis, hinc ad basin vix sinuatis, angulis posticis haud plane rotundatis fere subprominulis (fere ut *P. distinguendi*, Chaud.); elytris confertim subtiliter (quam *P. australis* multo minus fortiter) punctulatis, obsolete striatis, humeris modice prominulis. [Long. $4\frac{1}{2}$, lat. $2\frac{1}{5}$ lines.

Maris tarsorum intermediorum articulis basalibus 3 subtus squamuloso-papillosis.

Very like *P. australis*, Dej., but differing from it by the very much finer puncturation of the elytra, the more uniformly ferruginous antennæ, the prothorax scarcely darker on the disc than on the margins, the front of the prothorax more strongly emarginate making the front angles more prominent and conspicuous, &c., &c.

Compared with *P. distinguendus*, Chaud., the prothorax is markedly narrower, the elytra much more finely punctured, &c., &c.; *P. grandiceps*, Chaud., is (as its name implies) notable for its large head (a character not observable in the present species) and appears to be punctured as *P. australis*.

P. intermedius, Chaud., *inter alia multa*, has the lateral margins of the prothorax only bisetose.

P. australasie, Chaud., *inter alia* has the sutural apex of the elytra furnished with a small tooth.

P. immaculatus, Chaud., and *occidentalis*, Blackb., have unicolorous elytra.

P. Froggatti, Macl., is only about half the size of this species and probably does not belong to this section of the genus.

The other described species have different male characters.

Victoria; Alpine district.

PHILOPHLEUS SYDNEYENSIS, sp. nov.

Sat depressus; pubescens; ferrugineus; elytris late fuscotrivittatis (vitta communi suturali postice abbreviata, alteris submarginalibus apicem vix attingentibus); prothorace antice bisinuatum minus fortiter emarginato, postice minus fortiter

lobato, ad latera utrinque 2-setoso, angulis posticis obtusis vix distinctis, elytris confertim subtiliter punctulatis, obsolete striatis, humeris parum prominulis.

[Long. $3\frac{1}{2}$, lat. $1\frac{3}{5}$ lines.

The above characters will distinguish this species from all of the genus previously described. The others having only two setose punctures on the lateral margins of the prothorax are *intermedius*, Chaud., *obtusus*, Chaud., *angulatus*, Chaud., *luculentus*, Newm., *rectangulus*, Chaud., and perhaps *mollis*, Newm. The last three of these are entirely different in their style of markings and other characters. From *obtusus* and *angulatus* the present species differs *inter alia* by the sutural vitta being abbreviated at about $\frac{3}{4}$ the length of the suture,—or (if the dark colour be regarded as the ground) by the two pale vittæ uniting behind and filling up the apex. This species is very near *P. intermedius*, its markings and colour being identical; but differs from it by its head almost smooth, its prothorax much less narrowed behind, less emarginate in front and scarcely lobed behind, its elytra much more finely punctulate and having the shoulders much less prominent, and its considerably smaller size.

I believe this is the first *Philophlæus* reported from N. S. Wales. I have not seen the male, but have no doubt its sexual characters are like those of *P. intermedius*.

N. S. Wales; Blue Mountains; under bark of Eucalyptus.

PHILOPHLÆUS LATICOLLIS, sp. nov.

Sat depressus; pubescens; ferrugineus, elytris fusco-piceis, lateribus (sat late) et vittis singulis dorsalibus latis ferrugineis; his in quinta parte apicali deficientibus; prothorace (maris vix feminae plane) quam longiori latiori, antice subbisinuatum leviter emarginato, postice lobato, ad latera utrinque 5-setoso, lateribus rotundatis postice vix subsinuatis, angulis posticis rotundato-obtusis; elytris fere ut *P. australis* sculpturatis, humeris minus prominulis.

[Long. $5\frac{1}{2}$ -6, lat. $2\frac{2}{3}$ - $2\frac{3}{5}$ lines.

Maris tarsorum intermediorum articulo 3° subtus simplici.

In the section of *Philophlæus* having the third joint of the intermediate tarsi simple in the male this species may be at once distinguished from all previously described except *P. eucalypti*, Germ., by the following characters in combination:—Prothorax 5-setose on either side, elytra not unicolorous on the disc and punctured not more finely than those of *P. australis*, Dej. It is remarkable for its extremely transverse prothorax (which is by measurement twice as wide as long in the female, and scarcely less wide in the male) which distinguishes it from *P. eucalypti*, Germ., and is one of the largest species of the genus.

Victoria; Alpine district.

PHILOPHLÆUS EUCALYPTI, Germ. (var. ? *Tasmanice*).

The only *Philophlæus* that I have seen from Tasmania is scarcely to be distinguished from this S. Australian species. I notice, however, that the antennæ (except the basal joints) and the palpi are much darker than those of typical *P. eucalypti*, and there is a slightly more decided indication of hind angles to the prothorax. The tarsi of the male, the prothoracic setæ, the elytral puncturation, and the colour and markings seem to be quite identical. I take it to be a local var.

PHILOPHLÆUS OPACICEPS, Blackb.

I have received this species from Western Australia (York district).

PHILOPHLÆUS CONFERTUS, sp. nov.

Sat depressus; pubescens; ferrugineus; elytris fusco-piceis, lateribus et vittis singulis dorsalibus minus latis ferrugineis; his in sexta parte apicali deficientibus; prothorace quam longiori fere duplo latiori, antice leviter emarginato, postice parum lobato, ad latera utrinque 2-setoso, lateribus ab angulis anticis retrorsum leviter arcuatis paullo ante medium angulatis hinc ad basin nullo modo sinuatis, angulis posticis valde obtusis vix rotundatis; elytris confertim subtilissime punctulatis, leviter striatis, interstitiis leviter convexis.

[Long. 4, lat. $1\frac{2}{5}$ lines.

My example of this species is a female, but there can hardly be a doubt of its belonging to the same section (the 2nd) of the genus as *P. angulatus*, Chaud., to which it is closely allied, though very distinct. Compared with that species the prothorax is wider and not quite so sharply angulated at the sides, which behind the angulation are not in the least sinuate, the hind angles, however, being more obtuse. The juxta-sutural elytral vitta continuous to near the apex and much narrowed behind distinguishes this species from all of the section (*angulatus* included) except *eucalypti* (in which, however, the said vitta is much wider in its front part), which *inter alia* has 5 setæ on either side of the prothorax and much more strongly punctured elytra. The bisetose sides of the prothorax, in combination with very finely punctured elytra, which are not unicolorous but bear a narrow dorsal vitta abbreviated behind and not turned inward towards the suture, will distinguish this insect from all others of the genus independently of sexual characters. I believe it is the first species of *Philophlæus* with a pattern on the elytra recorded from Western Australia.

W. Australia ; Yilgarn ; sent to me by C. French, Esq.

AGONOCHEILA.

The difficulty of this genus and of *Philophlæus* is greatly increased by the existence of several descriptions of the most unsatisfactory character, of which all that can be said is that they are very likely to have been founded on a *Philophlæus* or an *Agonocheila*, as the case may be,—but it is quite hopeless to refer them to any one in particular unless one could accomplish an examination of the original type, which is quite out of the question for Australian workers. I see nothing for it but to treat these as non-existent and to accept the risk of redescribing them. In my opinion the author of a sufficient description is perfectly justified in publishing it on the one condition that he do not create a synonym for a species already recognisable *by description*. I fully admit that if an eventual examination of an original type can enable its identity to be satisfactorily proved, its name must have priority against all others whatsoever,—but I hold the author of

the first *recognisable* description perfectly free from blame even though the name he used have to become a synonym through the subsequent investigation of the specimen on which some unintelligible description was founded.

Lebia irrita, Newm., is an example in point. De Chaudoir seems to think it likely to be a *Philophlæus*. I incline to believe that it is an *Agonocheila*, and it is quite possible that it may be the species described below. But it could not be identified except by inspecting the original type (which if still existent is, I suppose in the British Museum), and therefore I disregard it.

AGONOCHEILA FENESTRATA, sp. nov.

Sat depressus; pubescens; fusco-ferrugineus vel obscure rufotestaceus, exemplorum plurimorum capite abdominis lateribus apiceque et elytris obscurioribus (his macula brevi anguste oblonga longitudinali discoidali antice posita, et exemplis nonnullis altera communi transversa subobsoleta pone medium posita, ornatis); prothorace quam longiori fere duplo latiori, antice leviter emarginato, postice lobato, quam caput parum latiori, ad latera utrinque 2-setoso, latitudinæ majori longe ante medium posita, lateribus paullo pone angulos anticos angulatis hinc ad basin leviter fere recte convergentibus, angulis posticis rectis, basi quam margo anticus paullo latiori; elytris modice (quam *A. curtulæ*, Er., paullo minus fortiter) punctulatis, obsolete striatis, interstitiis vix planis.

[Long. $1\frac{1}{5}$ -2, lat. $\frac{3}{5}$ - $\frac{4}{5}$ line.

This species seems very easily recognisable by its diminutive size and its brown elytra bearing a short line-like testaceous mark on the disc a little in front of the middle; very rarely this mark is a little dilated laterally so as to be not much longer than wide, and almost equally rarely there is a short transverse testaceous mark crossing the suture a little behind the middle; in some examples the external margins of the elytra are narrowly (and more or less faintly) pallid; I have not seen an example in which the front pallid mark on the elytra is wanting except one probably immature,

in which the whole elytra are pallid. The species is remarkable also for the angulation of the sides of the prothorax (where the anterior of the two lateral setæ is placed) being very near to the front margin—much nearer, *e.g.*, than in *A. curtula*, Er., (\neq *corticalis*, Chaud.). Compared with *A. biguttata*, Chaud., the present insect is much smaller, with different markings, very much more transverse prothorax, &c.

S. Australia ; W. Australia ; Victoria ; common.

SCARITIDES.

EURYSCAPHUS SULCICOLLIS, sp.nov.

Minus latus; niger; nitidus; capite minus transverso, supra oculos utrinque bipunctulato, inter oculos vix rugato, sulcis frontibus modicis antice minus fortiter divergentibus, postice linea curvata conjunctis; prothorace quam longiori fere duabus partibus latiori, marginato, transversim leviter rugato, leviter canaliculato, intra margines laterales utrinque late longitudinaliter sulcato, lateribus postice vix sinuatis, margine antico manifeste bisinuato, angulis anticis leviter productis, marginibus utrinque bipunctatis; elytris modice convexis, fere lævibus, quam conjunctim latioribus sat longioribus, ad basin leviter emarginatis, humeris reflexis, disco postice utrinque punctura sat magna instructo.

[Long. 16, lat. $6\frac{2}{3}$ lines.

The most striking character of this species is the wide shallow sulcus on either side of the prothorax considerably within the lateral margin running from the front hindward, and gradually becoming fainter as it approaches the base (there is an approach to this sculpture in *E. bipunctatus*, Macl.). The large puncture on the hinder part of the disc of each elytron distinguishes the present insect from all the previously described *Euryscaphi* except *bipunctatus*, Macl., *obesus*, Macl., *tatei*, Blackb., and *ebenivus*, Sloane; the elytra are distinctly longer in proportion to their width (as 19 to 16) than in any of the last named except *tatei*, Blackb., to which this species is rather close, differing, however

(apart from the absence of elytral sculpture, which may be an unimportant character), by the presence of the prothoracic sulci already mentioned, by its less transverse head on which the frontal sulci are gently curved outward and forward in front with less approach to an angle than in the other *Euryscaphi* known to me, and by the non-sinuate hinder portion of the lateral margins of the prothorax. The legs do not appear to differ materially from those of *E. obesus*, MacL. The elytra are not much wider than the prothorax (as 16 to $14\frac{1}{2}$), and their sides are but little rounded.

S. Australia; basin of Lake Eyre.

EURYSCAPHUS CHAUDOIRI, sp.nov.

Minus latus; nitidissimus; aterrimus; capite valde transverso, supra oculos utrinque bipunctulato, inter oculos sat fortiter rugato, sulcis frontalibus modicis antice fortiter extrorsum directis, postice linea curvata conjunctis; prothorace quam longiori tribus partibus latiori, marginato, transversim obsolete rugato, canaliculato, lateribus postice manifeste sinuatis, margine antico vix bisinuato, angulis anticis leviter productis, marginibus utrinque bipunctatis; elytris convexis subtilissime vix striatis, quam conjunctim latioribus sat longioribus, ad basin leviter emarginatis, humeris reflexis, disco postice utrinque punctura sat magna instructo.

[Long. 15, lat. 6 lines (vix).

The elytra distinctly longer than usual in proportion to their width (as $17\frac{1}{2}$ to 15) together with the presence of a large puncture on the hinder part of the disc of each elytron will separate this species from all others described except *tatei*, Blackb., and *sulcicollis*, Blackb. It differs from the former by its considerably more transverse prothorax ($\frac{3}{4}$ again as wide as long), somewhat more elongate elytra (which are differently sculptured), &c., and from the latter by the frontal sulci much more angulated, differently sculptured prothorax, with sides sinuate behind, &c.

S. Australia, near Morgan.

CLIVINA ÆQUALIS, Blackb.

In describing this species (P.L.S.N.S.W., 1889, p. 718) I find I omitted to mention an important character, viz., that it has a perfectly well defined abbreviated punctulate stria on either side of the scutellum on the basal part of the juxta-sutural interstice. Owing to the presence of this additional stria, it should be noted, the stria that is bent outwards at the base to meet one of the external striæ is the 5th counted *along* the base, but the 4th (as stated in my description) if the count be taken a little behind the base.

ANISODACTYLIDES.

HYPHARPAX (HARPALUS) AUSTRALIS, Dej.

I have recently taken near Sydney two male examples which I have no doubt are referable to this species, of which I had previously seen only females. A study of these males shows them to be perfectly distinct from *Harpalus inornatus*, Germ., although so like it that apart from the sexual characters there might be room for doubt whether the differences are really specific. The hind femora of these examples are devoid of the tooth that is found in the males of so many species of *Hypharpax*, and which is very strongly developed in *inornatus*, and the hind tibiæ are nearly straight, the same in *inornatus* being strongly bent inward near the apex. Apart from these sexual characters the hind tarsi of these examples are not quite so short as those of *inornatus* but I cannot specify any other reliable distinction, unless it be that their prothorax is a trifle more strongly transverse, and with hind angles a little better defined than the same in *H. inornatus*. According to the Baron de Chaudoir's diagnosis of *Hypharpax* (Ann. Mus. Gen., 1878, p. 496) its essential distinction from *Diaphoromerus* consists in the dentate hind femora of the male, but it was pointed out by Mr. Bates in the same year (Cist. Ent., II., 320) that this is not a constant character, and in Trans. Roy. Soc. S. A. (1887, p. 182) I expressed the opinion that the true character of the genus consists in the short hind tarsi—a character

which is well marked in the Sydney specimens before me, their hind tarsi being very much shorter than those of any *Diaphoromerus* that I have seen, and with the basal joint not longer than the second. The female differs from *H. inornatus* by its straighter hind tibiæ and slightly longer hind tarsi.

HYPHARPAX OBSOLETUS, sp.nov.

Brunneus, æneo- vel subviride-micans, labro mandibulis palpis antennis pedibus scutello et (nonnullis exemplis) marginibus lateralibus flavis; prothorace fortiter transverso postice quam antice vix latiori, postice utrinque foveolato, foveolis sat perspicue punctulatis, lateribus modice rotundatis, angulis posticis sat rotundatis, latitudine majori mox ante medium posita; elytris subtiliter striatis, interstitiis planis (postice angustioribus convexis), 3° longe ante apicem (nonnullis exemplis) punctura setifera instructo.

[Long. 3-3½, lat. 1½-1½ lines.

Maris tarsis anterioribus 4 minus fortiter dilatatis; femoribus posticis simplicibus; tibiis posticis vix arcuatis.

This species seems very distinct from all previously described. Count Castlenau unfortunately gives no information as to the sexual characters of the numerous *Anisodactylides* which he described under the name *Harpalus*, and de Chaudoir has certainly, I think, mixed up *Diaphoromerus* and *Hypharpax* in the utmost confusion, so that it is a difficult matter to arrive at absolute certainty, but at any rate there is no species from W. Australia described by either of those authors which seems at all near the present one. Of described species *H. Deyrollei*, Cast., comes perhaps nearest to it, but in that the hind angles of the prothorax are entirely rounded off (non-existent in fact), whereas in this insect though somewhat rounded at the apex they are quite well-marked, much as in *H. inornatus*, Germ.

W. Australia; Yilgarn; sent to me by C. French, Esq.

AMBLYTELIDES [tribus (sensu Lacordairei) nova].

AMBLYTELUS.

Amblytelus is (as M. Lacordaire says) a very difficult genus to place, but I cannot satisfy myself that the great French author has done well in placing it in the *Trigonotomides*, inasmuch as its mentum is not particularly feebly emarginate. I have a considerable number of species before me (including one from Tasmania which is evidently the typical species), and in all these, and also in Erichson's figure, the mentum is not much different from that of many *Feronides*, but is totally distinct from that of typical *Trigonotomides* (e.g., *Lesticus* or *Abacetus*).

I think there is no doubt that this genus and some other genera hitherto undescribed allied to it ought to be regarded as representing a distinct "tribe" (as Lacordaire understood the term), i.e., a group of equal value with that of the *Feroniides*, *Trigonotomides*, &c. This group will be characterised among the *Carabidae* as follows:—intermediate coxal cavities closed, head furnished above with two supra-orbital setigerous punctures and not grooved beneath to receive the antennæ, mandibles with a setigerous puncture in the groove, basal 3 joints of antennæ glabrous (4th pubescent, at least near the apex), margin of the elytra interrupted at posterior 3rd and having a distinct internal plica, terminal joint of maxillary palpi not springing obliquely from the preceding joint. I believe the following character will also prove to be constant:—8th interstice of elytra strongly plicate-carinate near the apex.

Besides *Amblytelus* I think there can hardly be a doubt that *Dyscolus australis*, Er., and *D. dilatatus*, Er., will find a place in this tribe, indeed Mr. Sloane has shown me a specimen said to be of the latter (alleged to have been named by Mr. Bates and agreeing with the description) which certainly is an *Amblytelus* or (more probably) of a new genus very near *Amblytelus*; it unfortunately was badly broken in transmission, and is now hardly fit to be dealt with.

Mr. T. G. Sloane has sent me a number of interesting species allied to *Amblytelus* (together with some valuable notes), and my

AMBLYTELUS BREVIS, sp.nov.

Quam *A. curtus*, Er., minus elongatus; pallide rufo-testaceus, elytris vittis 3 nigris (mediana communi nullo modo, lateralibus vix, basin attingentibus) postice conjunctis ornatis; prothorace fortiter transverso, angulis posticis rotundato-obtusis. [Long. $4.4\frac{1}{2}$, lat. $1\frac{3}{5}$ - $1\frac{1}{5}$ lines.

Smaller than *A. curtus*, Er., and a shorter and wider insect; the prothorax is more strongly transverse and less narrowed behind and is without any trace of dark spots; the general colour is decidedly more yellow (*i.e.*, less *ferruginous*) and the elytra are differently marked; regarding the pale colour of the elytra as the ground tint the markings consist of three dark vittæ (the middle one on the suture where it commences considerably behind the scutellum, the others occupying about the 6th and 7th interstices of each elytron, and commencing close behind the base) which unite behind and fill up the whole apical quarter of the elytra with the exception of the margins, which remain of the ground colour. The other described species resembling this in style of markings is *vittatus*, Motsch., (which *inter alia* is described as an oblong insect, with the disc of the prothorax infuscate and the yellow lateral margin of the elytra very narrow,—in the present species it occupies the whole of the lateral two interstices). I have seen many examples of this insect and do not observe any variability.

S. Australia and Victoria.

AMBLYTELUS SINUATUS, sp.nov.

Ab *A. brevi* vix differt nisi capite paullo majori et prothorace aliter formato; hoc minus transverso postice quam antice manifeste angustiori, lateribus postice manifeste sinuatis, basi tota sinuatim rotundata (nullo modo in medio lobata).

[Long. $4\frac{1}{2}$, lat. 2 lines (vix).

This insect is extremely close to the S. Australian species described above, but the differences seem to be constant. The head in *A. sinuatus* is (independently of sex) distinctly broader and more massive, partly owing to the eyes being evidently larger

and more prominent. The prothorax is distinctly less strongly (though nevertheless strongly) transverse, and is very evidently more narrowed behind; its sides are distinctly though slightly (in *brevis* not at all) sinuate immediately in front of the base; and the base itself differs as follows:—In *sinuatus* it runs as a continuous curved (nevertheless sinuous) line from one hind angle to the other (the convexity of the curve directed hindward), and there is nothing at all like a median lobe distinguished from the rest of the base, while in *brevis* the middle part of the base forms a very wide and quite well defined lobe.

N. S. Wales; taken in the Blue Mountains by Mr. T. G. Sloane.

DYSTRICHTHORAX, gen.nov.

Ab *Amblytelo* differt prothorace utrinque punctura setigera singula solum instructo, hoc ad angulum posticum posito.

All the species that I have seen of this genus differ from all that I have seen of *Amblytelus* in their prothorax being much wider behind. The subapical intra-marginal carina of the elytra is as in *Amblytelus*. In the male the front tarsi are but little dilated, the basal 3 joints having scale-like papillæ beneath. *Amblytelus amplipennis*, MacL., belongs to this genus.

D. BICOLOR, sp.nov.

Oblongus; nitidus; testaceus, elytris utrinque vitta discoidali nigricanti a basi retrorsum gradatim dilatata, abdomine medio infuscato; prothorace leviter transverso, antice quam postice sat angustiori, canaliculato, transversim rugato, utrinque ad basin late longitudinaliter sulcato, antice linea arcuata transversa fortiter impresso, margine antico rotundatim subproducto, lateribus subdiaphanis ab angulis anticis (his rotundatis) ad medium rotundatim divergentibus hinc ad basin trisinuatam (vix sinuatim) leviter convergentibus, angulis posticis rectis; elytris ad basin quam prothoracis basis vix latioribus, a basi retrorsum cito dilatatis (latitudine majori pone medium posita), punctulato-striatis, interstitiis fere

planis (3° puncturis setiferis obscuris notato, 8° apicem versus plicato-elevato), angulis humeralibus acutis.

[Long. $3\frac{1}{2}$ -4, lat. $1\frac{1}{2}$ lines.

The subdiaphanous lateral margins of the prothorax are margined within by a fine interrupted black line, which is probably liable to be wanting. The setiferous punctures of the 3rd elytral interstice are very inconspicuous and difficult to discern, except by their setæ. This species bears a remarkable superficial resemblance to the Cistelid, *Apellatus nodicornis*, Blackb.

N.S.W.; Blue Mountains.

DYSTRICHTHORAX SLOANEI, sp.nov.

Præcedenti affinis; minor; totus rufo-ferrugineus (elytrorum singulorum disco toto plus minusve infuscato excepto); prothoracis lateribus ab angulis anticis usque ad basin rotundatim nec sinuatim divergentibus; elytrorum interstitiis paullo magis convexis. [Long. 3- $3\frac{1}{2}$, lat. $1\frac{1}{5}$ lines (vix).

Of very different superficial appearance from the preceding owing to its different colouring, but otherwise scarcely differing except in the few characters specified above. The principal difference lies in the absence of sinuation in the sides of the prothorax behind the middle, which makes the segment appear of a bell-shape (its base being its widest part, whereas in *D. bicolor* the prothorax is distinctly wider about the middle than across the base); in both species the subdiaphanous lateral margins become gradually wider hindward, but more strongly in *sloanei* than in *bicolor*.

N. S. Wales; Richmond R.; sent to me by Mr. T. G. Sloane.

DYSTRICHTHORAX BIPUNCTATUS, sp.nov.

Oblongus; nitidus; ferrugineus, capite obscuriori; prothorace quam longiori circiter quarta parte latiori, postice quam antice paullo latiori, canaliculato, transversim rugato, utrinque ad basin fovea magna profunda (antice linea arcuata transversa fortiter) impresso, margine antico rotundatim subproducto, lateribus leviter arcuatis postice vix sinuatis,

angulis posticis subrectis; elytris subtiliter (latera versus vix manifeste) punctulato-striatis, ad basin quam prothoracis basis vix latioribus, a basi retrorsum cito dilatatis, angulis humeralibus acutis, interstitiis planis (3° puncturis setiferis 2 notato, 8° apicem versus plicato-elevato).

[Long. $3\frac{4}{5}$, lat. $1\frac{1}{2}$ lines.

Australia; exact habitat uncertain; taken by Mr. T. G. Sloane.

DYSTRICHTHORAX LIVIDUS, sp.nov.

Oblongo-ovatus; nitidus; livide-brunneus, nonnullis exemplis ad latera dilutioribus; capitis sulcis frontalibus elongatis profundis; prothorace quam longiori fere tertia parte latiori, postice quam antice sat latiori, canaliculato, transversim rugato, utrinque ad basin fovea magna sat profunda (antice linea arcuata transversa leviter) impresso, margine antico leviter prominulo, lateribus leviter arcuatis postice vix sinuatis, angulis posticis subrectis; elytris ad basin quam prothoracis basis vix latioribus, a basi retrorsum cito fortiter dilatatis (latitudine majori pone medium posita), subtiliter (latera versus vix perspicue, postice magis fortiter) punctulato-striatis, interstitiis planis (3° puncturis magnis subobsoletis 2 notatis, 8° apicem versus plicato elevato), angulis humeralibus acutis.

[Long. $3\frac{1}{5}$, lat. $1\frac{1}{2}$ lines.

N. S. Wales; Richmond R.; Mr. T. G. Sloane.

DYSTRICHTHORAX VICINUS, Sloane (MS.).

Nitidus; subtus testaceus, prothorace capiteque testaceis, elytris nigris ad basin testaceis et utrinque vitta testacea sat brevi ornatis (vittis ad basin conjunctis) et ad latera late testaceo-marginatis, prothorace subquadrato antice quam postice fere angustiori, lateribus postice vix subsinuatis, angulis posticis fere rectis subdentiformibus, basi in medio late leviter lobata; elytris subovalibus sat convexis, striatis, striis subtilissime punctulatis (1^a 2^a que ad basin confluentibus), interstitiis sat planis (3° apicem versus puncturis 2 impressis, 8° apicem versus plicato-elevato).

[Long. $5\frac{1}{5}$, lat. $2\frac{1}{5}$ lines.

A very distinct species; the discal vittæ of the elytra are narrow, scarcely extend into the apical $\frac{1}{3}$ of the elytra, and are much narrowed behind. The insect has the general appearance of an *Amblytelus*. The base of the prothorax is very characteristic; immediately within the hind angle on either side it is emarginate and the inner apex of the emargination joins the middle piece of the base in a distinct angle.

Victoria; Princetown; taken by Mr. T. G. Sloane.

N.B.—Mr. Sloane's collection contains an example, also from Victoria (Yarragon), which I hesitate to regard as a species distinct from *D. vicinus*, although it differs in several respects from the type; it is larger (long. 6 lines), the base of the elytra is not testaceous except where the vittæ and lateral margins meet it, the vittæ are longer, reaching nearly to the apex, the reflexed margin of the prothorax seems a little wider, and the elytra are a little more strongly punctulate-striate.

The following tabulation will assist in identifying the species of this genus.

- A. Elytra devoid of well defined pale discal markings.
 - B. Small species—long. 4 lines or less.
 - C. Prothorax evidently wider at the base than in the middle.
 - D. Frontal sulci of head very elongate and deep *lividus*, sp.nov.
 - DD. Frontal sulci of head normal ... *sloanei*, sp.nov.
 - CC. Prothorax not wider at the base than in the middle..... *bipunctatus*, sp.nov.
 - BB. Of large size—long. 5 lines or more *amplipennis*, Macl.
- AA. Elytra with well defined pale discal markings.
 - B. Middle of base of prothorax reaching hindward much further than the hind angles..... *vicinus*, Sloane.
 - BB. Base of prothorax very little prominent hindward in the middle. *bicolor*, sp.nov.

EPELYX, gen.nov.

Ab *Amblytelo* differt tarsorum articulo 4° haud bilobo.

Maris tarsis anticis leviter dilatatis subtus sparsim squamuloso-papillatis.

EPELYX LINDENSIS, sp.nov.

Sat breviter ovalis; nitidus; supra obscure ferrugineus, prothorace piceo-umbrato, elytris (marginibus lateralibus et spatio communi indeterminato pone vel circa scutellum exceptis) piceis, antennis palpis pedibus et corpore subtus (hoc plus minus piceo-umbrato) testaceis; prothorace quam longiori dimidia parte latiori, antice quam postice vix angustiori, canaliculato, leviter transversim rugato, margine antico emarginato-truncato, lateribus modice sat æqualiter arcuatis, angulis (anticis sat rotundatis haud productis) posticis rotundato-obtusis, basi media late vix lobata; elytris ad basin quam prothoracis basis parum latioribus, conjunctim sat æqualiter ovalibus, subtiliter striatis, striis distincte punctulatis, interstitiis planis (3° 5° 7° que puncturis setiferis seriatim ornatis, 8° apicem versus plicato-elevato).

[Long. 3, lat. 1½ lines.

S. Australia; near Port Lincoln.

EPELYX LATUS, sp.nov.

Breviter late ovalis; sat nitidus; totus ferrugineus, corpore subtus pedibusque dilutioribus, elytris plus minusve piceo-umbratis; prothorace quam longiori vix dimidia parte latiori, antice quam postice vix angustiori, canaliculato, leviter transversim rugato, margine antico sinuato-truncato, lateribus modice sat æqualiter arcuatis, angulis (anticis sat rotundatis) posticis rotundatim valde obtusis, basi utrinque obliqua; elytris prothorace plus quam duplo latioribus, leviter (postice magis fortiter) striato-punctulatis, interstitiis sat planis, 3° puncturis sat magnis 3 (7° puncturis circiter 7) impresso, 8° apicem versus plicato-elevato.

[Long. 2¾, lat. 1¼ lines.

A short wide insect with the prothorax very small in comparison of the elytra. Less darkly coloured than the preceding, and also smaller, with the prothorax not so strongly transverse and differently shaped in the hinder part. In *latus* the base on either side runs from the hind angle obliquely (and a little sinuately) hindward and inward, the oblique lines thus formed meeting the median piece of the base almost subangularly; thus the hind angles of the prothorax not only are a good deal rounded off, but are formed by lines inclined to each other at a very obtuse angle; in *lindensis* the base on either side runs from the hind angle directly inward and not (or scarcely) at all hindward until it is slightly deflected hindward to form a very feeble median lobe; the hind angles thus being formed by lines inclined to each other at a much less obtuse angle. In both species the actual junction of the base and sides is a good deal rounded off.

N. S. Wales; Blue Mountains; taken by T. G. Sloane, Esq.

FERONIIDES.

RHYTISTERNUS SPLENDENS, sp.nov.

Subdepressus; sat parallelus, niger elytris læte cæruleo iridescentibus, antennis palpis tarsisque ferrugineis; prothorace vix transverso, antice quam postice vix angustiori, antice sat fortiter emarginato, subobsoleto canaliculato, subtiliter transversim rugato, ad basin utrinque foveato et bisulcato (sulco interiori profundo elongato, exteriori brevi obscuro), latitudine majori ante medium posita, lateribus postice haud sinuatis, angulis posticis valde obtusis vix rotundatis; elytris fortiter striatis, striis postice haud minus profundis, 5 in medio minus profunda, 6^a 7^a que antice subobsoletis; prosterno ad latera fortiter rugato; tarsis posticis externe sulcatis. [Long. 6, lat. 2½ lines.

The decidedly bright blue iridescence of the elytra seems to be a good character for this insect. *R. cyathodera*, Chaud., is said to be "subiridescent" only, and besides it is a considerably larger

insect, and is stated to have its elytra striated as *R. liopleura*, whereas the elytra of the present species are striated very differently, the enfeeblement of the striæ 5-7 being limited to the anterior part, so that in more than the apical $\frac{1}{3}$ part of the elytra the striation is nearly regular and even. *R. sulcatipes*, Blackb., has the slightest suspicion of iridescence, but it also differs *inter alia* in much larger size and in the very much more extensive enfeeblement of the 5th-7th elytral striæ. I notice that in this species the strigosity of the prosternal episterna is exceptionally strong, and is even extended a little on the middle part of the prosternum.

Victoria.

RHYTISTERNUS CARDWELLENSIS, sp.nov.

Subdepressus; minus parallelus; nitidus; niger, vix iridescens
antennis palpis tibiis ad basin summani tarsisque rufescentibus;
prothorace leviter transverso, postice quam antice multo
angustiori, antice parum emarginato, canaliculato, trans-
versim subobsolete rugato, ad basin utrinque foveato et
bisulcato (sulco interiori modice elongato exteriori brevi
obsuro), latitudine majori paullo ante medium posita,
lateribus antice fortiter rotundatis postice fortiter sinuatis,
angulis posticis valde obtusis nullo modo rotundatis; elytris
fortiter striatis, striis postice haud minus profundis, 5^a leviter
nec obsolete impressa, 6^a subobsoleta, 7^a vix impressa,
omnibus postice sat fortiter impressis; prosterno ad latera
minus fortiter rugato; tarsis posticis externe vix manifeste
sulcatis. [Long. $6\frac{1}{2}$, lat. $2\frac{1}{2}$ lines.

This species is distinguished from nearly all its described congeners by its prothorax being much narrower across the base than across its front margin, and the sides of the same being quite strongly sinuate in their hinder part. It is perhaps nearest to *R. puella*, Chaud., but in that species *inter alia* the hind angles of the prothorax are said to be right angles.

N. Queensland; Cardwell; in the collection of C. French, Esq.

MICROFERONIA ADELAIDÆ, Blackb.

The minute *Carabid* which I described under this name seems to have been wrongly referred by me to the *Feronini*, as I find that it has not the oblique sulcus traversing the elytral epipleuræ which appears to be an essential character of that sub-family. Removed from the *Feronini* it must find its place, I think, among the *Anchomenini*, and is probably related to *Lestignathus* and *Lacordairia*, though it has not much superficial resemblance to either of them.

LOXANDRUS.

The most salient character of this genus seems to consist in the 3rd interstice of the elytra having only a single puncture, and that placed slightly in front of the middle of the elytra; further characters may be found (at least for the Australian species) in the total absence of the abbreviated basal stria of the elytra, and the exceptionally conspicuous puncturation of the ventral segments, which are not transversely sulcate. I am unable to regard the presence or absence of wings as an essential character (the Baron de Chandoir, I observe, associates winged and apterous species in *Leptopodus*), as I have before me an apterous insect which presents all the above characters, and seems to have no structural difference whatever from winged examples of the genus, except the absence of wings.

There is a generally distributed species of this genus of which I have examples (apparently quite incapable *inter se* of specific separation), from very widely divided localities, and which I believe to have been described by the Count de Castelnau and Sir W. Macleay as *Pœcilus iridescens*, Cast., and *Pœcilus subiridescens*, Macl. It is a small insect (long. 4-4½ lines) of extremely brilliant iridescence, with the parts of the mouth, the antennæ and the legs more or less reddish or reddish-brown, with the prothorax (by measurement) very slightly transverse, punctulate behind, somewhat quadrate, its greatest width about the middle, its sides slightly arched, its hind angles roundly obtuse, and its

front distinctly margined all across, and with the striæ of its elytra strong and distinctly punctulate and their interstices somewhat convex; it is winged, and has rather prominent eyes.

Besides this species, the Baron de Chaudoir places in *Loxandrus* the following three:—*Pœcilus rufilabris*, Cast., (from Queensland), which is described as an iridescent insect, larger than *iridescens* (long. 5 lines), with reddish-brown labrum and palpi, black legs and brown tarsi, prothorax wider in front than behind (where it is punctulate), and elytral striæ strongly punctulate; *Pœcilus gaganinus*, Cast., (from Tasmania), described as a small species (long. $3\frac{2}{3}$ lines), entirely black; and *Pœcilus atrovitens*, MacL., (from Queensland), which is briefly characterised as a little smaller than *subiridescens*, with the impressions on the head feebler than in that species, the elytral interstices less convex, and the surface almost devoid of iridescence. I have not seen any species that I can identify with the three just named.

LOXANDRUS LEVICOLLIS, sp. nov.

Alatus; sat elongato-ovalis; nitidus; niger, vix cyaneo-iridescens, capite antice palpis antennis tarsisque rufescentibus; oculis sat fortiter prominulis; prothorace haud punctulato, quam longiori plus quam tertia parte latiori, tenuiter canaliculato, utrinque ad basin sulco elongato longitudinali impresso, antice late leviter emarginato, margine antico quam postico paullo latiori, latitudine majori sat longe ante medium posita, lateribus modice arcuatis, angulis posticis obtusis vix rotundatis; elytris punctulato-striatis, striis latera versus minus profundis, stria abbreviata scutellari nulla, interstitiis sat planis (3° ante medium punctura ornato).

[Long. $4\frac{1}{5}$, lat. $1\frac{4}{5}$ lines.

Probably near *L. rufilabris*, Cast., but with the prothorax entirely devoid of puncturation (except the two marginal punctures). Compared with the species mentioned above, as probably *L. iridescens*, Cast., this insect *inter alia* has a more transverse prothorax, wider towards the front and with the

margin running along the front, obsolete in the middle, the striæ of the elytra narrower, but much more conspicuously punctured, the interstices considerably less convex, and the eyes more prominent.

S. Australia ; near Morgan.

LOXANDRUS MICANS, sp.nov.

Apterus ; sat elongatus ; nitidus ; niger, cyaneo-iridescens, capite antice palpis antennis tarsisque picescentibus ; oculis parum prominulis ; prothorace postice sparsissime punctulato leviter transverso, tenuiter canaliculato, utrinque ad basin sulco elongato longitudinali impresso, antice modice emarginato (angulis anticis manifeste prominulis), hic quam ad basin sat angustiori, latitudine majori paullo ante medium posita, lateribus modice arcuatis, angulis posticis rotundato-obtusis ; elytris striatis, striis 1-6 antice punctulatis, stria abbreviata scutellari nulla ; interstitiis vix convexis (3° ante medium punctura ornato). [Long. 6, lat. 2½ lines.

Very distinct by the absence of wings, as well as by its size notably surpassing that of the previously described Australian *Loxandri*. The prothorax is distinctly margined all across its front ; the punctures at its base are very few, but well defined.

Victoria ; in the collection of C. French, Esq.

TRECHIDES.

TRECHUS.

I have recently examined the types of the species of *Trechus* from Gayndah described by Sir W. Macleay and which are in the Australian Museum. I do not feel sure that any of them are true *Trechi*. *T. rufilabris* is a singular insect, for which I do not feel prepared to suggest a place. *T. atriceps* appears to be a *Thenarotes*, and *T. ater* a ♀ *Lecanomerus*. *T. concolor* may be a *Trechus* ; unfortunately it is a unique ♀.

BEMBIDIIDES.

BEMBIDIUM.

I have recently made an examination of the Australian types described by Sir W. Macleay as belonging to this genus. I was unfortunately not able to study them sufficiently at leisure to enable me satisfactorily to characterise new generic forms among them, which would, I think, be necessary in treating them properly; but as Sir W. Macleay in describing them intimated that he referred them to *Bembidium* only in a general sense, I think that I can furnish some notes on them which may prove useful pending a more exhaustive treatment of the subject.

One of them, *B. transversicolle*, appears to me to be a small *Harpalid* very close to my *Notophilus latus* (of which, however, I had not a specimen with me for comparison). The unique type in the Australian Museum is unfortunately in very bad condition, so that I fear it will be hardly capable of satisfactory examination.

The other species are all, I think, rightly referred to *Bembidium* (using the name in a very general sense). I should say, however, that *B. gayatinum* and *flavipes* might properly be referred to a new genus, *bipartitum* to another new genus and *brunnipenne* to still another.

The following appear to be typical *Bembidia*, viz., *bipustulatum*, *amplipenne* and *subviride*.

The rest of the species are, I think, congeneric with *Tachys Flindersi*, Blackb., and other species which I have referred provisionally to *Tachys* as presenting in general the structural characters of that genus, while at the same time their superficial resemblance to typical *Bembidia* suggests the probability that eventually they may receive a distinct generic name.

BEMBIDIUM OCELLATUM, Blackb.

This species is identical with *B. subviride*, Macl., of which it must in future be regarded as a synonym. The rest of the species described by Sir W. Macleay as *Bembidia* are distinct from all I have described unless my *Notophilus latus* should be identified with *Bembidium transversicolle*, Macl.

PALPICORNES.

HYDROBATICUS TRISTIS, Macl.

An examination of the type of this species shows that it differs from *H. australis*, Blackb., in having the interstices of the elytra evidently convex behind, the alternate interstices slightly more so than the others, and the commencement of the posterior declivity a little marked, not quite evenly continuing the general surface.

HYDROBATICUS LURIDUS, Macl.

I have inspected the type of this insect and have no doubt of its being a variety of *H. tristis*. In his description Sir W. Macleay says that it differs from that species only by its smaller size and pale lurid colouring. I have found a very similar variation in *H. australis*.

LAMELLICORNES.

DIPHUCEPHALA SPRETA, sp.nov.

Viridis, capite postice prothoraceque aureo-micantibus, antennis (clava picea excepta) pedibusque rufis, tarsis apice picescentibus; pilis supra brevibus fulvis subtus elongatis albidis vestita; clypeo (maris) antice profunde arcuatim exciso, angulis anticis divergentibus; capite crebre ruguloso; prothorace crebre fortiter vix profunde punctulato late leviter canaliculato, sulcis transversis sat profundis sulcum dorsalem haud attingentibus, lateribus in medio angulatis, angulis posticis acute rectis; elytris sat fortiter transversim rugulosis obsolete 2-costatis; tibiis anticis ad apicem extus 2-dentatis.

[Long. 5, lat. $2\frac{1}{5}$ lines.

A large and handsome species; the only one yet recorded, I think, from W. Australia with red legs.

W. Australia; in the collection of C. French, Esq.

LIPARETRUS MAURUS, sp.nov.

Ovalis; minus nitidus; piceo-niger, antennarum stipite rufo, pedibus picescentibus; prothorace (basi excepta) setis erectis

nigris fimbriato, corpore subtus cinereo-pubescenti; capite confertim minus fortiter prothorace magis fortiter nec crebre, elytris sat fortiter subseriatim, propygidio subtiliter nec crebre, pygidio fere ut prothorax, punctulatis; clypeo antice manifeste arcuatim emarginato; fronte late longitudinaliter concavo; prothorace postice obsolete canaliculato; elytris sat fortiter geminato-striatis; tibiis anticis extus obtuse 3-dentatis; tarsis validis, posticorum articulis basalibus 2 sat æqualibus; antennis 9-articulatis.

[Long. $3\frac{1}{2}$, lat. $1\frac{1}{5}$ lines.

This species is closely allied to *L. concolor*, Er., and *L. collaris*, Macl. The latter differs from it *inter alia* by its brownish elytra and more densely frilled prothorax with finer puncturation. *L. concolor* is a shorter and more ovate species with the prothoracic channel entire or nearly so, the prothoracic puncturation much coarser, the propygidium much more strongly punctulate, the basal joint of the hind tarsi very evidently shorter than the 2nd joint, &c. I suspect that the specimens from N. S. Wales which Sir W. Macleay referred to *L. concolor* were examples of the insect I am describing.

N. S. Wales; Blue Mountains.

LIPARETRUS LUGENS, sp. nov.

Late ovalis; subnitidus; piceo-niger, antennis palpis elytris tibiis tarsisque obscure rufescentibus; prothorace basi excepta setis erectis brunneis fimbriato, corpore subtus cinereo-pubescenti; capite confertim minus fortiter, prothorace fortiter rugulose confluentem (fere ut *L. salebrosi*, Macl.), elytris sat fortiter nec rugulose nec confertim, propygidio vix fortiter vix crebre, pygidio sat fortiter vix crebre, punctulatis; prothorace vix manifeste canaliculato; elytris obsolete geminato-striatis; tibiis anticis extus fortiter tridentatis; tarsorum posticorum articulo 2^o quam 1^{us} fere dimidio longiori.

Maris clypeo antice lato reflexo-emarginato, angulis anticis extrorsum acute prominentibus; fronte longitudinaliter

obtuse bicarinata; tarsorum anticorum articulo primo intus dilatato.

Feminae clypeo antice minus lato leviter reflexo-emarginato, angulis anticis sat acutis; fronte obtuse minus fortiter bicarinata. [Long. 4, lat. $2\frac{2}{5}$ lines.

This species belongs to the first section (Sir W. Macleay's arrangement) of *Liparetrus*, and is not very closely allied to any previously described species.

N. S. Wales; taken by Mr. T. G. Sloane near Albury.

LIPARETRUS ADELAIDÆ, sp. nov.

Ovalis; sat elongatus; subnitidus; niger, palpis antennis (clava excepta) elytris (basi anguste nigra et nonnullis exemplis lateribus infuscatis exceptis) pedibusque rufis; supra pilis erectis pallide brunneis sat dense vestitus, corpore subtus pygidio propygidioque dense cinereo-hirsutis; capite prothorace pygidio propygidioque confertim sat fortiter subrugulose, elytris fortiter minus crebre, punctulatis; prothorace leviter vel vix manifeste canaliculato; elytris sat distincte geminato-striatis; tibiis anticis extus 3-dentatis; tarsorum posticorum articulo 2° quam 1^{us} dimidio longiori.

Maris clypeo antice minus lato, fortiter reflexo-emarginato, pone apicem angustato, angulis anticis extus sat acute productis; tarsorum anticorum articulo basali intus anguste elongato.

Feminae clypeo antice angustato subtruncato, vix emarginato.

[Long. $4-4\frac{3}{4}$, lat. $2\frac{2}{5}-2\frac{3}{5}$ lines.

According to description this species must be very near the Queensland *L. fulvohirtus*, Macl., but is very much larger. The late Sir W. Macleay compared an example with the type of his species and reported it "quite distinct."

S. Australia; near Adelaide.

SCITON, gen. nov.

Generi *Anodontonyxi* affinis; labri anguli nullo modo prominuli; palpi maxillares crassi, articulo apicali breviter ovali quam

secundus vix longiori, quam tertius vix dimidio longiori (quam latiori vix duplo longiori); clypeus (speciei typicæ) antice abrupte truncatus. Antennæ magis elongatæ (speciei typicæ 9-articulatæ).

Anodontonyx, Shp., must be very near *Colobostoma*, Blanch., differing *inter alia* by the number of joints in the antennæ. The latter is also no doubt near *Sciton*, but *inter alia* its maxillary palpi have their apical joint "oblongus" and the clypeus is "rotundatus."

Having only a single example I have been unable to dissect the parts of the mouth.

SCITON RUBER, sp.nov.

Sat elongatus; minus nitidus; subparallelus; totus ruber nisi tibiis obscurioribus, antennis palpisque dilutioribus; supra glaber subvelutinus; sternis pilis suberectis subtilibus sparsim inconspicue vestitis; segmentis ventralibus pedibusque setis sat robustis instructis; clypeo obscure ruguloso, antice late abrupte truncato, lateribus fortiter sinuatis ante oculos haud dilatatis; capite postice prothoraceque vix manifeste punctulatis; hoc quam longiori fere duplo (postice quam antice paullo minus) latiori, antice late marginato, supra æquali, lateribus leviter arcuatis, margine antico sat profunde bisinuatum emarginato, basi bisinuata, angulis anticis acutis modice productis posticis rotundatis (superne visis suberectis); elytris sparsim leviter punctulatis, perspicue striatis, interstitiis alternis quam cetera latioribus; pygidio nitido, longitudinaliter sulcato, subtiliter sat crebre punctulato; propygidio (hoc ab elytris haud plane oblecto) pubescenti; corpore subtus sat nitido; sternis sat crebre subfortiter punctulatis; segmentis ventralibus sparsius subtiliter punctulatis et transversim punctorum majorum setiferorum seriebus instructis; coxis posticis quam metasternum parum brevioribus; femoribus latis; tibiis anticis extus fortiter 3-dentatis; unguiculis simplicibus; antennis 9-articulatis, stipite quam clava duplo longiori, hujus laminis 3 subæqualibus.

S. Australia.

[Long. 8, lat. 4 lines.

COLPOCHILA CAMPESTRIS, sp.nov.

Ovata; sat brevis; rubro-ferruginea, vix iridescens, capite prothoraceque obscurioribus; pectore valde hirsuto; abdomine setoso; capite confertim rugulose confluentem nec crasse, prothorace (hoc subvelutino) pygidioque (hoc haud carinato), elytris (his geminato-striatis) obscure, punctulatis; antennis 9-articulatis; tarsorum posteriorum articulo 2° quam basalis manifeste longiori.

Maris (exempli typici) antennis carentibus; pygidio apice late sinuato-truncato.

Feminae antennarum clava 5-articulata, hujus articulo 2° quam 3° (et basali quam ille) quarta parte breviori; pygidio valde gibboso apice minus late truncato. [Long. $11\frac{1}{2}$, lat. 6 lines.

Very near the S. Australian *C. fortis*, Blackb., from which it differs by its darker colour, somewhat broader and more robust build, less distinctly punctured elytra, and the antennal characters. In the female the basal joint of the club is not much more than half as long as the third joint, and the second joint is about intermediate in length between the first and third, whereas in *C. fortis* (female) the basal joint of the club is scarcely shorter than the second, and the second is scarcely shorter than the third. The pygidium also in *C. campestris* (female) is very much more gibbous than in *C. fortis*. In the male the pygidium is much more widely and less straightly truncate at the apex than in the male of *C. fortis*, and no doubt the antennal characters are different. From *C. gigantea*, Burm., the five-jointed (in the female and no doubt in the male also) flabellum of the antennae distinguishes the present insect. In *C. dubia*, Blackb., the antennae (female) are much like those of *C. campestris*,—the 2nd joint of the flabellum, however, being markedly less abbreviated,—but the species *inter alia* is considerably more strongly punctulate, more nitid and more elongate. The other species of this group of *Colpochila* (large insects having a sharply defined lateral prothoracic gutter set with long soft hairs) differ still more widely. In

my tabulation of *Colpochila* (P.L.S.N.S.W., 1890, pp. 520-2) this species falls under "FF" on p. 521 with *C. fortis*.

W. Australia; near Yilgarn; sent by C. French, Esq.

FRENCHELLA, gen.nov.

Labium planum; palporum labialium articulus ultimus elongato-ovalis; maxillæ 5-dentatæ; palporum maxillarium articulus ultimus quam penultimus duplo longior; labrum minus crassum, angulis fortiter prominulis; antennæ 9-(vel. 8?) articulatae, clava 3-articulata quam stipes paullo breviori; pectus setis elongatis sparsim vestitum; tibiæ posticæ (ut *Colpochilæ*) apicem versus fortiter dilatatæ; tarsi modice elongati; unguiculi simplices; elytra nullo modo geminato-striata.

I am unable to specify any character to separate this genus from *Colpochila* (regarded as including *Haplonycha*) except the absence of any approach to a geminate arrangement of the striæ on the elytra. Nevertheless the facies is quite different, approaching that of *Heteronyx*, and I do not think the species described below could with any propriety be referred to *Colpochila*. I do not find any distinctive sexual characters among the examples before me. The genus *Homolotropus*, Macl., differs from this *inter alia* by its geminate-striate elytra, *Platydesmus*, Macl., by its depressed form, greatly developed antennal club, &c., *Colobostoma* by the apical joint of its labial palpi being "crassus." It is most probable that *Haplonycha striatella*, Blanch., *obscuricornis*, Blanch., and *rugosa*, Burm., should be placed in this genus, which I have named after C. French, Esq., the Victorian Colonial Entomologist.

FRENCHELLA LUBRICA, sp.nov.

Ovalis; convexa; pernitida; supra glabra, ad latera fulvo-ciliata; subtus capillis fulvis elongatis minus dense vestita; piceo-nigra, capite prothoraceque vix rufescentibus antennis palpis et tarsorum apice rufis; capite confertim æqualiter rugulose punctulato, clypeo reflexo antice rotundato-truncato, sutura clypeali distincta angulata; prothorace quam longiori

plus quam dimidio latiori, fere ut caput sed paullo sparsius punctulato, linea mediana lævi, basi bisinuata quam apex (hoc modice emarginato) dimidio latiori, lateribus postice fortiter rotundatis antice sinuatis, angulis anticis acutis, posticis obtusis; elytris crebre sat crasse punctulatis, transversim rugulosis, leviter regulariter striatis, striis apicem versus obsolete; tibiis anticis extus 3-dentatis; antennis 9-articulatis; pygidio crasse ruguloso, longitudinaliter carinato.

[Long. $6\frac{1}{2}$, lat. $3\frac{2}{5}$ lines.

Of the three species mentioned above as probably belonging to this genus the descriptions are very brief, but they all seem distinct from this species; *striatella* is called "tota ferruginea," *obscuricornis* has the club of the antennæ blackish and the elytra iridescent, while *rugosa* is said to be dark brown with the elytra paler. The uppermost tooth on the front tibiæ of this insect is small but well defined, and is directed almost straight forward.

Victoria; Swan Hill; taken by C. French, Esq.

OCNODUS LUGUBRIS, sp. nov.

Piceus, antennis palpis pedibusque rufescentibus; capite prothoraceque crebre, elytris minus crebre, pygidio sparsim, fortiter punctulatis; puncturis in fundo plus minusve pallidis vix manifeste setigeris (? exemplo typico abraso); elytris vix perspicue 3-costatis; clypeo antice late rotundato; tibiis anticis extus obtuse 3-dentatis. [Long. $4\frac{1}{2}$, lat. 2 lines.

The puncturation of the elytra (which tends a little to run in rows) and of the pygidium is decidedly coarse, that of the head and prothorax less so, but conspicuously closer. On the elytra the sutural stria is fairly well-marked, and there is no trace of other striæ, but an indication from a certain point of view of three scarcely distinct costæ. The pygidium is strongly fringed with longish fulvous hairs. The prothorax is decidedly more than half again as wide as long, strongly convex and even above, the sides very gently arched, the front (which is very strongly bisinuate, with sharp angles) very little narrower than the base, the hind angles obtuse and somewhat rounded, the base bisinuate

rounded hindward (the middle part a good deal produced hindward, but hardly distinctly lobed). The interstices of the punctures on the elytra are scarcely rugulose. The scutellum is moderate in size, and strongly transverse.

W. Australia, Roebuck Bay; sent by C. French, Esq.

HETERONYX MERUS, sp.nov.

Modice elongatus; minus convexus; postice vix dilatatus; sat nitidus; ferrugineus; fere glaber, capillis fulvis sparsim fimbriatus; clypeo confertim crasse rugulose, capite postice crasse minus crebre, prothorace sparsim acervatim minus fortiter, elytris sat fortiter nec crebre sublineatim, pygidio sparsim fortiter, punctulatis; clypeo brevi lato ante oculos extrorsum fortiter producto, antice obsolete angulatim late emarginato; prothorace quam longiori fere duplo latiori, postice quam antice plus quam dimidio latiori, lateribus leviter arcuatis, basi vix bisinuata, angulis anticis sat acutis sat productis, posticis bene determinatis obtusis fere rectis; elytris hic illic obscure striatis, setis inconspicuis fulvis sparsim ornatis; tibiis anticis extus valde 3-dentatis; labro a clypeo obtecto; antennis 9-articulatis; coxis posticis ad latera quam metasternum sat brevioribus quam segmentum ventrale secundum sat longioribus; unguiculis bifidis.

[Long. $4\frac{1}{5}$ - $5\frac{1}{5}$, lat. $2\frac{2}{5}$ - $3\frac{1}{2}$ lines.

I have not seen any other *Heteronyx* very close to this one, which possesses several characters unusual in the genus, especially the clusters of punctures thinly scattered over the prothorax and the peculiar sculpture of the elytra consisting in fairly defined rows of punctures (here and there appearing in a certain light to run in striæ for snort distances) separated by wide intervals on which are here and there little groups of punctures similar to those of the rows.

N. Queensland; sent by C. French, Esq.

HETERONYX ARCANUS, sp.nov.

Modice elongatus; sat convexus; postice vix dilatatus; sat nitidus; rufo-piceus, antennis palpisque testaceis; capillis

fulvis minus sparsim vestitus; capite crasse rugulose crebre, prothorace crassissime sat sparsim, elytris crebre crasse squamose, pygidio subcrebre minus fortiter, punctulatis; clypeo brevi lato ante oculos minus fortiter extrorsum producto, antice late rotundato; prothorace quam longiori (et postice quam antice) plus quam dimidio latiori, lateribus leviter arcuatis, basi bisinuata, angulis anticis sat acutis sat productis, posticis rectis; elytris haud striatis, pustulis inconspicuis setas erectas ferentibus instructis; tibiis anticis extus sat fortiter 3-dentatis; labro a clypeo obtecto; antennis 9-articulatis; coxis posticis ad latera quam metasternum multo brevioribus, quam segmentum ventrale secundum paullo longioribus; unguiculis bifidis.

[Long. $4\frac{1}{2}$ - $5\frac{1}{2}$, lat. $2\frac{1}{2}$ -3 lines.

N. Queensland; sent by C. French, Esq.

HETERONYX PROTERVUS, sp. nov.

Modice elongatus; sat convexus; postice minus dilatatus; sat nitidus; ferrugineus, antennarum clava testacea; pilis erectis fulvis sparsim vestitus; clypeo crebre fortiter rugulose, capite postice crebre fortiter nec rugulose, prothorace inæqualiter sparsius sat fortiter, elytris crasse vix squamose vix crebre, pygidio sparsim sat fortiter, punctulatis; clypeo brevi lato ante oculos extrorsum fortiter producto, antice rotundato (vix sinuatim); prothorace quam longiori (et postice quam antice) plus quam dimidio latiori, lateribus vix arcuatis, basi leviter bisinuata, angulis anticis leviter productis sat acutis, posticis subrectis; elytris nullo modo striatis; tibiis anticis extus sat fortiter 3-dentatis; labro a clypeo obtecto; antennis 9-articulatis; coxis posticis ad latera quam metasternum sat brevioribus quam segmentum ventrale secundum sat longioribus; unguiculis bifidis.

[Long. $4\frac{1}{2}$ -5, lat. 3 lines.

N. Queensland; sent by C. French, Esq.

N.B.—Since the publication of my tabulation of the 1st section of *Heteronyx* (P.L.S.N.S.W., 1888, pp. 1329-1331) several additional species have come before me belonging to that section and

forming a group distinguished by the combination of 9-jointed antennæ, comparatively short hind coxæ, and very strongly bifid claws. This little group seems to be confined to Northern Australia, and occupies in my tabulation (*loc. cit.*) lines 10-21 on p. 1331. I propose now to substitute the following for the contents of lines 13-21 in order to include the additional species, but I regret that I must drop *H. corpulentus*, Macl., out of this revised table, as I have not an example of the insect before me; at the time of my drawing up the original table I had a type lent me by Sir W. Macleay and since returned. From memory and description, however, I think it is distinguishable from all the species included in the following table by the character referred to in its name—viz., its short broad form; it is certainly not identical with any of them.

- G. Front outline of clypeus not evenly rounded (*i.e.*, more or less truncate or sinuous).
- H. Elytra evenly punctulate.
- I. Uppermost tooth on margin of front tibiæ well defined..... *protervus*, Blackb.
- II. Uppermost tooth on front tibiæ almost obsolete. *breviceps*, Blackb.
- HH. Elytral punctures subseriate and with unpunctured spaces of various area.....
- I. Clypeus much more closely punctured than forehead; size moderate..... *merus*, Blackb.
- II. Head somewhat evenly punctured; size very large..... *piceo-niger*, Macl.
- GG. Front outline of clypeus quite evenly rounded.
- H. Punctures of prothorax excessively coarse..... *arcanus*, Blackb.
- HH. Punctures of prothorax very much finer..... *rugosipennis*, Macl.

HAPLOPSIS VIRIDIS, sp.nov.

Breviter ovata; supra fulvo-, subtus griseo-, pilosa; minus nitida; læte viridis, corpore subtus (et nonnullis exemplis elytris) obscuriori; capite prothoraceque sat crebre granulatis; hoc fortiter transverso, antice angustato, lateribus leviter arcuatis, angulis anticis fortiter productis posticis obtusis; elytris obscure rugulosis, 5-lineatim (plus minusve distincte) longitudinaliter convexis, lineis glabris vix rugulosis; tarsorum posticorum articulo 1° quam 2^{us} fere duplo breviori.

Maris clypeo latissime quadratim producto antice late leviter emarginato antennarum clava elongata, tibiis anticis externe leviter 3-dentatis.

Feminae clypeo antice angustato vix emarginato, antennarum clava brevi, tibiis anticis externe fortiter 3-dentatis.

[Long. 3-3 $\frac{3}{4}$, lat. 1 $\frac{4}{5}$ -2 lines

N. S. Wales and Victoria.

BYRRHOMORPHA, gen.nov.

Generi *Heteronyxi* affinis; mentum concavum; palporum labialium articulus apicalis piriformis; maxillæ 5-dentatæ; palporum maxillarum articulus ultimus quam penultimus plus quam duplo longior; labrum permagnum supra clypeum sursum productum; antennæ breves, 9-articulatæ, clava brevi 3-articulata; tibiæ posticæ minus breves apice modice dilatatæ; tarsi modici; unguiculi simplices; corpus valde crassum, crasse sculpturatum; elytra sulcatis sulcis subgeminatis.

The species of this genus to a casual glance present somewhat the appearance of *Byrrhus*; this peculiar build in combination with a labrum strongly elevated above the clypeus (giving the front of the head strongly the trilobed appearance characteristic of certain species of *Heteronyx*) and simple claws will, I think, distinguish the genus from all its allies. The mentum and labrum are so related to each other that from a certain point of view they appear to form a continuous surface which is deeply

concave longitudinally. I do not notice any sexual distinctions except that the antennal club seems a little elongated in the examples I take to be males.

BYRRHOMORPHA VERRES, sp.nov.

Breviter ovalis; valde convexa; nitida; fere glabra; atra, tarsis scutelloque vix rufescentibus, antennis palpisque rufotestaceis; capite confertim crasse rugulose, prothorace confertim rugulose minus crasse, elytris crasse inæqualiter minus crebre, pygidio subtiliter confertissime aspere, punctulatis; clypeo antice sat fortiter emarginato ad labrum recipiendum, ante oculos leviter extrorsum dilatato; prothorace quam longiori (et postice quam antice) vix tertia parte latiori vix manifeste canaliculato lateribus leviter arcuatis; basi valde retrorsum dilatata, margine antico fortiter arcuatim emarginato, angulis anticis acutis fortiter productis, posticis rotundato-obtusis (superne visis rectis et extrorsum subproductis); scutello magno antice punctulato; elytris inæqualiter sulcatis, interstitiis sat latis fortiter inæqualiter transversim rugulosis, alternis quam cetera irregulariter latioribus; tibiis anticis extus 3-dentatis, dentibus inferioribus magnis acutis, tertio parvo; coxis posticis quam segmentum ventrale secundum vix longioribus; corpore subtus pernitido fortiter minus crebre punctulato. [Long. 5, lat. 3 lines (vix).

Viewed from the side the labrum presents somewhat the appearance of a small upturned horn or tusk. The sculpture of the elytra is different from that of any of the allied genera. The elytra cannot, I think, be regarded as genuinely geminate-striate, and I should place the genus among those with the elytra *simply* striate; but nevertheless the irregularity in width of the interstices (which might be called uneven costæ) brings some of the sulci somewhat into pairs,—but this arrangement is rendered still more irregular by some of the wider interstices being in places split apart by uneven furrows that traverse them; moreover the distinctness of this arrangement varies in different examples.

S. Australia; Port Lincoln and elsewhere.

BYRRHOMORPHA PONDEROSA, sp.nov.

Præcedenti valde affinis; multo major; prothorace quam longiori (et postice quam antice) fere duplo latiori, angulis posticis subrectis (superne visis acutis et fortiter extrorsum retrorsumque directis); elytris minus fortiter sulcatis.

[Long. 6, lat. $3\frac{3}{4}$ lines.

W. Australia; Yilgarn; sent by C. French, Esq.

PSEUDOHETERONYX.

Heteronyxi affinis sed apterus; elytra conglutinata; metasternum breve.

Huic generi *Heteronyx baldiensis*, Blackb., tribuendus est.

PSEUDOHETERONYX HELÆOIDES, sp.nov.

Brevis; fortiter convexus; postice leviter dilatatus; minus nitidus; supra fere glaber pilis erectis fulvis sparsissime vestitus, subtus et in pedibus setis fulvis minus sparsim vestitus; piceo-niger, antennis palpisque rufis, illarum clava testacea; clypeo crebre, capite postice minus crebre, prothorace sparsim, pygidio etiam magis sparsim, leviter sat crasse punctulatis; elytris substriatis et leviter foveato-rugulosis; clypeo antice sinuato-truncato, ante oculos extrorsum vix perspicue producto; prothorace quam longiori fere duplo (postice quam antice haud multo minus) latiori, lateribus a basi antorsum arcuatim convergentibus, basi media sat lobata, angulis anticis modice productis sat acutis, posticis (superne visis) obtusis; tibiis anticis extus obtuse 3-dentatis; labro a clypeo obtecto; antennis 9-articulatis; coxis posticis quam metasternum (hoc brevi) vix brevioribus, quam segmentum ventrale secundum parum longioribus; unguiculis appendiculatis.

[Long. $5\frac{1}{2}$, lat. $3\frac{1}{2}$ lines.

This species bears a remarkable resemblance to a *Helæid* (e.g., *Nyctozoilus*) on a casual glance. The absence of wings is a rare character among the *Melolonthidæ*, and I do not know how it escaped my notice when I was describing *P. baldiensis*; which,

however, is much more like a *Heteronyx* superficially than is *P. helæoides*. The basal joint of the hind tarsi is considerably shorter than (in *P. baldiensis* about equal to) the 2nd joint.

N. Queensland ; a single example sent by C. French, Esq., and generously presented to me.

RHOPÆA SOROR, sp.nov.

Minus elongata ; pubescens, capite prothoracis margine antico sternis (his densissime) pygidio pedibusque longe villosis ; rufescens vel flavo-brunneus ; capite subcrasse, prothorace confertim sat subtiliter, elytris dupliciter (et crebre sat subtiliter et minus crebre magis crasse), punctulatis ; prothorace quam longiori (et postice quam antice) fere duplo latiori, lateribus crenulatis sat fortiter arcuatis, angulis posticis obtusis fere rectis ; elytris singulis apice manifeste rotundatis.

Maris antennarum flabello minus elongato 7-articulato, articulo 3° intus producto.

Feminae antennarum flabello brevi 6-articulato, articulo 4° intus producto ; tarsi posticis brevibus.

[Long. 10-10½, lat. 5½ lines.

Very near *R. heterodactyla*, Germ. ; the principal differences that I notice are as follows :—The flabellum of the antennæ is evidently shorter (in *heterodactyla* male it is by measurement as long as the basal 4 joints of the tarsi together, in this species clearly less), the puncturation is throughout a trifle stronger and less close, the prothorax is more narrowed in front with its sides very evidently more strongly rounded, the elytra (regarded individually) are manifestly more rounded at the apex.

N. S. Wales, near Tamworth ; taken by C. T. Musson, Esq.

RHOPÆA MUSSONI, sp.nov.

Minus elongata ; pilus elongatis sparsim (in capite sternisque sat dense) vestita ; rufescens ; capite sat crebre prothorace minus crebre subfortiter punctulatis, elytris subcrasse rugulosis, pygidio confertim subtilius punctulato ; prothorace

quam longiori dimidio (postice quam antice fere duplo) latiori, lateribus crenulatis modice arcuatis, angulis posticis rectis; elytris singulis obsolete 2-costatis, apice minus rotundatis.

Maris antennarum flabello elongato 6-articulato, hujus articulo primo quam ceteri multo breviori.

Feminae antennarum flabello minus elongato 6-articulato, hujus articulo primo perbrevis. [Long. 9-10, lat. 5-5½ lines.

Differs from all the previously described species of *Rhopaea* by its much coarser sculpture. The antennæ come nearest to those of *R. Verreauxi*, but differ considerably. In *Verreauxi* (male) the 3rd joint of the antennæ is unusually elongate, the 4th is sharply produced in a kind of spine internally and the apical 6 form a very elongate flabellum (all the latter being subequal in length except the 1st, which is a little shorter than the rest). In *Mussoni* the 3rd joint of the antennæ is less elongated, the 4th is scarcely produced internally, and the apical 6 form a flabellum not very much different from that of *Verreauxi* except in the 1st of them being very much shorter. I have not seen a female *Verreauxi* and therefore cannot compare the female of the present species with it.

N. S. Wales, near Narrabri; taken by C. T. Musson, Esq.

ANOMALA AUSTRALASIE, sp. nov.

Oblongo-ovalis; sat convexa; viridis, antennis rufis, pedibus nonnullis exemplis piceis; capite confertim subtilius subrugulose punctulato; prothorace fortiter transverso, subtiliter plus minusve distincte crebre punctulato, antice angustato, angulis posticis rotundato-obtusis; elytris sparsius subtilissime punctulatis, puncturis paullo majoribus sat crebre intermixtis, his hic illic obscure seriatim in striis vix impressis positis; pygidio magis fortiter punctulato; tibiis anticis extus apicem versus bidentatis, et in medio dente subobsoleto armatis.

[Long. 8, lat. 4½ lines.

The only Australian *Anomala* that I can find to have been described is *fuscoviridis*, H. and J., which is omitted from Masters' Catalogue. It is differently coloured from the present

insect, and *inter alia* is said to have its elytra "deeply punctate sulcate."

N. Territory of S. Australia ; also N. Queensland.

MICROVALGUS.

This is an extremely difficult genus to deal with ; it appears to contain numerous Australian species so closely allied *inter se* that it is most difficult to characterise them in such manner as to enable them to be recognised by description. Only three have been named,—*Lapeyrousei*, G. & P., (N.S.W. and Vict.), characterised as a dark brown species, with reddish elytra and tibiæ and underside blackish, and the clypeus perceptibly emarginate ; *nigrinus*, Macl., (Queensland), entirely black with the clypeus rounded in front ; and *castaneipennis*, Macl., (Queensland), having the head and prothorax black and elytra chestnut, and the clypeus truncate in front. Judging by the examples before me, which certainly represent at least several species, the differences in the outline of the clypeus are very slight. The colour as a rule seems somewhat constant. I think I know *M. Lapeyrousei* and *nigrinus* ; if my identification is correct the former is evidently larger than the latter, and the basal joint of its hind tarsi is longer in proportion to the second joint. The following species from Western Australia is evidently distinct from any hitherto described.

MICROVALGUS YILGARNENSIS, sp.nov.

Ferrugineus, elytris ad latera et apicem infuscatis ; albido-squamosus ; prothorace quam longiori vix sexta parte latiori, angulis anticis acutis valde productis fere spiniformibus, posticis obtusis, lateribus leviter arcuatis ; tarsorum posteriorum articulo basali quam secundus plus quam dimidio longiori. [Long. $1\frac{1}{2}$, lat. $\frac{7}{16}$ line.

An exceptionally narrow species, coloured differently from those previously described, and remarkable for the very strongly projecting front angles of the prothorax, which (if the head be in its natural subvertical position) stand out free of the body, and are

conspicuous to the naked eye, looking like two horns. No other species that I have seen approaches this one in this respect.

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

CISTELIDÆ.

APELLATUS MASTERSI, Macl.

I have examined the type of this insect, and have no doubt whatever of its being the female of *A. palpalis*, Macl.

CURCULIONIDÆ (BRACHYDERINÆ).

PRYPNUS (?) SQUAMOSUS, sp. nov.

Oblongus (mas), magis latus (fem.); niger squamis, supra griseis vel albidis (nonnullis fuscis maculatis intermixtis), subtus albidis nonnullis fulvis intermixtis, vestitus; breviter inconspicue fulvo-setosus; rostro capite angustiori longiori, longitudinaliter bisulcato, supra sat fortiter arcuato; oculis sat magnis, modice convexis; antennis modicis, scapo oculorum marginem posticum vix attingenti; prothorace transverso, antice posticeque truncato, crebre tuberculato-ruguloso, canaliculato, margine antico sub oculos ciliato; elytris ad apicem singulatim leviter acuminatis, punctulato-striatis, interstitiis subinæqualibus alternis leviter alternis fortiter convexis, interstitio 3° ad basin antrorsum prominente, humeris reflexis subprominulis, sutura postice cariniformi.

[Long. 5-6, lat. $1\frac{1}{5}$ - $2\frac{2}{11}$ lines.

In freshly coloured examples, the head and rostrum are densely clothed with nearly white scales, in which a few of a pale fuscous colour are intermingled (sometimes in small patches), the rest of the upper surface being densely clothed with scales of an obscure ashen hue, much interrupted by patches of fuscous scales which form on the prothorax an ill-defined central band and some small lateral spots, and on the elytra more or less numerous ill-defined and small spots; the most conspicuous marking is the dark central band of the prothorax; the general aspect is that of a dull ashy-coloured insect, with the head and rostrum almost white, or at any

rate, much and conspicuously paler than the rest of the surface. A very distinct depression divides the rostrum from the head. The rostrum would probably appear tri-carinate if it were abraded. There is a short well-defined longitudinal fovea just above the base of the rostrum. The funicle of the antennæ is slightly longer than the scape. Its basal joint is the longest, except the 2nd, which is half again as long, 3-5 each half as long as 2, and distinctly longer than wide, 6 and 7 somewhat longer. The base of the elytra is considerably wider than the base of the prothorax. The sides of the latter are gently and evenly rounded. The sides of the elytra are somewhat evenly arcuate, very gently in the male, pretty strongly in the female. The metasternum is very short, scarcely longer than the diameter of the middle coxæ, and only about $\frac{2}{3}$ the length of the basal ventral segment. The prothorax is without ocular lobes and the rostral scrobes are linear and curved downward.

I have little doubt but that this species is closely allied to that which Herr Faust has described (Deutsch. Ent. Zeit. xxx. p. 362) as "*Prypnus* (?) *pygmæus*." It differs a little from *Prypnus* in facies, owing to the absence of well-marked tubercles near the apex of the elytra, the dense squamosity of the surface, and the slightly uneven appearance of the elytra which seem to be thickly furnished with slight scarcely defined nodosities; this appearance is caused, I think, by the punctures in the striæ being deep and coarse, so that the scales on the interstices, between each two of these punctures, seem to be slightly protuberant above the scales that fill the punctures themselves. It differs also from *Prypnus* in the presence of a fringe of cilia on the front margin of the prothorax, behind the eye.

N. S. Wales; Blue Mountains.

(OTIORHYNCHINÆ.)

TITINIA.

The group of Australian *Curculionidæ* to which this genus belongs, may be characterised as *Otiorrhynchidæ* having the hind

corbels open, the claws free, and the metasternum evidently longer than it is in *Otiorhynchus* and its immediate allies. They are allied to the European *Phyllobius*. In this group *Titinia* seems to be characterised sufficiently (for distinction from the other genera yet described except *Idaspora*) by the following in combination: prothorax not or scarcely bisinuate at base; scape of antennæ strongly arcuate, reaching when set back well on the prothorax, but not extending to the elytra; funiculus of antennæ 7-jointed, none of its joints transverse; scutellum distinct; femora unarmed; front coxæ contiguous.

Between *Idaspora* and *Titinia* the distinction seems very uncertain. Mr. Pascoe, the author of both genera, at the time he characterised them supplied a tabulation of the differences between them and other genera, in which (E.M.M., 1869) he distinguishes them by the club of the antennæ pedunculate in *Titinia*, sessile in *Idaspora*. A little later, however, he described a species as *Titinia marmorata* (Ann. Nat. Hist. 1872), of the club of whose antennæ he says, "vix pedunculata," at the same time adding a note that *Titinia* can best be separated from *Idaspora* by its rostrum "having no raised lines or costæ bordering the scrobes on each side and continued back nearly to the eyes." A reference to the original diagnoses does not throw much light on the matter, as the only tangible difference I find is that the scrobes are said to approximate above in *Titinia* and not to approximate in *Idaspora*, while a note is added after *Idaspora* to the effect that it differs from *Titinia* in its longer rostrum with the scrobes lateral.

I have a large number of specimens before me which appear to belong to one or other of these two genera, but I cannot make two genera of them. In fact, the distinctness of the raised lines bordering the scrobes varies in the individuals of a species. If, however, the scrobes in *Idaspora* are strictly and entirely lateral, none of the examples in question can be referred to that genus, so I think it will be well to call them all *Titinia*.

I may observe that I believe one of the species before me to be *Merimnetes tenuis*, Germar. It is very common all over S.

Australia and extremely variable both in size and markings. One variety agrees perfectly with Germar's description, except in not being a *Merimnetes*, its claws being free. It is decidedly a *Titinia*, showing no tendency towards the special characters of *Idaspora*. In the descriptions following, the species with the scrobes approximated above are pretty certainly *Titinia*; those with the scrobes less or scarcely approximate seem to hover between the two genera, but I really cannot see any reason for separating them generically.

Among the species before me is one which I am inclined to regard as *Idaspora terrea*, Pasc. It agrees in every respect with the description of that insect except in the scrobes not being truly lateral but cutting to some extent into the upper surface of the rostrum, though much less so than in others which seem to be true *Titinia*. It is extremely like some vars. of what I regard as *Merimnetes tenuis*, Germ., but differs in its scrobes being much less approximate above and the sides of the prothorax very evidently less rounded.

In my collection are examples from Victoria of what I have no doubt is *Merimnetes uniformis*, Boh. It is not unlike a *Titinia*, but may be at once distinguished by its claws soldered together except at the extreme apex.

TITINIA BREVICOLLIS, sp.nov.

Picea; squamis (subtus albidis, supra obscure fuscis his nonnullis aurantiacis maculatim intermixtis) dense vestita, antennis pedibusque obscure ferrugineis; illarum clava fusca; scrobibus supra approximatis; antennarum funiculi articulo basali quam 2^{us} vix longiori, hoc 3° 4° que conjunctis æquali; prothorace fortiter transverso ad basin fere subbisinuato, sparsim manifeste punctulato, basi quam margo apicalis manifeste latiori, lateribus leviter arcuatis; elytris punctulato-striatis. [Long. 1 $\frac{3}{8}$, lat. $\frac{1}{2}$ line.

The prothorax is distinctly more transverse than in any other known to me of the genus. If the species is not variable (my two examples are quite identical), it may be at once distinguished by

the numerous small spots of a golden colour sprinkled over the dark brown of the elytra. The punctures on the prothorax are quite visible in spite of the dense clothing of scales. Probably the derm sculpture of an abraded specimen would appear very different. The antennal club is distinctly pedunculate. The elytra are devoid of distinct erect bristles. The 3rd joint of the antennal funicle is notably longer than the 4th.

W. Australia; taken by E. Meyrick, Esq.

TITINIA LÆTA, sp.nov.

Picea; squamis (subtus albis supra obscure fuscis, his nonnullis albis nonnullis fulvis intermixtis) dense vestita; scrobibus supra approximatis; antennarum funiculi articulo basali quam 2^{us} sat longiori, hoc sequentibus 2 conjunctis subbreviori; prothorace vix transverso, antice tubulato, ad basin fere subbisinuato, sparsim punctulato, basi quam margo apicalis sat latiori, lateribus postice sat fortiter rotundatis; elytris punctulato-striatis. [Long. $1\frac{1}{5}$, lat. $\frac{7}{10}$ line.

On the upper surface the white scales clothe the cheeks, the portion of the rostrum between the scrobes form a ring round the eyes, project as extensions of the white undersurface on the sides of the prothorax, clothe the scutellum and extend backward a little along the suture, and form a spot on each shoulder; while the fulvous scales mingle with the white ones round the eyes, form two narrow lines diverging hindward on the prothorax, and are sprinkled here and there over the elytra; the sides of the latter are irregularly clothed with greyish scales. The antennal club is scarcely pedunculate. The elytra bear some short semi-erect hair-like bristles. The 3rd joint of the antennal funicle is not longer than the 4th.

Victoria; Alpine district; a single specimen.

TITINIA (*Idaspora*?) EREMITA, sp.nov.

Picea; squamis pallide griseis (his supra inter squamas fuscas intermixtis) dense vestita, antennis (clava excepta) tibiis tarsisque obscure ferrugineis; scrobibus parum approximatis;

antennarum funiculi articulo basali quam 2^{us} multo longiori, hoc sequentibus 2 conjunctis manifeste breviori; prothorace quam caput vix latiori, vix transverso, ad basin fere truncato, sparsim punctulato, basi quam margo anticus haud latiori, lateribus vix arcuatis; elytris punctulato-striatis.

[Long. $1\frac{3}{5}$ - $2\frac{1}{2}$, lat. $\frac{3}{5}$ -1 line.

The prothorax having almost straight sides scarcely bulges out in the middle enough to exceed the head in width. The grey scales (which are of a leaden tone) on the upper surface form a continuous stripe down the prothorax, head (where it is at its widest), and rostrum and are more or less conspicuous on (at least the base of) the elytral suture; they also are condensed along the sides of the elytra and form some irregular markings on its general surface, which, however, are little conspicuous except in very fresh examples. The antennal club is feebly pedunculate. The elytra bear short semi-erect stout hairs which seem to be wanting in all but the freshest examples. The 3rd joint of the antennal funicle is slightly longer than the 4th.

S. Australia; basin of Lake Eyre.

TITINIA (Idaspora?) BICOLOR, sp. nov.

Piceo-fusca; squamis (subtus albidis, supra fusco-brunneis) dense vestita, scutello niveo, oculis griseo-circumcinctis; scrobibus parum approximatis; antennarum funiculi articulo basali 2° longitudine æquali, hoc quam 3^{us} multo longiori; prothorace vix transverso, ad basin vix subbisinuato, sparsim obscure punctulato, basi quam margo anticus vix latiori, lateribus sat arcuatis; elytris punctulato-striatis.

[Long. 2-3, lat. $\frac{3}{5}$ - $1\frac{1}{10}$ lines.

The punctures in the prothorax each bear a little seta, like a granule, and a row of granule-like setæ runs down each interstice of the elytra. The white scales on the scutellum are wanting in specimens at all abraded. The whitish scales of the undersurface extend to the underside of the femora, and in some examples to

the extreme lateral margin of the elytra. The antennal club is scarcely pedunculate; the 2nd joint of the funiculus is about as long as the 3rd and 4th together.

S. Australia; basin of Lake Eyre.

The following is a tabulation of distinctions among the species of *Titinia* and *Idaspora* so far as they are known to me. The two species that are not known to me are *T. ignara*, Pasc., and *T. marmorata*, Pasc. The colouring of these is different from that of any species I have seen, but I am afraid colour and markings are very little to be relied upon. *T. ignara*, however, is described as having its prothorax longer than wide, and if this be correct by measurement, that character will separate it from all the following. Of *T. marmorata* the author says that the prothorax is subcylindric, which at once furnishes a distinction from all the species I have seen except *T. eremita*. The latter and *T. marmorata* are from localities so far apart that they seem *unlikely* to be identical, and are very differently marked and coloured,—e.g., *T. marmorata* having 3 fuscous vittæ on its prothorax, which is quite a different style of marking from that of the prothorax of *T. eremita*.

- A. Rostrum very narrow between the scrobes.
- B. Basal joint of the funiculus much longer than 2nd joint.
- C. Prothorax considerably wider at base than at front margin..... *læta*, Blackb.
- CC. Base and front margin of prothorax about equal in width.... *tenuis* (*Merimnetes*), Germ. (?).
- BB. Basal joint of the funiculus about same length as second joint..... *brevicollis*, Blackb.
- AA. Rostrum but little narrowed between the scrobes (*Idaspora*, Pasc.?).
- B. Basal joint of funiculus scarcely or not longer than 2nd joint.

- C. Sides of prothorax strongly rounded
in the middle..... *bicolor*, Blackb.
- CC. Sides of prothorax lightly and evenly
arcuate..... *terrea*, Pasc.?
- BB. Basal joint of funiculus much longer
than 2nd joint..... *eremita*, Blackb.

LEPTOPSINÆ.

ESMELINA.

Mr. Pascoe's reference of this genus to the *Leptopsides* seems to me very much open to criticism. The absence of ocular lobes from the prothorax (not referred to by Mr. Pascoe in his diagnosis) is much more suggestive of the *Brachyderides*, nor are the eyes (although certainly a little more acuminate beneath than those of most *Brachyderides*) very much different from those of some species of *Prypnides* whose place among the *Brachyderides* is not questioned. Mr. Pascoe calls the posterior corbulæ "apertæ," but it seems to me they are rather of the form which M. Lacordaire calls "subcavernosæ." I should incline to refer the genus to the *Brachyderides*, where it seems to me to stand at no great distance from *Dermatodes*, and in some respects to be very near Mr. Pascoe's genus *Styreus*. I may say that I have examined specimens of *E. flavo-vittata*, Pasc., in the Macleay Museum, said to be named on Mr. Pascoe's authority, and have myself taken the same species in the Blue Mountains (the original locality), and as it is an insect with very characteristic and unusual markings on the elytra I do not think there is any possibility of my identification of it being erroneous.

In describing the following new species of *Esmelina* I draw attention to the probability that it may be *Lagostomus australis*, Boisd., (*Lagostomus* was a non-præocc., for which *Dermatodes* was substituted). This is little more than a guess, founded on probability arising from the habitat of my insect and its resemblance to *Dermatodes*. Dr. Boisduval's description consists of eight

words and would fit scores of Australian *Curculionidae*; however, this is one that would fit, and so I have thought it well to give the name *australis* to the present species, judging that if it be not specifically identical with Boisduval's the chances are strong against its being generically identical.

ESMELINA AUSTRALIS (? *Lagostomus australis*, Boisd).

Ovalis; nigro-picea; confertim squamis brunneis albidisque intermixtis vestita, et setulis brevissimis suberectis crebre obsita; antennis subferrugineis; capite prothoraceque crebre punctulatis et rugulosis; hoc supra æquali; elytris seriatim punctulatis, puncturis sat magnis, interstitiis planis.

[Long. $4.4\frac{4}{5}$, lat. $1\frac{3}{5}$ -2 lines.

The male is evidently narrower and smaller than the female. The whole sculpture is completely buried in squamosity except the central carina of the rostrum and the rows of punctures on the elytra. The semi-erect setæ are minute and need looking for. Closely examined the vestiture seems to be a ground of brown scales on which whitish scales are very thickly and evenly sprinkled, but in some lights there appears to be a slight coppery gloss, which is most conspicuous on the head and undersurface. The scales on the middle part of the femora are almost black. The prothorax has no trace whatever of a central carina or furrow, but in some examples there is a very feeble transverse impression near the front margin. It is probable that the elytra of an abraded example would be found to be striated, but in a fresh example the elytral sculpture consists simply of lines of extremely conspicuous (and moderately large) punctures. I regret that I have not a spare specimen from which to remove the scales in order to describe the underlying sculpture more definitely. The rugulosity of the prothorax seems to be somewhat coarse on a small space which I have denuded of scales. Differs from *E. flavo-vittata*, Pasc., chiefly by its colour and markings and by the front of its elytra less strongly reflexed, especially near the shoulder.

N. S. Wales; Blue Mountains.

(AMYCTERINÆ.)

CUBICORHYNCHUS MUSSONI, sp.nov.

Ovalis; confertim piceo-squamosus; piceo-niger, elytris ad latera et pedibus maculatim albido-squamosis; nigro-setosus; cristis in capite sat elongatis retrorsum inclinatis; tuberculis frontalibus nullis; prothorace confertim granuloso; elytris obscure punctulato-striatis, interstitiis planis alternis quam cetera paullo latioribus. [Long. 6, lat. $2\frac{2}{3}$ lines.

A somewhat longer and more oval species than most of its congeners; this character, together with the black colour of its setæ, the very close granulation of its prothorax, and the absence of frontal tubercles will distinguish it. The form of the crests on the head also is peculiar; their external outline evenly continues hindward the external outline of the rostrum almost to the length of half the rostrum. Probably nearest to *C. piceo-setosus*, MacL., which, however, is described as having its prothorax canaliculate down the middle and subtuberculate on the sides. This is the only *Cubicorhynchus* known to me in which the prothorax is not at all canaliculate.

N. S. Wales; taken by C. T. Musson, Esq., F.L.S., near Tamworth

DIALEPTOPUS APPROXIMATUS, sp.nov.

♂ Angustus; nigricans, obscure subvittatim plumbeo-argenteo squamosus, tuberculis pedibusque rufescentibus; rostro quam caput longiori, leviter bicarinato; prothorace apice haud bilobo; elytris prothorace parum latioribus seriatim foveatis, biseriatim tuberculatis, seriei externæ tuberculis 4 magnis conicis internæ 6 vel 7 (anterioribus minoribus), trans processus humerales quam trans prothoracem sat angustioribus; tarsis valde elongatis, posteriorum articulo 2^o quam 1^{us} vix breviori; antennarum scapo quam tarsorum anteriorum articulus 4^{us} vix breviori, funiculi articulis basalibus 2 manifeste elongatis. [Long. 7, lat. $2\frac{1}{5}$ lines.

Near *D. sepidioides*, Pasc., and differing from it by its longer tarsi (the 2nd joint of the hind tarsi scarcely shorter than the 1st), the very much feebler carinæ of the rostrum, and the larger and differently arranged tubercles of the elytra; in the outer row the tubercle nearest the base is much larger than either the 1st or 2nd in the same sex of *sepidioides*, and is placed slightly further back than the 1st is in that species. The apical ventral segment is transversely sulcate near its hinder margin, the sulcation being not very sharply defined and being extended forward a little in the middle.

W. Australia; near York; sent to me by C. French, Esq.

OPETIOPTERYX, gen.nov.

Caput æquale; rostrum breve crassissimum a capite vix distinctum; mentum profunde in cavitate immersum; scrobes antice positæ, ab oculis longe remotæ, leviter arcuatæ; antennarum brevium scapus oculus vix attingens; hic rotundatus sat parvus a prothorace liber; prothorax æqualis antice bisinuatus, postice truncatus, in medio canaliculatus, utrinque leviter arcuatus, lobis ocularibus distinctis; scutellum minutum; elytra æqualia, ovalia, apice singulatim acuminata, humeris haud prominulis; tibiæ sat rectæ, apice (præsertim anteriores 4) introrsum acuminato-dilatatis; tarsi breves sat paralleli, articulis basalibus 3 fortiter transversis subtus tomentosus.

The insect for which I propose this name is one of the most perplexing *Curculionidæ* I have met with; its head and rostrum (including the mouth organs as far as they can be examined without dissection) are extremely like those of *Sclerorhinus*, except that the upper surface of the rostrum is very evidently narrowed forward and is only obsoletely concave longitudinally, and has a very feeble carina down its middle, at the hind end of which is a small fovea, while the scrobes are extremely short, being separated from the eyes by a very long interval, and the scape of the antennæ when laid back scarcely reaches the eyes. The funiculus of the antennæ is scarcely longer than the scape,

and the club is nearly as long as the last 3 joints of the funiculus together. The joints of the funiculus scarcely differ *inter se*, save in the basal joint being a little stouter than the rest. The tarsi are very short and parallel (the 3rd joint scarcely wider than either of the preceding) and are tomentose on their under surface. The metasternum is longer than in most of the *Amycterinæ*, being about as it is in some of the *Cylindrorhininæ*. The basal two ventral segments are elongate, the 3rd and 4th together a trifle shorter than the 2nd, and longer than the 5th. The whole surface is entirely devoid of the tubercles and spines so characteristic of the *Amycterinæ*.

I am in some doubt as to the sub-family in which this remarkable species should be placed. Its very short and extremely robust rostrum, with the mentum deeply sunk in the buccal cavity is so characteristic of an *Amycterid* that I have given that character the preference in determining its place. But the metasternum is certainly inconsistently long, and the tomentosity of the underside of the tarsi (which latter, however, is found in *Melanegis*), and the absence of tubercles, &c., perhaps point to *Bothynorhynchus* as a nearer ally. The latter genus I have not seen, but according to description the present insect could certainly not be referred to it as it differs *inter alia* from *Bothynorhynchus* by the short scape of its antennæ and the strong ocular lobes of its prothorax. It may be observed, however, that *Bothynorhynchus* itself is regarded by Schönherr as being very near the *Amycterinæ*, and is differentiated by Lacordaire only by the tomentosity of the undersurface of the tarsi,—which character loses its value by its presence in *Melanegis* (not known to Lacordaire),—apparently in all other respects a perfectly typical *Amycterid*.

OPETIOPTERYX FRIGIDA, sp.nov.

Ovalis ; picea, squamis pallide viridibus variegata ; his corpus femoraque subtus dense vestientibus, rostrum antice marginantibus, et vittas 2 in prothorace et in elytris maculas basales nonnullas vittamque lateralem marginalem formantibus ; corpore supra sparsim obscure punctulato, puncturis setas

minutas rubras ferentibus; elytris leviter striatis, striis puncturis sat magnis instructis, interstitiis subconvexis.

[Long. $5-5\frac{1}{2}$, lat. $2-2\frac{1}{2}$ lines.

In treating of the genus I have mentioned the characters sufficiently at length to render a further specific description unnecessary.

Victoria; Alpine district; under a stone near the summit of one of the higher mountains.

(RHYPAROSOMINÆ.)

DYSOSTINES GLABER, sp. nov.

Nitidus; glaber (antennis pedibusque setosis exceptis); nigerimus, antennis rufo-picescentibus; maris prothorace quam elytra vix angustiori, his fere a basi retrorsum angustatis; feminae prothorace quam elytra sat angustiori, his late ovalibus; rostro quam ad apicem latiori fere duplo longiori, supra arcuato vix manifeste carinato, dupliciter minus punctulato; capite inter oculos longitudinaliter foveato, dupliciter (postice sat crebre) punctulato; antennarum funiculi articulis basalibus 2 sat elongatis ceteris moniliformibus; prothorace subgloboso, postice quam antice latiori, subtilissime canaliculato, sparsim fortiter punctulato (puncturis nonnullis parvis intermixtis); scutello minuto; elytris fortiter punctulato-striatis, interstitiis sparsim punctulatis, humeris subprominulis lateribus mox pone basin dilatatis; pedibus valde robustis, tibiis anterioribus 4 intus dente magno obtuso armatis et infra denticulatis et ad apicem valde arcuatis (posticis maris intus longe ciliatis), posticis maris ante apicem intus subito angustatis et ad apicem fortiter introrsum curvatis et calcare valido armatis, feminae ad apicem dilatatis; prosterno inter coxas anticatas quam antennarum clava haud angustiori; segmento basali ventrali (maris) late concavo subinaequali, feminae vix concavo subinaequali.

Variat prothorace rufo.

[Long. $3-3\frac{1}{5}$, lat. $1\frac{1}{10}-1\frac{2}{5}$ lines

The male characters vary somewhat in development. In some examples the teeth on the inner side of the tibiæ are much larger than in others. The long cilia on the tibiæ are, I suppose, easily rubbed off, as in some examples they are wanting, while in one male (the other sexual characters of which are very feeble) they are present even on the intermediate tibiæ.

Victoria; this very fine and distinct species is not uncommon under stones at an elevation of about 6000 feet above the sea on the Alpine range.

DYSOSTINES ADVENA, sp.nov.

Subopacus; setis suberectis sparsim vestitus; piceo-niger, antennis coxis femorum basi tibiæ basi apiceque tarsisque plus minusve rufescentibus vel testaceis; supra squamis piceis brunneisque intermixtis confertim vestitus; maris elytris quam prothorax vix latioribus antice sat parallelis apicem versus fortiter angustatis; feminae elytris quam prothorax sat latioribus postice minus angustatis; rostro quam ad apicem latiori sesqui longiori, supra arcuato, confertim punctulato, carinato; prothorace vix transverso, canaliculato (canali sub squamas abdito) pone apicem transversim impresso, vermiculato-ruguloso, postice quam antice vix latiori, lateribus fortiter rotundatis; scutello vix manifesto; elytris leviter striatis, striis puncturis subquadratis sat magnis instructis, interstitiis alternis quam cetera magis elevatis, humeris vix prominulis; pedibus sat robustis, maris tibiis posticis intus angulatim dilatatis; coxis anticis contiguis; maris segmento ventrali basali longitudinaliter concavo, in medio postice transversim prominenti; antennarum funiculi articulis basalibus 2 sat elongatis, ceteris brevibus. [Long. $1\frac{1}{5}$, lat. $\frac{3}{5}$ - $\frac{7}{10}$ line.

In fresh specimens the sculpture is almost entirely concealed by a dense covering of scales. This is an inconspicuous-looking little species; the contiguous front coxæ seem inconsistent with its being a *Dysostines*, but I can find no other structural peculiarity whatever, and in the species originally attributed to the genus by its author

(Mr. Pascoe) the coxæ vary from being "remote" to "approximate." This is the smallest species yet described of the genus. It has a certain superficial resemblance to a very small *Polyphrades*. One of my examples (probably immature) is of a rufo-testaceous colour.

Victoria ; Alpine district.

(CYLINDRORHININÆ.)

CENTYRES SINUATUS, sp. nov.

Ovatus ; piceus, squamis griseis vel silaceis vel cinereis confertim vestitus, antennis plus minusve rufescentibus ; his sat elongatis, scapo prothoracem fere attingenti, funiculi articulis basalibus 2 elongatis (2° quam 1^{us} fere longiori quam 3^{us} fere duplo longiori, ceteris inter se fere æqualibus quam 3^{us} parum brevioribus) ; rostro obsolete longitudinaliter carinato ; prothorace quam longiori fere sesqui latiori, antice quam postice sat angustiori ; vix manifeste canaliculato, obscure ruguloso, lateribus modice rotundatis ; scutello minutissimo ; elytris basi quam prothoracis basis parum latioribus (maris ovalibus quam prothorax parum, feminae ovatis quam prothorax multo, latioribus) subtiliter striatis, striis sat fortiter minus confertim punctulatis (externis postice valde sinuatis), interstitiis leviter convexis, sutura postice sat fortiter carinata ; segmento ventrali 2° quam 3ⁱus parum longiori, maris segmento basali longitudinaliter leviter concavo.

[Long. $3\frac{1}{2}$ -4, lat. $1\frac{1}{5}$ - $1\frac{4}{5}$ lines.

The punctures in the striæ each bear a small scale, as in the previously described species of the genus. The present insect agrees well with Mr. Pascoe's generic diagnosis except that segments 2-4 of the abdomen are not quite exactly equal *inter se*, the 2nd segment being slightly longer than either of the next two, but very much shorter than the two together. The strong sinuation (behind the middle) of some of the elytral striæ (especially the 3rd and 4th) is a very marked character, as also the strongly cariniform elevation of the suture behind. The rostrum is very

little shorter than the prothorax ; its scrobes gradually disappear considerably in front of the eyes. The ocular lobes are feeble and very low down on the sides of the prothorax

Victoria ; Alpine district.

(GONIPTERINÆ.)

GONIPTERUS RUFUS, sp. nov.

Rufus, antennarum clava infuscata, supra squamis minutis pallidis sparsim obscure (subtus sat dense squamulis albidis piliformibus) vestitus ; rostro quam caput vix longiori carinulis nonnullis obscuris longitudinaliter instructo, crebre subtilius rugulose punctulato ; capite inter oculos impresso, quam rostrum paullo magis fortiter punctulato : prothorace subconico fortiter rugulose punctulato ; scutello elongato-triangulari ; elytris æqualiter punctulato-striatis, puncturis sat magnis subquadratis, interstitio 3^o antice fortiter (5^o minus fortiter) tuberculiformi, humeris extrorsum sat prominentibus, tuberculo post humerali valido acuto.

[Long. 4, lat. 2 lines (vix).

The almost uniform red colour of this species will distinguish it from nearly all previously described of the genus ; the legs and front part of the elytra are a trifle brighter than the other parts, and the prothorax is slightly the most obscure part. The puncturation of the elytra scarcely differs from that of *G. suturalis*, Gyll. The post-humeral tubercle is strongly developed and more acute than usual in the genus. As with many of its congeners, the anterior tuberosity of the 3rd and 5th interstices is more marked in some examples than in others. The 5th interstice is more or less feebly callous near the apex. The 3rd joint of the antennæ is something less than twice as long as the 2nd.

I may add that a near ally of this species has been taken in Tasmania by Mr. J. J. Walker, R.N., but this latter appears distinct, having the prothorax evidently less coarsely rugulose, and the post-humeral tubercle shorter and blunter.

Victoria ; Alpine district.

(ATERPINÆ.)

MEDICASTA.

According to Mr. Pascoe's tabulation of genera of *Aterpine* (Journ. L. Soc., 1871), *Medicasta* differs from *Ethemaia* by its parallel-sided tarsi. On reference to the diagnosis of the former no comparison with *Ethemaia* is found there beyond a remark that the two genera are obviously related to each other,—but the eye being covered above by its orbit (mentioned in the diagnosis) is evidently a distinctive character. Some years later Mr. Pascoe published the name of another allied genus,—*Hyphæria*,—which he characterised far too briefly, merely remarking “characters as in *Ethemaia*, but 3rd tarsal joint not bilobed”; and in the description of the species, he says that the sides of the head project slightly over the eye. Hence *Medicasta* and *Hyphæria* must be very close to each other and have not been distinguished *inter se*. There is, therefore, a doubt incapable of determination whether the following species is a *Medicasta* or a *Hyphæria*, but it agrees with the diagnosis of the former, except that the sides of the head are not dilated so as to cover the eyes more than partially; the eyes nevertheless are but little prominent.

MEDICASTA LUGUBRIS, sp. nov.

Oblonga; piceo-nigra; antennarum scapo basi curvato quam funiculus parum breviori, hujus articulo basali sat crasso parum elongato, 2° multo graciliori vix breviori, ceteris paullo brevioribus; rostro quam caput vix breviori huic (oculis exceptis) latitudine fere æquali, quam antennarum scapi longitudo vix angustiori, supra longitudinaliter 4-sulcato, sulcorum interstitiis elevatis (interstitio mediano minus fortiter), carinis ita formatis abrupte ad rostri basin desinentibus; prothorace subcylindrico vix transverso, antice leviter constricto, supra inæquali, crasse nec crebre rugulose punctulato, antice quam postice paullo angustiori, basi bisinnata; elytris leviter striatis, striis sat crasse nec crebre punctulatis,

interstitiis antice convexis, dorso carinis tuberculisque inæquali. [Long. $3\frac{1}{2}$, lat. $1\frac{1}{2}$ lines.

The inequalities on the elytra are very intricate. At the base of the posterior declivity is a large transverse tubercle on each elytron, the two tubercles almost meeting on the suture; the hind face of these tubercles bears some black scales, and from the external end of each tubercle a carina runs back to the apex, the whole space between the carinæ being elevated and the carinæ themselves being tuberculated, their tubercles bearing some black scales. Between each of these carinæ and the external margin is a tubercle which is the apical one of a series of 4 on the 5th interstice. The 3rd interstice bears two large tubercles (one at, the other a little in front of, the middle) which are connected by oblique wavy carinæ, with the corresponding tubercles on the 5th interstice. The 7th interstice is cariniform in almost all its length. Most of the elevations are more or less clothed with black scales (where they are absent probably my example is abraded).

Victoria; Alpine district.

ATERPUS RAUCUS, sp.nov.

Ab *A. tuberculato*, Gyll., differt statura minori, antennis multo magis gracilibus, capite crebre crasse ruguloso, pedibus rufis. [Long. 7, lat. 3 lines.

Differs from all the previously described *Aterpi* of the *tuberculatus*-group by the coarse rough rugulosity of its head, which scarcely differs from that of the front part of the prothorax. Apart from the characters mentioned above, and its smaller size, I do not find any difference between this species and *A. tuberculatus*.

N. S. Wales; Blue Mountains.

ATERPUS ABRUPTUS, sp.nov.

Ab *A. tuberculato*, Gyll., differt rostro supra longitudinaliter minus convexo vix tam fortiter canaliculato; prothorace minus crebre minus grosse granulato, spatio mediano (haud

granulato) antice latiori nec parallelo haud vel vix pone medium prothoracis retrorsum manifesto, elytris postice valde perpendiculari, sutura ad partis declivis basin magis fortiter magis abrupte tuberculato-carinata.

Maris tibiis anticis sat elongatis sat gracilibus æqualiter subfortiter curvatis.

Feminae tibiis anticis minus elongatis minus gracilibus subrectis vel potius intus vix bisinuatis. [Long. 7-8, lat. $2\frac{1}{2}$ -3 lines.

Another member of the group of which *A. tuberculatus*, Gyll., may be considered the type, and scarcely differing from that species except in its smaller size and in the characters specified above. The front tibiæ of the only sex I possess of *A. tuberculatus* (the male, I believe) are unlike those of either sex of this species, being straight on the external margin, and having the internal margin rather deeply concave in its apical half. The prothorax is not at all canaliculate, but its whole surface is evenly convex except that it has a light transverse depression immediately behind the front margin; the tubercles, however, with which its general surface is clothed much as in *A. tuberculatus*, are wanting on a small vaguely defined space occupying the front half of the middle line. The scutellum is conspicuously clothed with white scales. The most striking character of the species is the extreme abruptness of the apical declivity of the elytra. If the insect be regarded from the side it is seen that the apex of the elytra does not protrude hindward at all further than does the summit of the apical declivity, and the hind outline of the elytra [*i.e.*, the line (as viewed from the side) connecting the summit of the apical declivity and the apex itself] appears concave. The tuberculation of the elytra is variable, in some male examples being almost exactly as in *A. tuberculatus*, while in others and in most females it is feebler and tending to run into interrupted costæ. In very fresh examples the squamosity looks like a dusty brown indumentum and renders the surface opaque, while abraded specimens have a subnitid appearance. From *A. horrens*, Gyll., this species differs *inter alia* by its non-caliculate prothorax, from *seriatus*, Boisd., (which has elytra considerably, though less abruptly,

declivous behind) by its differently shaped front tibiae, differently sculptured prothorax, &c., from *A. rubus*, Er., by its non-cristate prothorax, &c.

S. Australia.

PELORORHINUS PROXIMUS, sp.nov.

Sat elongatus; piceus vel nigro-piceus supra squamis subar-genteis et nonnullis fere croceis plus minusve vittatim vestitus, corpore subtus fere toto albido-squamoso pedibus rufescentibus; prothorace quam latiori nonnihil longiori, lobis ocularibus haud plane nullis, elytris punctulato-striatis; rostro supra longitudinaliter leviter sat æqualiter arcuato; antennarum funiculi articulo basali quam 2^{us} fere sesqui longiori; oculis quam *P. argentosi*, Gyll., sat minoribus.

[Long. $5\frac{1}{4}$ -6, lat $1\frac{1}{2}$ -2 lines.

The scales on the *Pelororhini* are so easily rubbed off, and it is so seldom that specimens can be obtained which are not more or less abraded that it seems almost useless to give an exact account of the patterns formed by the scales on the elytra. In the present species the head and prothorax are marked almost as in *P. argentosus*, and the scales on the elytra form a pattern similar to that in the same insect. But the scales forming the pattern have a much less silvery tone,—in some examples they are to a considerable extent of a saffron or fawn colour, and the pattern is (in the examples before me) much less sharply defined. The decided tendency of the silvery scales on the elytra to run *in vittæ* seems, however, to be distinctive of *argentosus* and the present species. Placed beside an example of *P. argentosus* the present species differs as follows,—the eyes are smaller and more widely separated (I am not absolutely certain that this may not be sexual), the 2nd joint of the antennal funicle is evidently shorter, the rostrum is a little longer and narrower, and the lower part of the front margin of the prothorax (viewed from the side) is slightly convex in a forward direction, as though tending towards being an ocular lobe. The whole insect, moreover, is a little less elongate and especially a little less acuminate towards the apex.

P. margaritaceus, Er., *inter alia* has the basal joint of the antennal funicle longer in proportion to the 2nd joint. *P. angustatus*, Fahrs., *inter alia* is very distinctively and differently marked with silvery scales. *P. pusio*, Sch., is a much smaller insect, variegated with black, white and ferruginous markings. *P. sparsus*, Germ., is only doubtfully distinct from *P. maculosus*, Fahrs., which *inter alia* is very different in respect of its rostrum.

Victoria.

PELORORHINUS CRASSUS, sp. nov.

Minus elongatus; piceus plus minusve rufescens, supra squamis argenteo-niveis et nonnullis obscure griseis maculatum vestitus, corpore subtus fere toto albido-squamoso; prothorace quam latiori vix longiori, lobis ocularibus nullis; elytris punctulato-striatis; rostro supra longitudinaliter fortiter vix æqualiter arcuato, minus brevi; antennarum funiculi articulo basali quam 2^{us} fere sesqui longiori; oculis quam *P. argentosi*, Gyll., paullo minoribus. [Long. 6-7, lat. 2-2 $\frac{2}{3}$ lines.

The scale-pattern on the head and prothorax is almost as in *P. argentosus*; on the elytra it is very different, having no tendency to run in vittæ; it may be best described by regarding the silvery-white scales as forming the ground; this ground is interrupted by the rows of denuded spots or granules usual in the genus, and which are less closely placed in this species than in most others; there are also two obscure fascia-like spots on each elytron (one a little in front of, the other a little behind, the middle) on which the scales are much less close than on the rest of the surface and are of a pale fuscous tone of colour; the whole of these markings, however, are clearly defined only in very fresh specimens. The most distinctive character seems to consist in the form of the rostrum.

RHINARIA CALIGINOSA, Pasc.

There does not seem to be much doubt that this species is either *R. rugosa*, Boisd., or *R. excavata*, Boisd., and it appears to me very probable that they are two names for one species. Between Boisduval's descriptions of the two I find no difference except that

in that of *R. excavata* the prothorax is said to be "medio posticeque subinflatus," while in the other it is described as "medio subincrassatus," and that *R. excavata* is said to be a little larger than *rugosa*. I have before me a short series taken in New South Wales (some at least of them from near Bombala,—the habitat assigned to *R. caliginosa*) which I cannot regard as representing more than one species, and which seem as if they might include all the above-named forms. I feel no doubt whatever as to their being *caliginosa*; some of them have the sides of the prothorax a little sinuate behind the middle, which gives the base a slight prominence on either side that may be referred to in the expression "postice subinflatus," but I do not regard it as a specific character, for its conspicuousness seems to depend on whether the prothorax is quite in its natural position in respect of the elytra. In extremely fresh and bright specimens the squamosity of the elytra renders the sculpture apparently much less pronounced than it is seen to be in more or less abraded ones. The robust incrassation of the middle of the femora seems to distinguish this insect from many of its congeners, and the less prominence of its eyes from others. If *R. excavata*, Boisd., be really distinct from *R. rugosa*, Boisd., it becomes a question whether it is not the same thing as *R. foveipennis*, Pasc., as there seems nothing inconsistent with such a supposition except that in that case Boisdual has in his brief description omitted to mention that the alternate elytral interstices are more elevated than the others,—an important omission, no doubt, but quite Boisdvallian.

RHINARIA TIBIALIS, sp.nov.

Picea; squamis nigris aliisque cinereis (setulis suberectis intermixtis) dense vestita; squamis cinereis in prothorace trilineatim condensatis, in elytris confuse marmoratim dispersis, corporis subtus fere superficiem totam vestientibus; capite crista bifida (hac squamis pallidis densis vestita) antice instructo; rostro nigro nitido, puncturis elongatis sparsim adperso, supra a basi longe ultra medium carina longitudinali mediana instructo, parte antica tertia concava; prothorace quam ad

basin latiori vix longiori, supra sat fortiter minus crebre ruguloso vix distincte granulato, lateribus a basi ad medium leviter divergentibus deinde fortiter rotundatum convergentibus, margine antico sat angusto sat fortiter rotundato-producto; scutello dense albo-squamoso; elytris a basi retrorsum leviter angustatis, leviter striatis, striis puncturis ocellatis modicis minus crebre notatis, interstitiis modice convexis sat æqualibus, humeris rotundatis extrorsum subprominulis; tibiis anticis intus ante apicem fortiter rotundato-emarginatis; extus ad apicem dilatatis; antennarum funiculi articulo 2^o quam 1^{us} sat breviori, 3^{io} æquali.

[Long. $3\frac{4}{5}$ - $4\frac{1}{2}$, lat. $1\frac{2}{5}$ -2 lines.

In a fresh, brightly marked specimen the three pale lines on the prothorax are sharply defined and the elytra are very conspicuously mottled with blackish brown and ashy scales,—the blackish scales predominating round the scutellum and about the middle of the lateral portions, and in other parts being very evenly mixed in small patches with the ashy scales. But the markings cannot be at all relied upon as a character, as in most examples they are very indistinct, the surface being nearly black with some obscure ashy shadings, or even of a uniform dusty brown, as though covered with an indumentum. The best character, I think, lies in the form of the front tibiæ, which are short and stout, evidently widening from the base to below the middle, and then roundly scooped out on the inner side between the point and the apex in such fashion that the inner margin immediately below the middle appears almost like a very blunt tooth; this character at once separates this species from the others known to me of the genus (*e.g.*, *cristata*, Kirby, *granulosa*, Fahrs., *myrrhata*, Pasc.). The nearest ally of *R. tibialis* is, I think, *cristata*, Kirby. Compared with that species the present one differs chiefly by the crest of its head, considerably smaller and especially less prominent at its vertex, though of similar shape and squamosity, by its rostrum very evidently narrower and more parallel (though otherwise very similar), by its differently shaped front tibiæ, and by the absence of a short nitid carina on

the central line of the prothorax. I find this latter character constant in the species which I have no doubt is *cristata*, Kirby. I believe the following characters in combination will distinguish this species from all the other *Rhinaria* at all resembling it in size and general appearance;—rostrum convex and strongly keeled above (except close to its apex), head with a strongly prominent and densely scaly bifid crest, elytral interstices equal *inter se*, front tibiæ strongly and roundly emarginate immediately before the apex of the inner margin. *R. maculosa*, Fahrs., is perhaps a little near this species, but *inter alia* its rostrum is rugulose, flattened above and subsulcate, and the shoulders of its elytra are more square. *R. variegata*, Boisd., is said to be identical with *maculosa*, Fahrs.

Victoria; Alpine district; on young shoots of *Eucalyptus*.

RHINARIA DEBILIS, sp. nov.

Elongata; piceo-nigra, supra squamis piceis vestita, inter has squamis pallidis plagiatis (et setulis suberectis) intermixtis; subtus dense pallide squamosa; capite bi-verrucosa verrucis infra conjunctis; rostro nigro lato, longitudinaliter excavato, excavationis parallele fundo plano antice carinis 2 arcuatis brevibus instructo, lateribus fortiter cariniformibus; prothorace parum transverso, sat fortiter nec crebre granulato, antice transversim impresso, lateribus sat fortiter rotundatis, margine antico sat fortiter rotundato-producto quam basis angustiori; elytris late leviter sulcatis, sulcis foveis parvis nec crebris seriatim instructis, interstitiis angustis minus fortiter (praesertim alternis) elevatis setis pallidis elongatis et granulis sat parvis ornatis, humeris rotundatis vix extrorsum productis; tibiis anticis latis compressis intus leviter bisinatis, apice intus leviter (extus nullo modo) dilatatis; antennarum funiculi articulo 2^o quam 1^{us} parum breviori.

[Long. 5, lat $1\frac{1}{5}$ lines.

I have little doubt that this species is as variable as most of its congeners in respect of the colours and arrangement of the scales clothing its upper surface; in the example before me the general

colour is black, and there are a number of spots caused by little patches of cinereous or brown scales, two or three on the prothorax, one on each shoulder (the scutellum is densely clothed with pale scales), and a number scattered irregularly over the elytra. The most conspicuous character is perhaps the wideness of the striae on the elytra and the consequent narrowness of the interstices, but this species is also readily distinguishable by its wide rostrum, the upper surface of which is concave in its whole length, the floor of the concavity being almost perfectly parallel and flat, and furnished in its front part with two conspicuous, short, curved carinae, placed longitudinally side by side; and by the shape of its front tibiae, of which the apex is not in the least dilated externally.

This species is allied to one occurring near Melbourne (Mr. French tells me it is mischievous on strawberry plants) which I take to be *R. perdix*, Pasc., but differs from it (apart from markings) *inter alia* by the much more parallel sides of the concave part of the rostrum, as well as by the 2nd joint of the antennal funiculus not much shorter than the first.

Victoria: Alpine district.

(HYLOBIINÆ.)

ORTHORHINUS BICOLOR, sp. nov.

Oblongus; piceo ferrugineoque-variegatus; dense squamis nigris et nonnullis albis nonnullis ferrugineis vestitus, squamis in elytris fasciam latam nigram postmedianam antice posticeque albo-marginatam formantibus; rostro sat valido prothorace vix breviori punctulato et longitudinaliter plus minusve strigato; antennis (clava picea excepta) plus minusve ferrugineis, funiculi articulo basali quam 2-5 conjuncti vix breviori; capite sat æqualiter convexo crebre nec crasse ruguloso, oculis minus approximatis minus crasse granulatis; prothorace sat transverso, antice tubulato, a basi ultra medium leviter parum arcuatim angustato, obscure minus crebre granulato, in medio carina longitudinali brevi

instructo ; elytris sulcatis, sulcis vix manifeste punctulatis, interstitiis granulis sat parvis et setulis suberectis ornatis ; femoribus tibiisque omnibus dentibus singulis armatis.

Maris antennis rostri prope apicem insertis ; tibiis anticis vix elongatis. [Long. $4-4\frac{3}{4}$, lat. $1\frac{3}{5}-1\frac{3}{4}$ lines.

In this species the derm is of two colours, being ferruginous with the base of the elytra (widely) and a fascia behind the middle of the same black. In fresh non-abraded specimens, however, this variegation of the derm is not very conspicuous. The scales are arranged as follows :—Those of ferruginous colour are few and very inconspicuous, and need to be looked for with a lens, except on the scutellum, where they are condensed (the general appearance being of a black and white insect) ; I fear the head and prothorax are more or less abraded in all my examples, but in the brightest of them the ferruginous scales are a little more conspicuous than on other parts, and there is a snowy white spot in front of the scutellum (probably the remains of a larger mark) ; the front half of the elytra is indeterminately marbled with black and white, immediately behind which is a space almost deprived of *white* scales (so that it appears as a conspicuous wide black fascia scarcely reaching the suture) ; this space is followed by one on which nearly all the scales are white mixed with a few ferruginous, and which extends to the apex but is interrupted by the subapical callosity, that and the space round it being black. The scales on the underside and on the legs are almost entirely white. The tooth on the hind tibiæ (which is below the middle) is larger and better defined than that of the front tibiæ.

This species may be at once separated from many of its congeners by the total absence of large fasciculated tubercles from its upper surface. Unfortunately there are several species described by Boisduval and Pascoe in such fashion that it is most difficult to identify them. However, it may be said that Boisduval's *athiops* is very much smaller than the present insect, and that it seems hardly possible that Mr. Pascoe could have failed to mention the presence of a well-defined tooth on the inner margin of all the

tibiæ (not only the front ones) if it had existed in any of Australian *Orthorhini* that he has described. The species of this author bearing a general resemblance to *O. bicolor* in size and the absence of fasciculated scales are *hilipoides* (described as an *Alcides*—"in a moment of aberration" its author says), *carinatus*, *infidus*, and *meleagris*; of these *hilipoides* is said to have the basal joint of the funiculus of its antennæ "breviusculus," *carinatus* to have the alternate interstices of its elytra different from the rest, and *meleagris* is not intelligibly described (probably through a printer's error), but as its elytra are spoken of as being especially "short" and some (at least) of the interstices of the elytra are called "dentato-tuberculati" at the base, it is evidently not the insect before me. *O. infidus*, I think, must be closely related to *O. bicolor*, but *inter alia* seems to be much larger (the length being given as 6 lines); it is, moreover, not mentioned as having any white scales, nor are the elytra described as bearing any pattern-like markings; its hind tibiæ are said to be "strongly compressed near the apex," an approximation no doubt to the toothed hind tibiæ of *O. bicolor*, but the phrase would certainly not adequately describe the structure of the latter.

Victoria; Alpine district; under bark of *Eucalyptus* about 6000 feet above sea-level.

(ERIRHININÆ.)

EMPLESIS.

This genus is distinguished by Mr. Pascoe from all other Australian *Eirrhinid* genera by the following characters in combination:—Apical joint of tarsi short and stout, protruding but little from between the lobes of the 3rd joint, antennal funicle 7-jointed, elytra without posterior callosities, 2nd ventral segment not so long as segments 3 and 4 together. It is to be remarked, however, that these characters do not separate *Emplesis* from *Storeus*. In tabulating the genera of *Eirrhinidæ* (Ann. Nat. Hist. 1873, pp. 182-3) Mr. Pascoe adds the further character that the ventral sutures are straight in *Emplesis* and laterally curved in *Storeus*,

but elsewhere says that this distinction cannot be relied upon as constant. The two genera appear to me to be really very close to each other, and I cannot find any more exact structural difference than that the form of *Emplesis* is much more narrow and oblong and that its 2nd ventral segment is evidently less abbreviated than in *Storeus*.

EMPLESIS MONTICOLA, sp. nov.

Elongata; minus robusta; nigra vel nigro-picea, squamis obscure ferrugineis et aliis albidis variegata, his pone medium alternatim cum illis in interstitiis longitudinaliter condensatis; funiculi articulo basali quam 2^{us} fere duplo (hoc quam 3^{ius} paullo) longiori, ceteris brevibus, ultimis transversis; prothorace leviter transverso mox pone apicem subito constricto-angustato; elytris striato-punctulatis.

Maris rostro quam prothorax vix longiori, modice robusto, supra sat opaco longitudinaliter striato, fere recto; antennis paullo ante rostri medium insertis; abdomine longitudinaliter concavo.

Feminae rostro quam prothorax multo longiori, leviter arcuato, supra nitido levigato; antennis vix pone rostri medium insertis; abdomine æquali. [Long. $1\frac{3}{4}$ -2, lat. $\frac{3}{8}$ line.

The whitish scales are condensed and prominent between the eyes but not so as to form a well-defined fascicle, on the prothorax they form three obscure vittæ, they clothe the scutellum densely and they are condensed in short longitudinal lines on the elytral interstices at equal distances from the base, so that there appears to be a number of fasciæ, each fascia formed of a number of short longitudinal lines placed side by side, the most conspicuous of these fasciæ being in the apical half of the elytra. The prosternum is distinctly concave in front of the coxæ; the intermediate ventral sutures are lightly but distinctly arched at the sides. The pattern-like markings of the head without either callosity or fascicle, the comparatively short basal joint of the antennal funicle, and the long shining black levigate rostrum of the female

will in combination distinguish this species. The antennal scape is of a bright ferruginous colour, but the general colour is darker than in most species of the genus.

Victoria; Alpine district.

EMPLESIS OCELLATA, sp. nov.

Minus elongata; ferruginea, squamis ferrugineis aliis fuscis aliis albidis variegata; in elytris squamis fuscis maculam magnam communem basin attingentem postice æqualiter rotundatam et albido-cinctam formantibus; funiculi articulo basali quam 2^{us} duplo longiori, ceteris brevibus; prothorace sat transverso mox pene apicem subito constricto-angustato supra inæquali; elytris striato-punctulatis.

Maris rostro quam prothorax sublongiori, apice leviter arcuato, modice robusto, supra opaco longitudinaliter striato et lineatim squamoso; antennis paullo pone rostri apicem insertis.

Femina latet.

[Long. $1\frac{3}{5}$, lat. $\frac{3}{5}$ line.

The remarkable spot formed by the scales on the upper surface will at once distinguish this species from all its congeners. This spot commences on the elytra at the base where it reaches from shoulder to shoulder. From each shoulder the external margin of the spot runs hindward curving to the suture, which it reaches at about the middle of its length. The large common spot thus enclosed consists of dark brown scales mixed with a few scarcely noticeable lighter ones (those of the rest of the surface being pale ferruginous); the spot is margined (somewhat narrowly) with white scales and is continued forward a little on the prothorax, as is also the whitish border, both dark spot and pale border becoming gradually narrower and less distinct towards the front of the prothorax, but the pale border being traceable evidently nearer to the front than is the dark spot. The principal inequalities on the surface of the prothorax are two obscure gibbosities placed near the front on either side of the median line, which is feebly impressed. The prosternum is very feebly and widely concave in front of the coxæ; the intermediate ventral sutures are slightly

arched at the sides. There is a certain resemblance in style of marking between this species and *E. umbrosa*, Blackb., (though this resemblance is really only slight), but the two may be at once separated by the prothorax being scarcely transverse in *umbrosa* and pretty strongly so in *ocellata*.

Victoria ; Alpine district.

GERYNASSA AFFINIS, sp.nov.

Picea vel nigra, squamis fulvis (certo adspectu sub-aureis) et aliis nigrescentibus variegata; rostro obscure piceo-ferrugineo, quam prothorax longiori, nitido, basin versus obscure punctulato-striato; antennis obscure ferrugineis, clava picea, scapo apice sat clavato, funiculi articulo 2° quam 1^{us} sublongiori; prothorace transverso, antice constricto-angustato, ante basin transversim subgibboso, lateribus ampliatis; elytris trans basin sat æqualiter convexis, intra humeros haud longitudinaliter depressis, inæqualiter punctulato-striatis, interstitiis alternis hic illic in carinis brevibus nigris parum conspicuis elevatis; corpore subtus squamis pallide aureo-fulvis minus confertim ornato. [Long. 2-2¹/₅, lat. 1 line.

In most examples the fulvous scales are irregularly scattered on the upper surface among the blackish ones without forming anything like a pattern, in other examples they are entirely wanting on a small space on either side of the scutellum or on a small space on either side of the prothorax near its base, those spaces consequently appearing as dark spots. From *G. basalis*, Pasc., the elevations on the alternate interstices of the elytra will at once distinguish this species; from *G. nodulosa*, Pasc., it may be known *inter alia* by its much darker rostrum and antennæ, the evenness of the convexity of its elytra across the base (the shoulders not being preceded by any depression), and the longer second joint of its antennal funicle.

Victoria ; Alpine district.

GERYNASSA MINOR, sp.nov.

Ferruginea, squamis fulvis, aliis nigris, aliis cinereis, aliis albis variegata; rostro quam prothorax longiori, arcuato, postice subtiliter longitudinaliter striato, antice vix manifeste punctulato; antennarum articulo basali quam secundus sat longiori, ceteris sat brevibus, clava picea; prothorace transverso, antice sat constricto, lateribus ampliatis; elytris trans basin minus æqualiter convexis intra humeros longitudinaliter subimpressis, subæqualiter punctulato-striatis, interstitiis subconvexis vix inæqualibus; corpore subtus minus confertim albido-squamoso. [Long. $1\frac{1}{3}$, lat. $\frac{1}{2}$ line.

An intricately mottled species; the scales on the prothorax are shining ferruginous with some of a whitish colour sprinkled over the disc and more condensed on the sides; on the elytra the whitish scales are prevalent and are condensed on the shoulders and also to some extent on the sides of the scutellum (which is dark brown); the 4th interstice is clothed with blackish scales in its basal part and the scales on the basal part of the 2nd and 3rd interstices are dark brown; dark brown scales about the middle part of each interstice cause the appearance of an obscure fascia in which are several short longitudinal black lines; immediately behind this fascia the scales are almost entirely whitish, so that it seems to be followed by a narrow pale fascia, behind which ferruginous scales predominate but are much sprinkled with whitish scales and present one or two short lines formed of blackish scales. The 2nd joint of the funiculus very decidedly shorter than the first (though considerably longer than the following joints) will distinguish this species from its described congeners; its small size and the scarcely uneven interstices of its elytra are further distinctions from *G. nodulosa*, Pasc., which is perhaps its nearest ally.

Victoria; Alpine district.

MERIPHUS FULLO, Er.

I have recently taken a *Meriphus* in several localities near Sydney, which agrees with Dr. Erichson's description of *M. fullo* in all respects except that the prothorax is by measurement distinctly wider across the base than long. It is possible if Dr. Erichson did not measure the proportions of his type that the prothorax may have appeared to his eye more elongate than the reality, and therefore it would not be safe to consider the Sydney species distinct from the Tasmanian on account of this discrepancy. The great distance between Sydney and Tasmania, nevertheless, suggests the probability that if specimens from both localities could be compared they would be found to present other differences.

MERIPHUS HUMERALIS, sp. nov.

Sat angustus; sat gracilis; piceo-niger vel ferrugineus, femorum basi tibiis rostro et antennarum scapo plus minusve rufescentibus; squamis albidis setiformibus parce vestitus; rostro maris capite prothoraceque conjunctis paullo longiori, feminae paullo magis elongato; prothorace quam longiori haud latiori; antrorsum leviter angustato et constricto, rugulose sat crasse punctulato, haud carinato; elytris punctulato-striatis, interstitiis alternis obscure granulatis, squamis albis in humeris maculatim dense condensatis; femorum dentibus parvis.

[Long. (rostr. incl.) $1\frac{1}{5}$ -2, lat. $\frac{2}{5}$ - $\frac{3}{5}$ line.

The whitish scales are evenly and thinly distributed except that they are evidently condensed on the sides of the prothorax and the shoulders of the elytra (where they form a conspicuous white patch), that they clothe the scutellum densely, and that they are somewhat linearly placed along the interstices of the elytra, where, however, they are frequently interrupted in such fashion that the intervals on which they are wanting appear as faint and ill-defined dark spots placed here and there along the interstices. As this pattern is present in all of the several examples I have seen, I think it is certainly not the result of abrasion. This

species differs from *M. umbrinus*, Pasc., *inter alia*, by the black funicle and club of its antennæ, and from *M. lineatus*, Blackb., by its smaller size, the interruptions in the vestiture of the elytral interstices, the much smaller size of the teeth on its *femora*, the conspicuous white patch on the shoulders, &c. The other described species are all very different.

N. S. Wales ; near Sydney ; also in the Blue Mountains.

MYOSSITA MUNDA, sp.nov.

Oblongo-ovata ; sat convexa ; ferruginea, pilis albedo-fulvis sat sparsim vestita, capite rostro antennisque (articulis basalibus 2 exceptis) nigris, tarsis obscuris ; rostro quam prothorax longiori, apicem versus leviter dilatato ; antennarum funiculi articulo basali quam 2^{us} duplo longiori ; prothorace sat fortiter transverso, antice angustato, lateribus modice rotundatis, elytris punctulato-striatis, puncturis in striis sat magnis rotundatis vel subquadratis. [Long. 1½, lat. ½ line.

This species does not seem to have anything like the quasi-pattern that some of its congeners show on their elytra through the uneven density of their pubescence, nor can I find any trace of the quasi-marking that Mr. Pascoe attributes to *M. tabida*, when he says that in certain lights the punctures on the elytra seem to be surrounded by pale rings. It may be distinguished from all previously described by its small size and the blackish colour (in contrast with its general ferruginous red) of the head, rostrum and antennæ (the scape and the base of the funiculus of the latter being, however, more or less reddish).

Victoria ; Alpine district.

MYOSSITA CRUCIGERA, sp.nov.

Oblongo-ovata ; sat convexa ; squamis crassis piliformibus albidis irregulariter vestita ; rufa ; capite, scutello, spatio circa scutellum, corporeque subtus (hujus apice excepto) nigricantibus ; rostro sat robusto quam prothorax vix longiori apicem versus leviter dilatato ; funiculi articulo

basali quam 2^{us} vix duplo longiori, hoc 3^{io} fere æquali ; prothorace sat transverso, antice angustato, lateribus sat rotundatis ; elytris leviter striatis, striis obscure punctulatis.

[Long. 1 $\frac{3}{5}$, lat. $\frac{3}{5}$ line.

The whitish hair-like scales on the elytra are wanting on a rather large roundish space around the scutellum, on the suture and on a transverse space crossing the suture just behind the middle, but not reaching the lateral margins. From a certain point of view (looking from the scutellum hindward, the rostrum being directed towards the observer) the denuded spaces present the appearance of a cross standing on a globe. The blackish head (the rostrum and antennæ being red) and space around scutellum, in contrast with the red colour of all the rest of the insect (as seen from above) will also render this species very easy to identify. The sculpture of the elytra is very much less definite than in the preceding species.

South Australia ; Lake Eyre basin.

ERISTUS, gen. nov.

Rostrum latum depressum leviter arcuatum minus elongatum basi leviter angustatum ; scrobes postmedianæ ad oculi partem inferiorem attingentes ; scapus brevis ; funiculus 7-articulatus ; clava sat distincta ; oculi magni rotundati sat prominuli fortiter granulati ; prothorax antice angustatus, lobis ocularibus nullis ; scutellum modicum ; elytra oblonga ; pedes sat validi ; femora sublinearia mutica ; tibiæ apice spina armatæ ; tarsi elongati, articulo tertio fortiter dilatato bifido, quarto elongato, unguiculi simplices divaricati ; mesosternum inter coxas sat latum ; abdominis segmentum secundum quam sequentia 2 conjuncta haud brevius ; horum suturæ rectæ vel ad latera retrorsum leviter productis ; corpus (? specierum omnium) setis elongatis sparsim vestitum.

Examples of this very abnormal form have long been in my collection, and I have delayed describing them because I have been unable to make up my mind to what subfamily they should be referred. Each re-examination, however, leads to the same

conclusion,—that they represent an aberrant type of *Erirehinidae*,—and, therefore, I decide to describe them as such. They appear to me to be aberrant only in respect of the rostrum which (though not excessively short, being but little shorter than the prothorax) is most unusually wide and depressed, its width on the upper surface being not less than the length of the scape of the antennæ, and fully twice the thickness of the rostrum (as viewed from the side). The rostrum, in fact, reminds one of the form of a duck's bill. Owing to the upper surface being arched longitudinally, and the lower surface scarcely so, the rostrum has a subulate appearance when viewed from the side. The structure of the scrobes is not very different from that of *Glaucopela*. The rostrum and the general appearance are very suggestive of a *Cossonid* (indeed the first species described below is very much like *Phloeophagus spadix*, Hbst., but with the elytra much wider at the base), but the combination of contiguous front coxæ, distinctly articulated antennal club (its basal joint not much longer than the second) strongly dilated and bifid, 3rd tarsal joint and 1st ventral suture well defined, seems impossible for a *Cossonid*. I must acknowledge some misgivings as to whether it is possible that this genus is identical with that characterised by Mr. Wollaston under the name *Thaumastophasis* as a *Cossonid*. That author's expressions,—“scapo longiusculo” and “metasterno brevissimo,”—would, however, be quite inapplicable to the species before me, and I do not think they could be fairly applied to them even if they were being compared with genera of *Cossonidae*. The metasternum is a little longer and the antennal scape is very much shorter for example than in *Phloeophagus*. Mr. Wollaston does not mention the antennal club in his *Thaumastophasis* as being distinctly articulated. On the whole, I do not see that much confusion will result even if (with these qualifications) I am re-naming Mr. Wollaston's genus, whereas it might be very confusing if I were to describe as *Thaumastophasis* species which should prove not to be attributable to that genus. I may add that I have in my collection an example which seems to me to be very possibly Mr. Wollaston's species (*T. oculatus*), as it agrees

fairly well with the specific description, but its antennal club is not in the least *Cossonid*-like, and I cannot see the appropriateness of the term "brevissimum" for its metasternum. If it be Mr. Wollaston's insect, the species before me are undoubtedly very close to *Thaumastophasis*, but differ in the scrobes being subbasal instead of median and the scape of the antennæ being much shorter.

ERISTUS SETOSUS, sp. nov.

Oblongus; subnitidus; setis sat crassis pallidis sparsim vestitus; piceus, tarsis (et exemplorum nonnullorum tibiis) rufescentibus; capite rostroque sat crebre minus fortiter punctulatis; prothorace leviter transverso, antice sat angustato, crebre minus fortiter umbilicato-punctulato, in medio longitudinaliter obscure carinato, lateribus sat rotundatis, basi leviter bisinuata; elytris leviter striatis, striis puncturis sat magnis sat crebre instructis, interstitiis sat planis sat subtiliter punctulatis; corpore subtus sat crasse minus crebre umbilicato-punctulato. [Long. $2\frac{1}{5}$, lat. $\frac{4}{5}$ line.

Victoria; Alpine district; occurs in S. Australia also.

ERISTUS BICOLOR, sp. nov.

Ovatus; subnitidus setis minus crassis (supra sparsis fulvis, in scutello et in corpore subtus niveis, in scutello et in mesosterno metasternique in episternis densissime condensatis); piceus, capite (rostro incluso) prothorace pedibusque rufis; capite rostrique basi sat fortiter sat crebre punctulatis, rostri parte antica vix manifestè punctulata, capite inter oculos et rostri basi in medio longitudinaliter carinatis; prothorace sat transverso, antice subconstricto-angustato, crebre fortiter punctulato, lateribus (parte constricta excepta) sat fortiter rotundatis; elytris vix striatis, seriatim sat fortiter (interstitiis minus fortiter) punctulatis; corpore subtus subcrebre subfortiter punctulato. [Long. $1\frac{1}{5}$, lat. $\frac{1}{2}$ line.

The piceous undersurface, antennæ, and elytra strongly contrasted with the red head, rostrum, prothorax, and legs render this a very conspicuous little species.

Victoria; Alpine district.

APIONINÆ.

APION TERRÆ-REGINÆ, sp. nov.

Oblongo-ovatum; nitidum; nigrum; setis brevibus albidis vestitum; capite inter oculos concavo; rostro sat valido, sat fortiter arcuato, sat cylindrico, quam caput prothoraxque conjuncta longiori, minus subtiliter punctulato; antennarum articulo 2° quam 3^{us} sat crassiori; prothorace subcylindrico antrorsum paullo angustato, sat crasse sat crebre punctulato; elytris compressis sat fortiter sat æqualiter striatis, striis obscure punctulatis, interstitiis planis sat distincte minus crebre punctulatis. [Long. $2\frac{1}{2}$, lat. $\frac{4}{5}$ line.

A large shining black species resembling the European *A. scutellare*, Kirby, but with compressed elytra, stouter and more strongly punctured (though otherwise similar) rostrum, head hollowed out between the eyes, prothorax less rounded on the sides, elytral interstices perfectly flat, &c., &c.

The only previously described Australian *Apion* coming near it in size is *A. albertisi*, Pasc., which, however, is described as having its prothorax impunctulate and only one distinct stria on each elytron.

N. Queensland; Palmer R. district; given me by C. French, Esq.

NOTES ON AUSTRALIAN CYNIPIDÆ, WITH DESCRIPTIONS OF SEVERAL NEW SPECIES.

BY WALTER W. FROGGATT.

As far as I am aware, nothing has been written on the Australian *Cynipidæ*, although a large number of the small parasitic hymenoptera, many of which are inquilines with the true *Cynipidæ*, have been described in European publications, chiefly by Francis Walker in his "Monograph of Chalcididæ" and in his miscellaneous papers.

In this short paper I propose to describe three species common about Sydney on the Acacias, *A. discolor* and *A. longifolia*; and in my next contribution on this group to work out those found on the Eucalypts. For the last three years I have been collecting and breeding out the gall-making inhabitants, and their parasites, from such excrescences and galls as I could find in the bush or obtain from my numerous friends interested in this work. One of the difficulties attending the breeding of the *Cynipidæ* is that the parasitic wasps so outnumber the gall-makers that one can breed out hundreds of Chalcids and Proctotrupids without ever obtaining a perfect specimen of the Cynipid host. I believe that when our gall-flies are worked out, it will be found that Australia contains a large number of species, and I think that, though working under the disadvantages of want of access to type specimens of many genera, and a rather hazy knowledge of the classification of some of them, yet I shall be doing useful work in studying their life-histories, by drawing and describing them from living specimens, and by noting their parasites; work requiring time, perseverance and a large amount of material; but there is at least the consolation that, if not successful one year, there is a

chance if one is content to wait for the next year's crop of galls. There is certainly not much at present to show for a good deal of careful work ; but when one sees the large number of trees that are attacked and often rendered seedless year after year, such knowledge as I am in search of must eventually become of more or less value even from the economic standpoint. In working at their classification I find the meagre details given by some of the earlier describers very bewildering, and the hair-splitting of more recent systematic entomologists even more distracting. I therefore provisionally place the three species presently to be described under the old genus *Cynips*.

I propose to follow Cresson's arrangement of the genera (Catalogue of North American Hymenoptera, 1887, a most useful work to anybody interested in the study of hymenoptera). This writer gives two tables of classification of *Cynipide* ; first, Mr. W. H. Ashmead's Synoptical Tables, taken from the Transactions of the American Entomological Society for 1886, which only deals with species occurring in that country ; and, secondly, a translation of Dr. Mayr's tables, taken from his "Die Genera der gallenbewohnenden Cynipiden," which deals with European and American forms. The latter divides them into two groups, the first containing the true gall-makers, and the second what he terms guest-flies, or those living in the galls formed by the first section. The three species I am about to describe are true gall-making Cynipids.

CYNIPS ACACIÆ-DISCOLORIS, n.sp.

Length of body, 2 lines. Expanse of wings, $4\frac{1}{2}$ lines.

Head, thorax, and legs reddish-yellow ; abdomen, eyes, markings round the ocelli, and inner margins of femora of fore legs black. Antennæ reddish-brown ; first joint long, slightly curved, cylindrical ; 2nd pear-shaped, narrowest at base ; 3rd and 4th smallest ; 5-10th rounded at base, square across at apex ; 11-13th forming an oval club ; all the joints clothed with fine hairs. Head narrow, hollowed behind, base black, ocelli red, eyes black, very prominent. Thorax : middle lobe of mesonotum large, scutellum large, smooth

and shining, with a few scattered hairs all over it; metathorax black beneath, and thickly clothed with black hairs. Abdomen black, covered with fine hairs. Wings fuscous, upper margin of forewings darkest, stigma black, nervures almost black. Legs covered with fine hairs.

The gall is very common on *Acacia discolor* in the month of November, when the pupa of the Cynips will be found wrapped up in a black pupa case in the gall when opened. It is formed on the twigs where a leaf bud or small shoot is commencing to sprout; sometimes it simply forms an oval swelling at the base of the shoot, but the typical form is an oval gall produced into three irregular horns at the apex, formed out of aborted leaf buds. It is very much infested by a small black Chalcid that attacks the gall and changes it into a shapeless fleshy mass; scores of these minute parasites will hatch out of a single gall.

Locality: Rose and Double Bays, Thornleigh, N.S.W.

CYNIPS ACACIÆ-LONGIFOLIÆ, n.sp.

Length of body, 2 lines. Expanse of wings, $4\frac{1}{4}$ lines.

Head, thorax, antennæ, and centre of upper side of abdomen from below second segment to tip of abdomen ochreous-yellow; eyes and ocelli dark brown; first two segments of abdomen and the edges of the following ones black, the colour fading in old specimens to an ochreous-brown; coxæ and femora dark brown; underside of abdomen black. Antennæ inserted below the eyes in a depression; 13-jointed; 1st slender, cylindrical; 3rd-4th small, funnel-shaped; 5-10th rounded at base and square at apex; 11-13th forming a club; all from the second joint margined with fine hairs. Head rounded in front and not hollowed behind; eyes and ocelli dark brown. Prothorax narrow; middle lobe of mesonotum large, rounded in front, lateral lobes wedge-shaped; scutellum large, rounded in front, heart-shaped. Abdomen broad and rounded at base, with a depression in the centre, rather pointed at apex. Wings large, hyaline; costa and nervures black; forewings clouded with a fuscous patch about $\frac{2}{3}$ from the tip of wing. Legs clothed with fine hairs.

The galls are round or oval, fleshy, about the size of a large filbert nut, containing several cavities in each gall. When they are ripe, about the end of October, they are brightly tinted with red and yellow, and are known in Victoria as "Wattle apples" by the children. They are formed on the flower stalk, as are also certain dipterous galls, and are very plentiful on the Acacias growing back from Rose Bay. Unless taken quite ripe, they are difficult to keep, as the galls decay, and the larvæ die in consequence.

Locality: Rose Bay, Botany, &c.

CYNIPS MAIDENI, n.sp.

Length of body, 2 lines. Expanse of wings, 4 lines.

♂. Head, thorax, abdomen, coxæ and base of femora black; the rest of the femora, tibiæ, and tarsi pale yellow in live specimens, darker in old ones.

♀. Differs in being slightly larger, with the abdomen broader, and from below the first segment of a rich yellow slightly margined with black on the sides.

Antennæ 13-jointed, ochreous-yellow, clothed with fine hairs; 1st joint cylindrical; 2nd cup-shaped; 3-4th, very small, funnel-shaped; 5-10th cylindrical, broad, rounded at base, and straight across at apex; in the female these joints are smaller and more subovate; 11-13th forming an oval-shaped club; in the male the 5th joint is much larger than the following ones. Eyes vermilion when alive, ocelli bright hyaline; head round in front, square behind. Thorax broad, shining, very rugose, the corrugations running in wavy lines; middle lobe of mesothorax large; scutellum large, shield-shaped. Legs covered with fine hairs.

I have much pleasure in dedicating this fine species to J. H. Maiden, Esq., F.L.S., Curator of the Technological Museum, to whom I am indebted for many specimens, and whose work among our wattles is well known. This *Cynips* causes the small twigs and branches of *Acacia longifolia* to swell into thick fleshy galls, often several inches in circumference, and five or six inches long.

Several trees on the South Head Road near Vaucluse are attacked year after year, and I have taken galls from them for the last three years; they are ripe about the end of October. This Cynips does not seem to be much attacked by parasites, and is easily bred from the gall. Another tree infested with this gall grew in the late Sir William Macleay's garden, but the galls were always very small, and it was only on breeding the Cynips out that I proved them to be the same species. This is not a common gall, and I only know of it in these two localities.

Locality: Elizabeth Bay and Rose Bay.

OBSERVATIONS ON THE *CHAROPIDÆ*.

PART I.

BY C. HEDLEY, F.L.S.

(Plates I. and II.)

Widespread throughout Australia and Polynesia is a group of land shells which, varying greatly among its members, yet appears clearly distinguishable from other orders by the small size of its species, their cancellated sculpture, in which stout ribs are a prominent feature, flame painting, straight sharp peristome, which describes a convex then a concave sweep on approaching the right insertion, and a projecting semitransparent callus, which buries the sculpture of the whorl on which it encroaches. For this group I provisionally accept the title *Charopidæ*, assigned by Hutton, 1884 (Trans. N. Zealand Inst. xvi. p. 199), extending, however, the limits indicated by that writer. His vague diagnosis runs as follows: "Animal heliciform with an external shell; tail with a mucous gland." No type is nominated by the author of the family, and I therefore suggest that the type of *Charopidæ* would naturally be the genus *Charopa*, Albers, whose type species is *C. coma*, Gray. I quote from "Die Heliceen," 2nd ed. p. 87, the original definition of that genus.

CHAROPA, Albers (1860).

"Testa umbilicata, tenuis, depressa, raro conica, plicis transversis, elevatis, pilis rigidulis sparse saepissime obsilis, costulata; anfractus 4-5½, ultimus antice non descendens; apertura parum obliqua, lunato-rotundata; peristoma simplex, marginibus conniventibus."

Under this head he assembled these species :—*portia*, Gray ; *pinicola*, Pfr. ; *juloidea*, Forbes ; *eta*, Pfr. ; *ide*, Gray ; *varicosa*, Pfr. ; *epsilon*, Pfr. ; *coma*, Gray ; *anguiculus*, Reeve ; *gamma*, Pfr. ; *biconcava*, Pfr. ; *omicron*, Pfr. ; *zeta*, Pfr. ; *dimorpha*, Pfr. ; *hypopolia*, Pfr. ; *sericatula*, Pfr. ; *iota*, Pfr. ; *kappa*, Pfr. ; *egesta*, Gray ; *dianæ*, Pfr. ; *alpha*, Pfr. ; and *beta*, Pfr.

Considering the scanty material and information at the disposal of this sagacious naturalist, we may well admire his sketch of the affinities of this group, and regret that later writers have not followed the path indicated by the systematist of the last generation.

The only other reference to such a classification is the following remark by Pease (P.Z.S. 1871, p. 450), the fruits of an unrivalled knowledge and unremitting study of the land mollusca of Polynesia :—"Thirty-five or more species of *Helices* have been described from the Papuan Islands, Australia, Tasmania and New Zealand under the genera *Patula*, *Discus*, &c., which are more nearly related to the Polynesian genus *Pitys*. They are generally more planorboid in shape, with the aperture open and not laminate or dentate ; their relation to the genus *Pitys* cannot be determined until the animals are examined and compared."

From the same article, p. 451, I extract the characters of the genus *Pitys*, Beck, first defined in the "Index Molluscorum," 1837, and whose type is *P. oparica*, Anton, as amended by Pease.

PITYS, Beck (1837).

"Shell orbicular or planorboid, finely radiately ribbed ; spire but slightly elevated, last whorl rounded at its periphery and also at the umbilicus, more or less openly umbilicate, rarely imperforate ; aperture generally dentate or laminate ; radiately striped or tessellated on their upper surface with reddish-brown and yellowish, the stripes occasionally taking a zigzag form on the periphery and base ; rarely wholly reddish-brown ; generally covered with a thin epidermis, which, on a few species, supports short hairs."

"The above genus," observes Pease, "was established by Dr. Beck on *Helix oparica*, Anton, from the collection made by the late Mr Cuming at the island of Rapa (Opara), one of the Austral group, a few hundred miles south of Tahiti. There is no doubt as to the identity of the species, although it was described by Dr. Anton as *H. oparica* from America. By reason of the similarity between the shells of certain species discovered since and those of the European genus *Discus*, Fitz., = *Patula*, Held., all the Polynesian forms have been described under the European genus; with few exceptions the shells are quite distinct and the animal decidedly so; they are most numerous at the Hawaiian and Tahitian Islands, less so at the Samoas, and altogether absent in West Polynesia."

Nevill (Hand List Mollusca, Indian Museum, Pt. I. p. 69) misquotes *H. contorta* as the type of *Pityis*.

Allied to *Pityis* is the genus *Endodonta*, Albers, type *E. lamellosa*, Férussac, created for the reception of species from the Society and Sandwich Archipelagos. The description, "Die Heliceen," 2nd ed. p. 90, runs as follows:—

ENDODONTA, Albers (1850).

"Testa umbilicata vel perforata, depressa, discoidea vel orbiculato-convexa; aufractus 5-8 arcte voluti; apertura rotundato-lunaris vel saepius angulata, rarissime simplex, plurumque in pariete ventrali lamellata, vel etiam margine basali lamellatodentato, peristoma rectum, acutum."

Nearly related to the preceding is the genus *Libera*, Garrett. No type is named, but the first species, which may be considered such, is *L. fratercula*, Pease.

This genus was defined by Garrett (Journ. Acad. Nat. Sci. Philadelphia, Ser. 2, 1881, p. 390) in the following terms:—

LIBERA, Garrett (1881).

"Shell small, widely umbilicated, umbilicus (in adults) strongly constricted so as to form a cavernous or pouch-like cavity; whorls 7-9, costulate or striate, last one angulate or carinate, rarely

rounded; aperture subrhomboidal or securiform; peristome thin, simple, straight; parietal region with one or two, and the palate with (rarely without) two or three, internal laminae; columella emarginate and furnished with a spiral fold."

Another genus which, judged by shell characters, would be assigned to the *Charopidæ* is *Diplomphalus*, Crosse and Fischer (1872), described Journ. de Conch. xx. p. 288, type *D. cabriti*, Gassies. The anatomy of this form as elucidated by Fischer (Journ. de Conch. xxi. pp. 1-25, pl. III.) demands for it, on the contrary, a position among the *Testacellidæ*. Fischer suggests (*op. cit.* p. 13), that various members of the *Testacellidæ* represent different groups of the *Helicidæ*, just as sundry orders of monodelphous mammals are shadowed forth among marsupials. We might pursue the idea further and inquire whether the *Testacellidæ* may not be an artificial group composed of forms of diverse origin which have independently acquired similar secondary characteristics consequent on adopting carnivorous habits. If *Diplomphalus* possesses a caudal mucous gland and pedal groove, these would support the shell characters in claiming for it a derivation from some form allied to *Charopa*.

Under *Charopidæ*, Hutton ranges (Trans. N.Z. Inst. xvi. p. 200) these four genera:—

GERONTIA, Hutton (1884).

"Shell depressed, widely umbilicated, striated; periphery rounded; whorls about five, slowly increasing; aperture oblique. Mantle included. Jaw smooth, striated."

First species (type ?) *G. pantherina*, Hutton.

PYRRHA, Hutton (1884).

"Shell thin, translucent, of $4\frac{1}{2}$ - $5\frac{1}{2}$ regularly increasing whorls, subperforate. Animal heliciform, mantle subcentral, reflected over the peristome with an even margin; tail truncate, with a large papilla and mucous gland. Jaw with flat ribs. Marginal teeth broad, with several points."

First species (type ?) *P. cressida*, Hutton.

PSYRA, Hutton (1884).

“Shell imperforate or narrowly umbilicated, ribbed, periphery rounded, not hairy. Jaw and teeth as in *Charopa*.”

First species (type?) *P. dimorpha*, Pfeiffer.

THERASIA, Hutton (1884).

“Shell conoidal, depressed, periphery subcarinated, subperforate or narrowly perforate, whorls smooth, striated or with membranous plaits. Jaw with flat ribs. Marginal teeth broad, usually with several points.”

First species (type?) *T. celinde*, Gray.

Seeing that the type of THALASSIA is *subrugata*, Pfeiffer, I must decline for the present to follow Hutton in classing it (*op. cit.* p. 203) among the *Charopidae*.

Possibly Gray's genus LAOMA (1849), type *L. leimonias*, Gray, may be inserted in the family under discussion, but it does not share the ordinary appearance of its members.

Probably these two genera may also be included:—

THERA, Hutton (1884).

“Animal and jaw as in *Patula*. Shell conical, high, perforate, hairy; periphery angled” (*op. cit.* p. 193).

First species (type?) *T. alpha*, Pfeiffer.

PHACUSSA, Hutton (1884).

“Shell depressed; periphery rounded; whorls 5-6, gradually increasing. Mantle included. Jaw with flat ribs” (*op. cit.* p. 205).

First species (type?) *P. hypopolia*, Pfeiffer.

Suter proposed, but did not formulate, a group (genus?)—MAORIANA, *Trans. N.Z. Inst.* 1890, p. 96—to replace *Huttonella* (preoccupied) and to comprehend *leioda*, Hutton; *pseudoleioda*, Suter; *wairarapa*, Suter; *hectori*, Suter; *microundulata*, Suter; and *aorangi*, Suter. He also quoted (*op. cit.* p. 90) SIMPLICARIA, Mousson, as a MS. generic term. Dr. von Martens has proposed

“Critical List of the Mollusca of New Zealand,” 1873, p. 12, the group (genus ?) FLAMMULINA whose first species (type ?) is *H. omega*, Pfr.

From the above review of the genera proposed, it will be seen that the student of the *Charopidæ* is better supplied with divisional names than with definitions.

The following authors have written upon the dentition of the *Charopidæ**:—

Binney, W. G. : Proc. Acad. Nat. Sci. Philad. 1875, p. 248, *tumuloides*, Garrett, and *astur*, Souv. ; Annals of the New York Academy of Sciences, Vol. iii. pp. 88 and 89, *incerta*, Mousson, *tumuloides*, Garrett, *hualinensis*, Pfr., and *astur*, Soubervie.

Hutton : Trans. N.Z. Inst. xvi. pp. 161-182, *iota*, Pfr. ; *dimorpha*, Pfr. ; *celinde*, Gray ; *coma*, Gray ; *lucetta*, Hutton ; *gamma*, Pfr. ; *theta*, Pfr. ? ; *ide*, Gray ; *eta*, Pfr. ; *zeta*, Pfr. ; *lambda*, Pfr. ; *tapirina*, Hutton ; *portia*, Gray ; *venulata*, Pfr. ; *pantherina*, Hutton ; *epsilon*, Pfr. ; *pumila*, Hutton ; *alpha*, Pfr. ; *helmsi*, Hutton ; *fulminata*, Hutton ; *planulata*, Hutton ; and *thaisa*, Hutton.

Suter : Trans. N.Z. Inst. 1890, pp. 85-91, *mutabilis*, Suter ; *sterkiana*, Suter ; *browni*, Suter ; *serpentinula*, Suter ; *bianca*, Hutton ; *cryptobidens*, Suter ; and *godeti*, Suter.

Semper : Reis. im Philip. iii. pl. 11. f. 18, *bursatella*.

Hedley : Records Aust. Museum, i. p. 139, *whiteleggei*, Brazier.

Though it seems a bold assertion, I consider that no other group of land shells is to-day so imperfectly understood, so misrepresented in standard works, and so inefficiently figured and described. Pfeiffer in his last volume of the “*Heliceorum Viventium*” scatters broadcast among different sections the species I wish to assemble under *Charopidæ*. Of these forms Fischer (Manuel, p. 470) only mentions *Endodonta* to associate it with *Discus*, *Trochomorpha*, &c. Hutton (*op. cit.* p. 200) recognises the genus *Charopa*, yet on p. 191 he tears away from it the type *coma*, a proceeding not

* The writer does not possess the opportunity of assuring himself by personal inspection that all these species are correctly referred here.

justifiable by any rule of zoology, but one in which he is followed by Tryon. On turning to p. 17 of Tryon's Manual, 2nd Series, Vol. iii., the negligence with which this group is treated is at once apparent; *Charopa* and *Pitya*, though, as Pease remarks, doubtfully distinct, are sundered into different families; the type of *Endodonta* is misquoted as *huahinensis*; *Pitya* is wrongly fathered upon the brothers Adams and misdated 1855, while no intimation is given of the preoccupation of *Libera*, pointed out in Zoological Record, 1881, Index, p. 8. So many errors upon a single page sufficiently destroy our confidence in the treatment of the group by this monographer.

To summarise: I would consider that "*Patula*" has no existence in the Pacific; that the southern species usually referred to that genus are not even of the *Helicidae* family; that these species can most conveniently be referred to one or other of the genera enumerated above, which genera may be grouped under the sub-family *Charopidae*, a division of the family *Zonitidae*.

None of the recorded descriptions fulfilling the exacting requirements of modern malacology, I propose in this and subsequent communications to refigure and redescribe all the Australian *Charopidae* of which I can obtain authentic specimens. Having studied the material accessible to me, I shall then consider the value of the proposed generic divisions; provisionally, all will be quoted as "*Charopa*."

The following descriptions and accompanying figures are based upon the author's types, most kindly placed at my disposal for that purpose by my friend Lieut. C. E. Beddome, R.N., of Hobart, Tasmania.

CHAROPA ALBANENSIS, Cox (1867).

(Plate II. figs. 5, 6, 7, 8.)

Syn.—*eastbournensis*, Beddome and Petterd, MSS.

Illustr.—Monograph Australian Land Shells, pl. iv. fig. 2 (2 figures); Manual of Conchology (2), ii. pl. LXII. figs. 25 and 26 (copied from the above).

Descrⁿ.—P.Z.S. 1867, p. 723; Mon. Aust. L. Shells, p. 15; Monographia Heliceorum Viventium, vii. p. 138; Man. Conch. (2), ii. p. 209; Trans. N.Z. Inst. xxiii. (1890), p. 85.

Shell thin, transparent; contour sublenticular, apex obtuse. Colour hyaline-white, painted above and below with very faint radiating chestnut flames, each extending over three costæ and narrower than the colour interspace, about 17 of these ornament the last whorl. Whorls $4\frac{1}{2}$, gradually increasing in diameter, upper whorls deeply channelled at their superior suture, somewhat flattened below and descending tumidly to the inferior suture, last whorl not descending at the aperture, channelled at the suture, flattened between the suture and the periphery, rounded abruptly at the periphery and gently on the base. Sculpture: the embryonic surface is modelled upon that of the adult and consists of faint capillary costæ, which become sharper and stouter as the growth proceeds, on the completion of a whorl and a-half the adult sculpture is abruptly substituted for the embryonic; the costæ here suddenly change to four times the size of their predecessors, with corresponding increase of the width of their interstices, in proportion as the shell increases so the intercostal spaces widen, their width is not always uniform nor are the costæ always of uniform size, more rarely they are not parallel, never do they continue across the suture from whorl to whorl, on starting from the suture the latest costæ are seen as sharp erect lamellæ directed square across the whorl, nearing the periphery they trend obliquely backwards, their upright crest curling backwards, arrived beneath the periphery they steer straight across the base to the rim of the umbilical crater, into which they plunge directly, viewed edgeways (the apex of the shell uppermost) each costa is somewhat the shape of a letter S whose upper bend has been straightened; upon the last whorl I counted 83 and upon the penultimate 60 costæ; between and parallel to the costæ are from four to twelve microscopic raised hair-lines, which are crossed at right angles by similar spiral lines; this secondary sculpture, which also extends over the costæ, gives an appearance of network to the shell when highly magnified, here and there a hair-line thickens into a rudimentary

costa. Umbilicus about a third of the width of the shell, deep, conical, showing every revolution and almost all the embryonic whorl, sculptured within similar to the spire. Aperture slightly oblique, ovate, lunate; peristome sharp, straight, except at the columellar margin, where it is a little reflexed, viewed from above the peristome describes a wide convex, then a sharper concave curve on approaching the insertion. Callus on body whorl slightly projecting past an imaginary straight line drawn from insertion to insertion of the peristome, thin, transparent, just burying the costæ overtaken by it. Diam. maj. $4\frac{1}{2}$, min. 4, alt. $2\frac{1}{2}$ mm.

Type in the Cox Collection.

H a b.—Port Albany, West Australia (Masters); Eastbourne, near Avoca, Tasmania (Beddome).

var. *stanleyensis*, Petterd (1879).

Syn.—*petterdiana*, Taylor (1879).

Descrⁿ.—Monograph Land Shells of Tasmania, p. 32; Quarterly Journal of Conchology, ii. (1879), p. 287; Trans. Roy. Soc. S.A. Vol. iv. p. 75.

Differs from the type by being more depressed, spire plane or nearly so.

Type in the Hobart Museum.

H a b.—Circular Head, Table Cape, Emu Bay, Torquay, Launceston, and Mount Wellington, Tasmania; islands in Bass Straits; Fernshaw (Petterd) and Gippsland (Australian Museum), Victoria.

var. *albida*, Taylor (1879).

Journ. of Conch. ii. p. 287.

“White, without markings” (J. W. T.).

Type (?).

H a b.—(?).

Specimens on which the above description is based, being the types of *eastbournensis*, exactly coincide with some of the original lot collected by Masters in West Australia. From both, specimens of *stanleyensis*, collected at Circular Head and sent by Petterd, differ in a varietal degree. My experienced colleague and friend

Mr. Brazier, who examined these specimens at my request, fully concurs with me in this opinion.

The extended range we thus find possessed by *albanensis* is shared by its congener *C. paradoxa*, Cox, and as our knowledge of the fauna of South-Western and South-Eastern Australia improves, so may the affinity demonstrated by Hooker between their respective floras be paralleled in the animal kingdom.

These shells offer another illustration of the law pointed out by Garrett*—that the most widely diffused species of land mollusca are always minute; other instances are—*Pupa pacifica*, Pfeiffer, in Australia; *Stenogyra gracilis*, Hutton, and *Pupa pedicula*, Shuttleworth, in Polynesia; *Vallonia pulchella*, Müller; *Vertigo muscorum*, Linné; *Zonites fulvus*, Draparnaud; *Z. viridulus*, Menke; *Z. nitidus*, Müller; *Acanthinula harpa*, Say; and *Ferrussacia subcylindrica*, Linné, which range through the northern portions of Europe, Asia, and America.

C. ANTIALBA, Beddome (1879).

(Plate I. figs. 5, 6, 7, 8.)

DESCR^m.—Monograph of the Land Shells of Tasmania, p. 41; Proc. Roy. Soc. Tasmania, 1879, p. 23; Trans. N.Z. Inst. xxii. 1889, p. 226.

Shell thin, transparent; contour, a sphere truncated at the poles, deeply concave above and below, the umbilical excavation deepest. Colour brown, the shade of dry dead leaves, streaks of slightly lighter shade represent the flame painting of other species. Whorls 5, the earlier enrolled within the later and almost concealed by them. From the channelled suture the last whorl rises perpendicularly, then arches outwards to its summit, from which it describes a curve of a third of a circle to its base, whence it incurves to the umbilical crater. The characteristic involute growth does not occur till the shell has attained a whorl and a half, at which point the embryonic sculpture is interrupted (as

* Journ. Acad. Nat. Sci. Philad. 1881, p. 396.

described in *albanensis*) by the adult and the shell at once commences to widen axially; viewed either from above or beneath, the smoother plane embryonic shell is seen as the flat floor of the spiral or umbilical pit. Sculpture: the last whorl is adorned with 150 sharp erect straight costæ, which are seen to stand out in profile on the periphery like the teeth of a circular saw, they are directed straight across the whorl from the spiral to the umbilical sutures and may be likened to the lines of longitude on a terrestrial globe. The secondary sculpture varies upon different parts of the shell, that sketched in the accompanying illustration is selected from the umbilical wall of the last revolution. Upon the spire two or three raised hair-lines parallel to the costæ occupy the intercostal spaces, at right angles similar hair-lines cross both these and the costæ, producing a reticulated appearance. Towards the periphery these spiral lines grow faint, while the intercostal lines multiply to half-a-dozen, within the umbilicus the transverse lines diminish and the spiral sculpture assumes the supremacy. Umbilicus cup-shaped, profound, exposing every revolution, a third of the shell's diameter in width. Aperture perpendicular, crescentic, peristome straight, sharp, scarcely reflexed on the columellar margin, projecting at the periphery past an imaginary line drawn from insertion to insertion. Callus smooth, shining, thick, semitransparent, quite burying the overtaken costæ, projected on the penultimate whorl in advance of the peristome. Diam. maj. $2\frac{1}{2}$, min. $2\frac{1}{4}$, alt. $1\frac{1}{2}$ mm.

Type in the collection of C. E. Beddome, Esq., R.N.

H a b.—Gad's Hill and Mount Bischoff, Tasmania (Beddome); occurred under timber.

var. *alba*, var. nov.

Entirely hyaline-white.

Occurred with the above.

C. BISCHOFFENSIS, Beddome (1879).

(Plate I. figs. 1, 2, 3, 4.)

Descrⁿ.—Monograph of the Land Shells of Tasmania, p. 39; Proc. Roy. Soc. Tasmania, 1879, p. 23.

Shell thin, globose, slightly gibbous, very narrowly perforated. Colour brown, some specimens darker than others; the last whorl apparently darker than its predecessors. Whorls $5\frac{1}{2}$, slowly increasing, the penultimate wider than the final when seen from above, channelled at the suture, tumid beneath it; last whorl gradually and slightly ascending at the aperture, rounded at the periphery and on the base. Sculpture everywhere closely ornamented by microscopic transverse raised hair-lines, whose interstices are latticed by smaller spiral lines; upon the base there are distinguishable some thirty faint and irregularly spaced costæ, but this primary sculpture is obsolete above. Embryonic shell of $1\frac{1}{2}$ whorls, plane and nearly smooth, clearly marked off from the adult. Umbilicus very narrow, abrupt at the margin, half covered by a tongue of callus. Aperture crescentic, perpendicular, peristome thin, straight, projecting little at the periphery. Callus especially prominent and heavy, curving obliquely across the whorl. Diam. maj. $2\frac{1}{2}$, min. $2\frac{1}{4}$, alt. 2 mm.

Type in the collection of C. E. Beddome, Esq., R.N.

Hab.—Mt. Bischoff, Tasmania (Beddome); occurred under timber.

C. GADENSIS, Beddome (1879).

(Plate II. figs. 1, 2, 3, 4.)

DESCR.—Monograph of the Land Shells of Tasmania, p. 29; Proc. Roy. Soc. of Tasmania, 1879, p. 23.

Shell thin, transparent; contour discoidal, spire plane. Colour hyaline-amber, unicolorous. Whorls $3\frac{1}{2}$, rather rapidly increasing, deeply channelled at the suture, rounded on their summits and at the periphery, flattened somewhat on the base. Sculpture: embryonic whorls, comprising the first $1\frac{1}{2}$ revolutions, delicately sculptured by faint transverse capillary costæ, the adult whorls are ornamented by fine capillary costæ, of which the last whorl bears about 175. These are directed straight across the whorl, and are everywhere crossed by very minute raised hair-lines, which within the umbilicus grow coarser and dominate the transverse lines. Umbilicus about a third of the diameter of

the base, deep, cup-shaped, margin rounded. Aperture slightly oblique, roundly lunate, peristome straight, sharp, projecting at the periphery, scarcely reflexed on the columellar margin. Callus projecting, bluish-white, thin, just burying the costæ of the preceding whorl. Diam. maj. 2, min. $1\frac{3}{4}$, alt. $\frac{3}{4}$ mm.

Type in the collection of C. E. Beddome, Esq., R.N.

H a b.—From Gad's Hill to Mt. Bischoff, Tasmania (Beddome); occurred in and under decayed timber.

EXPLANATION OF PLATES.

PLATE I.

Figs. 1-3.—Lateral, superior, and inferior aspects of the shell of *C. bischoffensis*, Beddome. Magnified.

Fig. 4.—Sculpture of the same. Much magnified.

Figs. 5-7.—Lateral, superior, and inferior aspects of the shell of *C. antialba*, Beddome. Magnified.

Fig. 8.—Sculpture of the same. Much magnified.

PLATE II.

Figs. 1-3.—Lateral, superior, and inferior aspects of the shell of *C. gadensis*, Beddome. Magnified.

Fig. 4.—Sculpture of the same. Much magnified.

Figs. 5-7.—Lateral, superior, and inferior aspects of the shell of *C. albanensis*, Cox. Magnified.

Fig. 8.—Sculpture of the same. Much magnified.

A SECOND UNDESCRIBED FORM OF WOMERAH
FROM NORTHERN AUSTRALIA.

BY R. ETHERIDGE, JUNR., &C.

(PALÆONTOLOGIST TO THE AUSTRALIAN MUSEUM AND GEOLOGICAL
SURVEY OF N. S. WALES.)

(Plate III.)

Since I read a short Note to the Society on a Womerah from Northern Queensland,* Mr. Charles Hedley has been instrumental in obtaining for me the loan of a second form of this weapon from the Rev. George Brown, secretary to the Australasian Methodist Mission, presumably undescribed, and believed by the latter to come from North Queensland.†

The history of the specimen is as follows:—It was collected about four years ago, by the late Captain Alex. Craig, of the ship “Princess Louise.” The ship was wrecked, the Captain killed on a subsequent voyage, and the log lost. On the voyage on which

* P.L.S.N.S. W. 1892, vi. (2), Pt. 4, p. 699.

† *Additional Note*—14/7/92.—Mr. Hedley and myself have found, since the publication of my Paper, a brief record of this womerah by the late John Macgillivray, who says:—“The throwing-stick in use at Cape York extends down the N.E. coast as far as Lizard Island. . . . It is made of casuarina wood, and is generally three feet in length, an inch and a quarter broad, and half an inch thick. At the end a double slip of melon shell, three and a half inches long, crossing diagonally, serves as a handle, and when used the end rests against the palm of the right hand, the three last fingers grasp the stick, and the fore finger and thumb loosely retain the spear.” (*Narr. Voy. H.M.S. Rattlesnake during the years 1846-1850*, I. 1852, p. 18.) This reference thus enables us to extend the range of this womerah throughout the Cape York Peninsula, the Gilbert River being situated at its extreme base.—R. E., JUN.

the womerah was obtained he made a trip from Sydney to the Torres Straits Islands, thence westward round Dutch New Guinea to the Admiralty Islands, and back to Sydney.

It, therefore, became of importance to determine from what part of the Continent this weapon came. One naturally turns in the first instance for information to the late R. Brough Smyth's fine work on the "Aborigines of Victoria;"* failing that to the excellent illustrations given in Governor Eyre's "Journals of Expeditions of Discovery into Central Australia."† In neither of these works is any figure of the present womerah given; but on appealing to the valuable Macleay Collection at the University, with the aid of the Curator, Mr. G. Masters, three perfectly similar weapons were unearthed, and all labelled Port Darwin. So much for the district in which this form of throwing-stick is employed. Further researches amongst other works failed to find any description of such an implement as the present, but in Knight's "Study of the Savage Weapons at the Centennial Exhibition, Philadelphia, 1876,"‡ are two rough figures, without explanations, of "Spear-throwing Sticks, South Australia," one of them with a general resemblance to our womerah, but without any detail displayed. South Australia, with the light thrown upon the subject by the Macleay Museum specimens, must be an error, for the throwing-sticks of the southern portion of Australia are quite of a different type.

The womerah is lath-like and slightly curved, although for the first two feet from the handle it is straight, the curvature then becoming gradually marked, and the blade attenuating to a sharp point at the outer end. The total length is three feet nine inches, and two and a quarter inches wide at the lower or proximal end, and just above the hand hold. The blade is one-sixth of an inch

* The Aborigines of Victoria, 2 vols. (4to., Melbourne, 1878: Government Printer.)

† Two vols. (8vo., London, 1845.)

‡ Ann. Report Board Regents Smithsonian Inst. for 1879 [1880], p. 276, f. 117.

in thickness, and is quite flexible. The whole womerah has been stained red, except eight inches from the proximal and five and a half from the distal end, which spaces have been left uncoloured, and with the grain of the wood showing. At the proximal end the blade has been cut out to form a handle, and is terminated by a more or less shortly-pyriform knob-shaped mass of black gum cement, over which string has been spirally wound and interlaced in a highly finished manner, the whole smeared with a thin coating of gum-cement, and then coloured red like the blade. The string is at the edge of the gum knob wound three times spirally, occupying a space of somewhat less than a quarter of an inch, then passed along parallel to the length of the womerah for the space of an inch, and again following this for one and a quarter inches in a spiral direction. The carving of the handle is in the condition of very fine, regular, and beautifully executed incised lines, extending for three and a quarter inches up the blade. The first and widest band is of transverse or spiral lines, the second of oblique lines inclined to the right, the third transverse, the fourth obliquely inclined to the left, the fifth again transverse, the sixth oblique to the right as before, and the seventh and last again transverse, and the widest of all. It will be observed that the oblique lines alternately to the right and left produce a kind of herring-bone pattern divided by transverse bands.

I have not met with a precisely similar ornament in any Australian weapon or ornament, although the simple herring-bone pattern is not uncommon.

The attenuated distal end of the blade is mounted with a very neatly made hard-wood peg, somewhat bottle-stopper shaped, and lashed on by fine fibre or string.

The largest of the Port Darwin womerachs in the Macleay Museum, precisely similar in shape to this one, is three feet nine and a half inches long, and two inches and two-eighths wide at the base of the blade. It is an exact counterpart of the Rev. G. Brown's, but is coloured throughout the entire length. The second is three feet five inches long, and one and five-eighths at

the base. It is without carving of any description, wholly coloured, of much rougher workmanship, the knob at the end of the handle merely a ball of gum, and the peg and lashing at the distal end washed with white pipeclay pigment. The third example is three feet five and three-quarter inches in length, and two inches wide at the base. It is wholly coloured red, and the handle carved, but the carving extends a much shorter distance up the blade than in Mr. Brown's.

As I have before said, the only illustration in any way approached by this weapon is one of the two womerahs from "South Australia" given by Knight. The blade is very slightly curved, the cut-out portion of the handle very short, no carving, and the ball end of the handle circular and without sculpture.

EXPLANATION OF PLATE III.

Fig. 1.—Upper surface of womerah.

Fig. 2.—Handle; edge view.

Fig. 3.—Peg end; edge view.

(All the figures much reduced.)

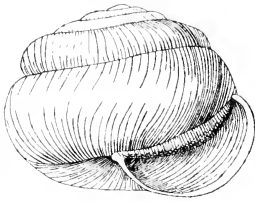
NOTES AND EXHIBITS.

Mr. Hedley exhibited specimens of *Charopa albanensis*, Cox (= *eastbournensis*, Beddome and Petterd, MSS.), *C. antialba*, Beddome, *C. gadensis*, Beddome, and *C. bischoffensis*, Beddome, in illustration of his paper.

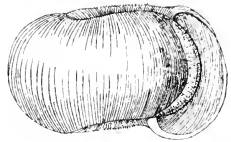
Mr. Froggatt showed the insects described in his paper; also coloured drawings of the same, and of their galls.

Mr. Etheridge exhibited the peculiar womerah described in his paper.

Mr. Henry Deane showed the ordinary flowers of a seedling of an Australian plant, *Pavonia hastata* (N. O. Malvaceæ), growing in his garden at Hunter's Hill; and he stated that he had hoped to have shown also cleistogamous flowers from the same plant, but that his intention had been defeated by the extremely inclement weather. Also monstrous specimens of *Zinnia* showing the transformation of florets into shoots, a condition probably induced by the continuance of damp warm weather.



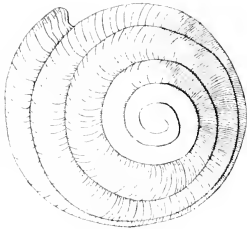
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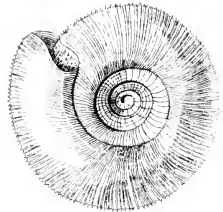
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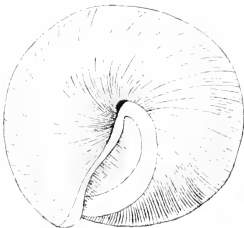
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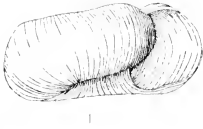
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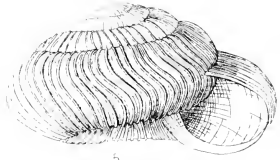
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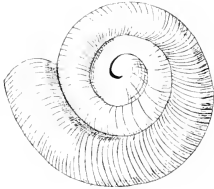
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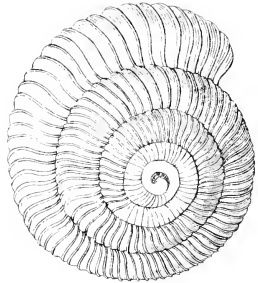
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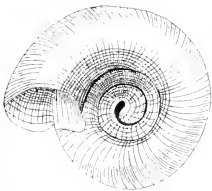
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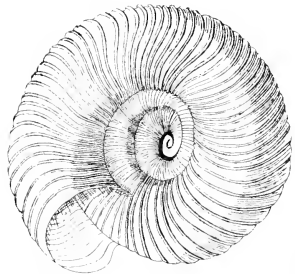
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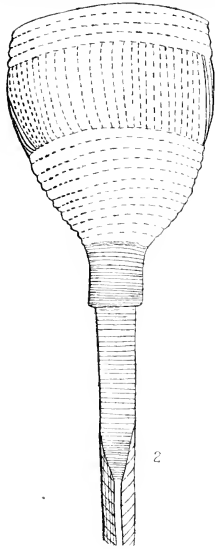
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3

WEDNESDAY, 27TH APRIL, 1892.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

DONATIONS.

“Archives de Biologie.” T. vii., Fasc. 4 ; T. x.-xi. (1890-91) ;
 “Curtis’s Botanical Magazine.” Third Series. Vol. xlvi. (1890) ;
 “Notes from the Leyden Museum.” Vols. xii.-xiii. (1890-91) ;
 “Nouvelles Archives du Muséum.” 3^{me} Série. T. ii. (two parts) ;
 T. iii., Part 1 (1890-91) : “Zeitschrift für wissenschaftliche
 Zoologie.” Bd. li.-liiii., Heft 1-3 (1890-91). *The gift of the late
 Hon. Sir William Macleay, F.L.S.*

“Royal Geographical Society of Australasia : Queensland
 Branch—Proceedings and Transactions.” Vol. vii., Part 1 (1891-
 92). *From the Society.*

“Journal of the Royal Microscopical Society, 1892.” Part 1
 (February). *From the Society.*

“Gesellschaft für Erdkunde zu Berlin—Verhandlungen.” Band
 xix. (1892), No. 1 ; “Zeitschrift.” Bd. xxvi. (1891), No. 6.
From the Society.

“The Journal of Comparative Medicine and Veterinary
 Archives.” Vol. xiii., Nos. 2 and 3 (February and March, 1892).
From the Editors.

“Museum of Comparative Zoology at Harvard College—Bulletin.”
 Vol. xxii., No. 4 (January, 1892) ; Vol. xxiii., No. 1 (Feb.,
 1892). *From the Curator.*

“Journal of the Bombay Natural History Society.” Vol. vi.,
 Nos. 3 and 4 (1891). *From the Society.*

“Smithsonian Institution—United States National Museum—Bulletin.” Nos. 41 and 42; “Annual Report, 1888-89.” pp. 427-445, 591-608, 729-735; “Proceedings.” Vol. xiii. (1890); Vol. xiv., Nos. 880-881 (1891-92). *From the Museum.*

“Comité Géologique, St. Pétersbourg—Bulletins.” Tome ix., Nos. 9-10 (1890), Tome x., Nos. 1-5 (1891); Supplément au Tome x. (1891); “Mémoires du Comité Géologique.” Vol. xi., No. 2 (1891). *From the Committee.*

“Bulletin de la Société Impériale des Naturalistes de Moscou.” Année 1891, Nos. 2-3. *From the Society.*

“Bulletin de la Société Belge de Microscopie.” xviii^{me} Année, Nos. 3-4 (1891-92). *From the Society.*

“The Australasian Journal of Pharmacy.” Vol. vii., Nos. 75 and 76 (March and April, 1892). *From the Editor.*

“Perak Government Gazette.” Vol. v., Nos. 5-6 (February 26th and March 11th, 1892). *From the Government Secretary.*

“Royal Society of London—Proceedings.” Vol. L., Nos. 303-304 (January, 1892). *From the Society.*

“Records of the Geological Survey of New South Wales.” Vol. ii., Part 4 (1892). *From the Hon. the Minister for Mines.*

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“Department of Agriculture, Victoria—Bulletin.” No. 14 (December, 1891). *From the Secretary for Agriculture.*

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PAPERS READ.

A VIVIPAROUS AUSTRALIAN PERIPATUS (*P.*
LEUCKARTII, SAENG.)

BY J. J. FLETCHER, M.A., B.Sc.

For some years past a species of *Peripatus* has been known to occur in New South Wales; and no one has ever said of it that after studying Sedgwick's full description of *Peripatus leuckartii* he was fairly certain that it did not belong to that species, but to a new one. On the contrary, no one has ever called it, or proposed to call it, by any other name than *P. leuckartii*, Säng. Further, on the *ipse dixit* of Dr. Dendy himself it is to be called *P. leuckartii*; for in two recent papers he quite authoritatively says that *P. insignis* is "the only other known Australian species": but *P. leuckartii* has fifteen pairs of walking legs, and *P. insignis* has fourteen pairs; and no *Peripatus* with other than fifteen pairs has hitherto been recorded from New South Wales. Now this New South Wales *Peripatus*, which even according to Dr. Dendy is *P. leuckartii*, and which has never been otherwise designated, is not only as viviparous as *P. capensis*, for example, but there has not been, since the year 1888, the slightest room for any doubt on the subject, for, among others, the simple and sufficient reason that the very first specimen of it that was ever opened, in the month of July, 1888, proved to be in the same interesting condition as the first specimen of *P. capensis* dissected in 1873 by Moseley, who says that on opening it he "found the animal to be viviparous, and full of far-advanced embryos." Nor is this mere assertion on my part, as I shall presently show, for one of the Australian *Peripatus* embryos was preserved by Dr. Haswell, who gave it to me in October, 1888, and it has remained in my possession ever since. This embryo is approximately at the same stage of development as one of Moseley's advanced Cape embryos just referred to, and, allowing for the specific difference

in the number of legs, it is very fairly represented by his figure thereof (Phil. Trans. Vol. clxiv, pl. LXXV, fig. 3).

Moseley's observation is now nearly twenty years old, but to this day the correctness of his conclusion is undisputed. Therefore, in the case of the Australian specimen which in July, 1888, I gave to Dr. Haswell, who a few days later found it to be full of far-advanced embryos, told me of his experience, promised me one of the embryos, and a few weeks later fulfilled his promise, it is not at all clear to me what other conclusion any sane individual could possibly have arrived at under such circumstances than that it, too, was viviparous; or, this being so, what there was about this simple fact in any way more remarkable or in any way affording better cause for undue excitement and exultation than that John Gould or his predecessors should have actually found that Australian birds, like birds in other countries, were unquestionably oviparous.

Moseley calls such a specimen as that he refers to, a pregnant specimen; and I have said of the Australian specimen in question that on dissection it proved to be pregnant, as anyone will see on turning to the Proceedings of this Society for 1888 [Vol. iii. (2nd ss.), Part 2, p. 892, footnote]; and as Dr. Haswell, who made the dissection, is, I am glad to say, still in Sydney, I need not enlarge on the subject of the agreement of the statement with the facts; it suffices to say that not only had a pregnant specimen been met with as far back as the year 1888, but that the fact is on record.

And this was only the first of a series of experiences, each by itself sufficient to establish the undoubtedly viviparous nature of the Peripatus with which we had to deal, and which has never been called anything but *P. leuckartii*. But even so, what was there to make a fuss about? No unprejudiced critic can deny that to anyone of the stamp of O. W. Holmes's youthful correspondent, "who longed to leap at a single bound into celebrity," there certainly was here presented an opportunity of gaining, if not celebrity, at least a little cheap notoriety, or, failing that, an inexpensive method of putting himself abundantly *en évidence* on very slight provocation. Otherwise, and as Peripatus was viviparous all along the line, and the Australian *P. leuckartii*

simply and naturally came up into line, there was just as little need to rush into print with sensational announcements about it as there is for an ornithologist who finds the previously unknown eggs of an already described bird, or a previously undescribed bird and its eggs, with a flourish of trumpets to flood the scientific journals with announcements of a new and rare discovery. A brief but correct record of the matter was made for future guidance; and that was sufficient.

At this time Dr. Dendy and the Australian *Peripatus* were strangers and had not met; one could not therefore be expected to provide against such a contingency as that on July 31st, 1891, a Victorian naturalist should arise and say with an emphasis which quite settles the matter, that *Peripatus leuckartii*, the common 30-legged *Peripatus* of Eastern Australia, is not viviparous at all, that it differs widely in this respect from all other known species, and that before the date mentioned nobody knew anything whatever about its mode of reproduction, or as he puts it, "Hitherto [*i.e.*, prior to July 31st, 1891] little has been known of its habits, and nothing of its mode of reproduction": in reply to which I may say that, as regards the New South Wales *Peripatus*, at least, while all this is both entertaining and amusing, the Victorian naturalist in question seems to have arrived a little late on the scene, and to have got off the track and to have lost himself *en route*, because there is no difficulty whatever in proving, even to his satisfaction, that the New South Wales *Peripatus* was viviparous in 1888, that it is still viviparous in 1892, and that in the interval it was also viviparous; or that it does not differ, and within the period mentioned has not differed, from extra-Australian species in respect of its viviparity.

In four recent papers* [Nature, Sept. 17th, 1891; Victorian Naturalist, Sept., 1891; Proc. Roy. Soc. of Victoria, Vol. iv. n.s.

* These are severally entitled: "An Oviparous Species of *Peripatus*" [the only Australian species referred to in the text being *P. leuckartii*]; "The Mode of Reproduction of *P. leuckartii*"; "On the Oviparity of *P. leuckartii*"; and "The Reproduction of *P. leuckartii*." In two of them *P. insignis* is referred to as "the only other Australian species" or "the only other known Australian species."

p. 31; and Zoologischer Anzeiger, December 28th, 1891] Dr. Dendy has announced the discovery that *P. leuckartii*—meaning thereby any Australian Peripatus which is not referable to the 28-legged *P. insignis*—is oviparous, that until he made this discovery nobody, more particularly myself,† knew anything about its mode of reproduction, and that it appears from my observations that the young are hatched in October. If all or any of this be correct, then of course the object given to me by Professor Haswell and referred to above as an embryo, is not and cannot be such, but it must be considered to be a yolk granule—a yolk granule with a pair of rudimentary antennæ, and fifteen pairs of developing walking legs, but only a yolk granule, however remarkable, nevertheless! For since Dr. Dendy describes the deposited eggs of *P. leuckartii* as consisting of “milky fluid contents containing very many yolk granules, but with no appearance of an embryo,” it is obviously impossible that advanced embryos could be present in younger (intra-uterine) ova of such an animal.

Clearly, therefore, Dr. Dendy would have done well either to have confined his remarks entirely to the mode of reproduction of the Victorian Peripatus, or else to have been quite sure of his ground. Because as set forth in his four papers Dr. Dendy has committed himself to definite statements about *Peripatus leuckartii* which when applied to the New South Wales Peripatus are simply preposterous; and when they are applied to the Victorian Peripatus are found, in view of subsequently ascertained facts, to be in need of so much limitation and qualification that when they come to be soberly restated in a modified form they may well be excused from knowing themselves when placed beside

† In three of Dr. Dendy's papers I am referred to as “the only observer, so far as I am aware, who has said anything of its [*P. leuckartii*] life-history.” Of course I knew nothing, because prior to July 31st, 1891, “nothing [was] known of its [*P. leuckartii*] mode of reproduction”; what there was to know was that *P. leuckartii* was oviparous and differed widely, &c. I have never said a word in the past on the subject of the life-history of any but N.S.W. specimens of *P. leuckartii*; and what I said about these was quite in order.

the somewhat inflated and pretentious originals. And the clue to what has happened may be offered in a few words.

Both Hutton and Sedgwick—the former as long ago as 1876—had found that sometimes the New Zealand *Peripatus* deposited eggs, and being cautious naturalists and duly mindful of a certain time-honoured wise saying—which a recent observer has conclusively shown to be every whit as applicable to the Victorian *Peripatus* as to the ordinary barn-door fowl—they did not commence operations by straightway proceeding to count the chicks—or at least not aloud and in print—on the very day on which the eggs were found some months in advance of the date at which even on a very moderate estimate, and under the most favourable circumstances possible, the young could be expected to hatch, if indeed that were to happen at all: on the contrary, they first waited to see what happened, and then talked, not about what they had expected to happen, but what they actually found to have happened; and so Hutton says “Although viviparous, the eggs are often extruded before development is complete; but these always die” [Ann. Mag. Nat. Hist. (4) 1876, xviii, p. 362], and Sedgwick in his Monograph on *Peripatus* says he can corroborate Hutton. This, it might not unreasonably be expected, would be enough to put subsequent egg-finders on their guard about discussing with confidence—in print at any rate—the possibilities of such eggs before, instead of after, the hatching of the young. Now, on July 31st, 1891, Dr. Dendy found a batch of Victorian *Peripatus* eggs—the only Australian *Peripatus* eggs anybody has ever met with—and two of his papers about them are dated July 31st, not 1892 but 1891, a third was read on August 10th, 1891, and the fourth on August 13th, 1891, but bears a postscript of date September 4th, 1891; whereas the eggs at the very earliest were not expected to hatch before the end of October, and even at that particular early period on quite erroneous grounds. Moreover, no one of them contains any reference whatever to the experiences of Hutton and Sedgwick with the eggs of the New Zealand *Peripatus*; and Dr. Dendy argues as if the eggs found by himself were the only *Peripatus* eggs ever met with, as if he knew for certain that they were

fertilised ova, and bound to hatch "at the end of October,"—for though I knew nothing about the mode of reproduction, Dr. Dendy shows to his own satisfaction that my observations, which have reference solely to a viviparous *Peripatus*, supplied the finishing touch to his splendid generalizations on the oviparity of *P. leuckartii*—and as if the N.S.W. *Peripatus* was not, and could not possibly be viviparous; consequently some new and remarkable conclusions are arrived at, and as so often happens under such circumstances, the new turns out not necessarily to be all true, because, in spite of Dr. Dendy's discoveries, among other things, the New South Wales *Peripatus* is viviparous, and when the Victorian *Peripatus* does lay eggs in July, not only are the young not hatched therefrom "at the end of October," or anywhere near that date, but at present, as far as I can learn, no one is bold enough to affirm that he ever knew a single instance in which young ever did hatch from such eggs.

If the Victorian *Peripatus* really is oviparous, then it is oviparous, and when the matter is settled nobody can raise any objections to its being so: in that case also the mode of reproduction of the Victorian *Peripatus* will certainly differ from that of the New South Wales *Peripatus*, and if such be true, no valid objection to that can be raised; indeed perhaps certain cynics, on other than biological grounds, might be disposed to aver that if the N.S.W. *Peripatus* certainly were one thing, that in itself would be full and sufficient reason why, on principle, the Victorian *Peripatus* should be something else as widely different as possible; but with such we are not now concerned. Dr. Dendy's modest claim is not, however, merely that he has proved that the Victorian *Peripatus* is oviparous, but that the common 30-legged Australian *Peripatus* wherever it occurs is so; and that until he shared his discovery with the world, he alone of all mortals knew anything of its mode of reproduction. To this it may be objected that Dr. Dendy's announcements were premature, and that in part they were based on the erroneous supposition that *P. leuckartii*, as it occurs in New South Wales, is not viviparous; that if the oviparity of the Victorian *Peripatus* were eventually established, not even then would Dr. Dendy's statements about

the mode of reproduction of the supposed oviparous *P. leuckartii* still apply to it without modification; that the statement or implication that *P. leuckartii* is oviparous cannot be allowed to pass muster until it is shown either that the New South Wales Peripatus is not viviparous, or that it cannot correctly be referred to that species; and that the wide difference in the mode of development of *P. leuckartii* as compared with all other known species is not proved, since the N.S.W. Peripatus is viviparous, and in the case of the Victorian Peripatus, if the wide difference consists in this that "the young are hatched at the end of October," that wide difference has now vanished, while if it be that eggs were once deposited, then on the same grounds Dr. Dendy should have stated that the New Zealand Peripatus was sometimes oviparous. Hence, under any circumstances whatever, explanations and restatements are necessary.

And as Dr. Dendy does not now for the first time hear that *P. leuckartii* as it occurs in New South Wales, is indisputably viviparous, and does not in its mode of reproduction differ widely from all other known species, and that there has never been any reason to suppose otherwise, it would have been just as well if an early opportunity of making the necessary modifications and of setting matters straight, had been found, because already his unmodified statements are finding their way into the records of zoological literature, and confusion and misapprehension must necessarily result. For example in Part i. of the *Journal of the Royal Microscopical Society* for 1892, recently to hand, there is (p. 37) an abstract of one of Dr. Dendy's papers, and it there occurs this wondrous statement, a perfectly legitimate deduction by a recorder whose bona fides is not to be questioned: "The eggs [of *P. leuckartii*] appear to be laid in or about July, and the young are hatched at the end of October." As a joke, or even as a fairy tale, this is, of course, perfectly admirable, because—and we may here leave the viviparous N.S.W. Peripatus entirely out of consideration for a moment—there must be a considerable number of individual specimens of Peripatus within the territory of Victoria, where, we are told, Peripatus is not an uncommon constituent of that section of the invertebrate fauna which lives out of sight

during the day time; and if only a fair proportion of the adult females lay their eggs in July of any given year, and if at the end of October following only a fair proportion of young are hatched therefrom—and we have it on high authority that the eggs are laid in July, and that the young are hatched at the end of October—it follows that except perhaps in very unfavourable years there ought annually to be a large accession to the Victorian Peripatus fauna just about October 31st: yet if the entire human population of Victoria were to turn out *en masse* and for a period of one month, six weeks, two months, and for how much longer we have not yet been told, dating from November 1st, were to devote themselves enthusiastically and exclusively to a search, over the whole area of the colony of Victoria, for the young of the Victorian Peripatus just hatching or newly hatched from eggs laid in July previous, the enthusiasts would find themselves engaged in a quest not less fruitless than if the same amount of time and energy had been given to the acquisition of specimens of the famous Australian bunyip. There are no buniyps to be captured in the Australian bush nowadays, neither at the time and under the circumstances mentioned are there any newly hatched young of *P. leuckartii*, for the latter are then as intensely “cryptozoic” and as altogether non-existent as the former. Then what a beautiful instance of unerring skill in forecasting the future, and in being able, at the first time of asking and on such slender evidence, to fix so precisely, not on the beginning nor on the middle, but on the end of October as the time when the impossible happens, is presented in the passage quoted; what an innocent-looking pitfall for the unwary—writer of a textbook it may be; and what a splendid chance of supplementing the catalogue of topsy-turvy biological and other arrangements prevailing at the Antipodes, given by the late Mr. Barron Field who says, “But this is New Holland . . . where the kangaroo, an animal between the squirrel and the deer, has five claws on its fore-paws, and three talons on its hind-legs, like a bird, and yet hops on its tail; . . . where the pears are made of wood, with the stalk at the broader end; and where the cherry grows with the stone outside” (pp. 461-462)!

And therefore viewing the matter in a serious light, and leaving misleading analogies and groundless expectations out of sight, and having regard only to the simple truth, what can be said of the latter clause at least of the above-quoted passage than that it is simply an exploded fable, a delusion and a snare? For, taking the passage as a whole, and as it stands, to what known Australian species of *Peripatus* is Dr. Dendy prepared to maintain that it can be truthfully applied? In other words, is it intended to be sober truth embodying the latest contribution to a knowledge of the life-history of the viviparous N.S.W. *Peripatus*, which Dr. Dendy says is oviparous, which has never been known to lay eggs in July, or to that of the Victorian *Peripatus*, whose young have never been known to hatch at the end of October or thereabouts? For one of the most important results arrived at by Dr. Dendy, so far, and at a date subsequent to that on which each of his four papers was written, is that the eggs found by him on July 31st—the only known Australian *Peripatus* eggs so far known—the possession of which on that date enabled him to prove so much, among other things, that *P. leuckartii* as it occurs in N.S.W. was certainly oviparous, utterly failed to come up to expectations, and that the young did not hatch therefrom “at the end of October”; for it appears from the Presidential Address of Professor Baldwin Spencer delivered in Section D at the Tasmanian Meeting of the Australasian Association for the Advancement of Science, on January 9th, 1892, in which the *Peripatus* eggs in question are referred to, that at that time [or to allow for a small margin let us say up to December 31st] they were still only in course of development, and he adds “that the embryos will apparently soon be hatched out.” Hence “at the end of October” is clearly an impostor, and may as well be thrown overboard once and for all.

Hutton and Sedgwick met with New Zealand *Peripatus* eggs, and they found that young did not hatch therefrom. Dr. Dendy on July 31st found Australian *Peripatus* eggs, and though on that date he knew exactly what would happen on or about October 31st, still up to December 31st he seems to have found himself pretty much in the same position, or at least in a position of extraor-

dinarily deferred expectation, viewed from the confident standpoint of July 31st.

The expected young may subsequently have hatched, or they may not have hatched, or they may yet hatch, or they may never hatch at all ; I cannot find any reference to the subject of later date than Professor Spencer's Address, of which he has recently very kindly sent me a copy. But whatever has happened or may happen in this matter, is quite immaterial just now, for I am not directly concerned with the mode of reproduction of the Victorian Peripatus, nor is it a subject on which in the past I have ever said a word. What we are directly concerned with at present is that the beautiful myth that the young of *P. leuckartii* "are hatched at the end of October" from eggs laid in July previous, has now received a well-merited quietus at Dr. Dendy's own hands ; and with it also the altogether fabulous Australian Peripatus—which would have been such a treasure to Mr. Field—whose young complete their development after deposition of the eggs in which there is no sign of an embryo, in the astonishingly short period of from three to four months—or, say, from July 1st to October 31st.

That on Mt. Kosciusko at such an elevation as 5700 feet, at which *Peripatus leuckartii* was found by Mr. R. Helms, Peripatus should lay its eggs in what we may call almost mid-winter, and that the eggs should hatch at the end of October, when some at least, if not the greater part, of this period would certainly be included in the months to which Mr. Helms refers when he says that "it must be remembered that this locality for at least from four to five months [in the year] is frequently covered with several feet of snow," and where even as early as 19th March Mr. Helms says he experienced frosty nights, would be on the face of it so extravagantly improbable—unless the development of the eggs of an oviparous Peripatus can steadily proceed at a temperature of about freezing point or lower—as never to have been worth serious consideration. And not less improbable, except with the same limitation, would it be of *P. leuckartii* at an elevation of over 3000 feet on the Blue Mountains, at which I myself have found it.

And if it be asked why the month of October should have been imported into the matter at all, any one of Dr. Dendy's four papers will supply an answer. This is one of them: "It thus appears that *P. lenckartii* lays eggs in July or thereabouts; and it appears also, from Mr. Fletcher's observations, with which it will be seen that my own fit in very well so far, that the young are hatched at the end of October" (Proc. R.S. Vict. iv. (n.s.) p. 33). This, it is hardly necessary to state, is entirely Dr. Dendy's own version of the matter, and in flat contradiction to my experience and statements; and I wholly repudiate any connection with it. I never irrationally supposed that the young specimens met with by me in October, 1888, were hatched from eggs laid by an oviparous animal some months before, I do not believe so now, and I have never made any statements which could possibly lead, or rather mislead, Dr. Dendy or any one else to suppose so. Quite the contrary; what I said was that of two females once in my possession, one on dissection proved to be pregnant—a perfectly correct use of the term sanctioned by so good an authority as Moseley—and that the other died shortly after giving birth to four young ones, which I exhibited at a meeting of this Society in October, 1888. My statements I can fully and convincingly justify; but Dr. Dendy has just as fully and convincingly shown the absurdity of his own conclusions respecting them by himself proving, firstly, that my observations when they are not misrepresented so far from fitting in very well with his own are diametrically opposed to them; and secondly, that when the Victorian *Peripatus* does lay eggs in July, young are not hatched therefrom "at the end of October" or anywhere near that date.

Moseley was the first to announce that *Peripatus* was viviparous; and as he unhesitatingly stated this to be the case, it is important to consider for a moment the evidence on which he relied, because at the time his classical paper was written he clearly did not know the month in which the young were born, he had not witnessed the birth of the young, and he had never even seen the newly born young; and it is equally clear that it was not possible for him to have known the one or seen the others. What he says on these points is: "The breeding-period of

P. capensis is thus probably the months of November, December and January, the three Cape summer months. Observations are required on the mode of congress of the sexes, and on the time and manner of the birth of the young" (p. 766). The subsequent investigations of Sedgwick established the fact that the young of *P. capensis* are born in April and May (Monograph, p. 165); Moseley's stay at the Cape in H.M.S. "Challenger" lasted from October 28th to December 17th, 1873, and his paper (Phil. Trans. Vol. clxiv. p. 757) is marked "received April 9, read May 21, 1874." His own words on the subject of viviparity are: "*Peripatus* was naturally the first animal sought after by the naturalists of the 'Challenger' expedition on their arrival at the Cape of Good Hope, and I was lucky enough to find a considerable number of specimens on the very first occasion of searching for them. My intention had been only to try to keep the animals alive, so as to obtain their eggs and watch their development, but on opening one large specimen I immediately recognised the presence of tracheæ, and found the animal to be viviparous and full of far-advanced embryos" (l.c. p. 757). In this passage it is noticeable that Moseley speaks of his finding the animal to be viviparous before he mentions embryos. From "Notes of a Naturalist on the 'Challenger'" it further appears (p. 161) that the specimen referred to was the first specimen met with. Moseley thus furnishes a safe criterion for determining whether a species of *Peripatus* is viviparous; and not only so, but he also gives authority for speaking of such a specimen as that to which he refers as a pregnant specimen. For he says that "of twenty female specimens dissected only one was found which did not contain embryos in some stage of development" (p. 766), and (on p. 767) "and in nearly all the pregnant specimens examined, &c.," and on p. 771 "the period of pregnancy" of two of them is spoken of, while the specimen not containing embryos is alluded to as "though, as before-mentioned, one still virgin female was found." Clearly, then, Moseley uses the term pregnant in the ordinary etymological sense of being "in the condition preparatory to bringing forth young," or, briefly, "with young." Additional authority for the use of the word in connection with *Peripatus* is,

if necessary, furnished by Slater, who after speaking of the embryos contained in the uterus of the S. American species which he proposed to call *P. inthurni*, goes on to say of breeding females: "I am unable to say whether they are pregnant all the year round, but it seems probable that this is the case."*

And as Moseley's knowledge of the viviparous nature of *P. capensis* was thus entirely derived from the study of pregnant specimens, as he himself terms them, and as his observations on this point, the correctness of which has never been questioned, are simply a record of pregnant specimens, it is quite clear that in dealing with other species of *Peripatus* about whose mode of reproduction nothing was previously known, any observer who meets with a female containing embryos knows *ipso facto* that he has to do with a viviparous species, he is entitled to speak of such a specimen as pregnant and is correct in so doing, and a record of a pregnant specimen is a record of a viviparous species. And if instead of taking the embryos out of the uterus oneself, they should be extruded during the process of drowning the mothers—by which means, as Sedgwick has recommended, one can obtain uncontracted specimens—owing, as I suppose to the continued struggles, this obviously is only another phase of the same thing, and is quite as satisfactory evidence of viviparity.

I first met with living specimens of the N.S.W. *Peripatus* in June, 1888, and on the 27th of that month I exhibited three of them at a Meeting of this Society, a notice of the exhibit appearing in due course in the Proceedings [Vol. iii. (2), Part ii. p. 892—published September 10th]. The subsequent history of two of these specimens—the third made good her escape, and I lost all trace of her—is soon told. Dr. Haswell was desirous of examining the muscles of *Peripatus* in the fresh condition [*vide* his Note on the subject in Report of Austral. Assoc. Adv. of Sc. Vol. ii. p. 487] and I promised him one of my specimens, and within a fortnight after the meeting I sent it to him. A few days afterwards when I next saw him, he told me that he had utilised the specimen, and that she was pregnant, or contained embryos—I am not sure now which of the expressions was used; and he added further

* Studies from the Morphol. Lab., Cambridge, Vol. iv. p. 215.

that he had saved one of the embryos for me and would let me have it at the first chance. For some time no opportunity offered, and as it was not a matter of vital importance I did not worry him about it ; but, as Dr. Haswell is known to be both a skilful and a veracious biologist, on the strength of his statement to me I was quite justified, even in the absence of an affidavit, in appending a footnote to the notice of my exhibit, as the proof finally left my hand, as follows : " One of these [three specimens exhibited] was subsequently dissected, and proved to be pregnant" (l.c. p. 892). This statement is brief, I admit, under the circumstances necessarily so ; but no reasonable objection can be taken to it on other grounds. I have shown that the specimen was one that Moseley would without hesitation have called pregnant ; and the inferences that he would have drawn under the circumstances are evident from the quotations already given from his paper. Also, as I have already remarked, Professor Haswell is still in Sydney.

The second specimen I kept, partly in the hope that she might live to produce young, and partly because I was much interested in her : as far as possible she was inspected daily, and from time to time the contents of the tin in which she was kept were carefully lifted out for an airing, and as carefully replaced. On October 24th I found her dead, and with her corpse four living newly born young ones ; these I exhibited at a Meeting on the 31st, and I said of them that they were the progeny of one of the females exhibited in June preceding and that the mother had died a few days ago after giving birth to them [Proceedings l.c. p. 1508] ; and in so saying not only did I know that another female got on the same day, at the same place, probably under the same stone, had been found by Dr. Haswell to be pregnant three months before, but when I made that statement I believe myself to be perfectly correct in saying that I actually had in my possession the embryo promised me by Dr. Haswell ; that in fact he brought it to the Meeting, and handed it over to me there and then ; it is mounted in balsam, and labelled in his own handwriting ; and I have had it in my possession ever since. The part of the Proceedings containing the notice of the exhibit was published on

March 22nd, 1889, but a notice of it appeared in the Abstract two days after the Meeting.

Confirmatory evidence was soon forthcoming. In November of the same year I got two specimens of *Peripatus* at Burrawang; they were exhibited at a Meeting of this Society on November 28th, and they were drowned on December 14th; in the process one of them extruded five embryos considerably older than Dr. Haswell's specimen. On September 18th, 1890, a specimen from the Blue Mountains under similar circumstances extruded three advanced embryos; and in December of the same year from a second lot of specimens from Burrawang some twenty or more embryos were obtained. These were carefully preserved; and they were shown to Professor W. Baldwin Spencer, who happened to be passing through Sydney early in September last, a few days after I saw the first of Dr. Dendy's four papers; they were also exhibited at a Meeting of this Society on September 30th, and their bearing on the subject at issue pointed out.

The climax in my experience, however, was reached in quite an unexpected and rather overwhelming manner in January of this year, during a visit to the Blue Mountains, part of the time at Mt. Wilson, where, with the help of Mr. J. D. Cox and Mr. A. G. Hamilton, I got about forty specimens; the following week elsewhere I was able to increase the number, and I came back on the 16th with fully 100 living healthy specimens. When collecting, young ones were never once met with; but in getting two females out of rotten wood I accidentally gashed them in the side; in one case there immediately protruded a moniliform portion of one of the oviducts suggestive of the presence of embryos; the other one was evidently in distress and I kept her under observation, and finally a little later I saw her in the act of depositing four advanced embryos; these with the two females were promptly preserved. On Jan. 18th I put all the specimens into fresh and more comfortable quarters, keeping them in four separate lots, but there were still no young ones. On Jan. 25th I first noticed young ones, the number steadily increasing day by day, and until young ones were present in each of the four tins; frequently twenty or more could be seen at once when one of the tins was

opened ; altogether there must have been at least 200 born, for after a number had died I counted 124 on Feb. 12th, and these just what I could see without routing out the cracks and crannies of the pieces of wood. A period of typical sweltering Sydney summer heat set in unfavourable alike to adults and young ; the mortality began to increase, and a number of the adults began to develop white bladdery swellings about the head ; and as I saw there was little use in trying to keep them much longer, I took steps to preserve the adults, and a sufficient number of the young, the others being liberated in the bush-house. Of a number of adults which were drowned, one extruded four embryos nearly at the full period, one extruded two, and three others extruded one each on February 11th ; of the last lot five females were chosen at random and opened, and the oviducts and uteri displayed but not otherwise interfered with ; in one case these contained neither ova nor embryos ; in the other four they were simply crammed with embryos, the pigmented tentacles of the oldest showing plainly through the membranes and the uterine wall after being a little while in spirit. A representative selection of the above was exhibited at the Meeting of this Society in February last.

Such then are some very simple facts about the mode of reproduction of the New South Wales Peripatus which has never been called otherwise than *P. leuckartii*. As facts about a Peripatus which, like all extra-Australian species is viviparous, they are in no way remarkable except that they are entirely and irreconcilably out of harmony with Dr. Dendy's very widely circulated and positive statements about the oviparity, not of the Victorian Peripatus, but of the common 30-legged Australian Peripatus known hitherto as *P. leuckartii*, Säng. In view of these simple facts ; in view also of the simple fact that of the first two small batches of Peripatus which I had a share in finding, one specimen was found on dissection to be pregnant, another brought forth her young in due course, and a third in the process of being drowned extruded five advanced embryos—all before Dr. Dendy had ever seen an Australian Peripatus ; and also in view of the also equally simple fact that on July 31st, 1891—as well as up to and including December 31st of the same year—Dr. Dendy had never seen

a newly hatched specimen of an oviparous Australian Peripatus, nor did he know of a single instance in which young had ever hatched from eggs laid by such an animal—it certainly is very wonderful that on July 31st, 1891, Dr. Dendy should not only imagine himself to be, but in four different Journals should pose as, the sole repository of all human knowledge, the infallible source of all wisdom on the subject of the mode of reproduction of the common widely distributed Australian Peripatus with fifteen pairs of walking legs, known as *P. leuckartii*: especially as that knowledge and wisdom included such items as that—leaving the local Victorian *P. insignis* out of consideration, nothing having as yet been ascertained about its mode of reproduction—there is no viviparous Australian Peripatus, that the young of the oviparous *P. leuckartii* are hatched at the end of October from eggs laid in the preceding July, thus completing their development in something like three or four months. And while no objections need at present be raised against Dr. Dendy's claim on the score of the excessive modesty and the imposing masterfulness implied thereby, very solid objection to it can be raised on the ground that it does not represent quite accurately the present state of anybody's knowledge about any known Australian species of Peripatus whether in New South Wales, Queensland, or Victoria.

And as, on the subject of Peripatus, I followed so safe a guide as Moseley, and called a pregnant specimen one which on dissection proved to be pregnant; or spoke of the young of a viviparous animal as having been born, it is not evident what there is about such a proceeding savouring of imposture, or perversion of the truth, that one's statements should, without inquiry or investigation, be deemed unworthy of credence. If such statements appeared to Dr. Dendy to be incompatible with truth, it would have been a simple and a courteous matter to have sent me a note of inquiry as to what I really did mean: such at least would not have been the first communication with which in the past he has favoured me on the subject of Peripatus; it would have received due attention, and within twenty-four hours he would have learned that, however little might have been known about the mode of reproduction of the N.S.W. Peripatus before July 31st

1891, certainly the events of that day were not likely to advance our knowledge at all.

The field open to biologists in Australia is wide enough, and the number of workers is few enough, to allow of abundance of fruitful material still being available; and it is quite possible even at the present day to go on a voyage of discovery in Eastern Australia, or even to aspire to fill the rôle of a Biological Captain Cook. But under such circumstances it would not seem at all necessary to allow zeal to run away with discretion, or to discover too much, or to suppose any one grossly incapable in not finding the hypothetical eggs supposed to have been laid by a viviparous specimen of *Peripatus*, even though the opportunity of doing so suppositionally lasted over four months and the deposited eggs of *P. leuckartii* are "easily seen, being fairly large," or even "very large"; nor in exposing the crass ignorance of other people would it be advisable to forget that one's own statements should be free from grave errors; nor as a prognosticator would it be worth while to be so painfully accurate in fixing the date almost to a day on which the young of the oviparous *P. leuckartii* do not by any chance hatch, or the exact number of months, after the deposition of the eggs, in which the young of *P. leuckartii* cannot possibly complete their development.

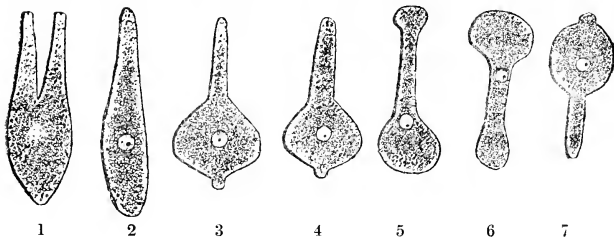
And since Dr. Dendy has quite settled matters relating to the mode of reproduction of the Australian *Peripatus* on a firm basis, and has proved quite conclusively, to his own satisfaction at least, that *P. leuckartii*, the common Australian *Peripatus* with fifteen pairs of walking legs, is oviparous and differs widely in its mode of reproduction from all other known species, it now only remains for him to push his conclusions to a logical end by showing in what a far-reaching and revolutionary manner prevalent notions on the subject of the mode of reproduction of extra-Australian species of *Peripatus* are affected thereby. For inasmuch as the N.S.W. *Peripatus* is not *P. insignis* it must be *P. leuckartii*, which Dr. Dendy has shown to be oviparous; and it entirely agrees as to its mode of reproduction with *P. capensis*, with *P. balfouri*, with *P. novæ-zealandiæ*, with *P. demeraranus*, with *P. edwardsii*, and with *P. torquatus*, for instance, therefore, &c.

JOTTINGS FROM THE BIOLOGICAL LABORATORY
OF SYDNEY UNIVERSITY.

BY PROFESSOR WILLIAM A. HASWELL, M.A., D.Sc.

NO. 16. NOTE ON THE OCCURRENCE OF A FLAGELLATE INFU-
SORIAN AS AN INTRA-CELLULAR PARASITE.

In an undescribed Rhabdocœle Turbellarian found in water obtained from a pond in the Victoria Park, Sydney, a remarkable phenomenon was observed. All the specimens examined had a dull yellowish-green colour, and, when they were examined under the compressorium, the colour was found to be due to the presence of innumerable, actively-moving, parasitic organisms. These were situated in the interior of the unicellular glands or other



large cells in the parenchyma—a very large proportion of these cells being thus infested. When, by dint of crushing the Turbellarian, the parasites were set free from the interior of the cells, their form and movements could be more readily observed. In shape they were nearly always constantly varying with great rapidity between an extreme of elongation and an extreme of

contraction. When in a quiescent condition they had the form represented in figure 2—approximately cylindrical, sharply pointed at one—the anterior—end, less sharply at the other; in length they were $\cdot 005$ mm. and in greatest breadth $\cdot 002$ mm. In many cases a series of movements, successive phases in which are represented in figures 3 to 7, followed one another in rapid succession. A glance at the figures will show that these movements are just the movements which are calculated to force a soft contractile body through such an obstacle as the protoplasmic network of a cell would present,—a narrow process thrust forward to force a passage, a thickening formed at the end of this process, and the main mass of the body drawn forward into this; then a fresh process thrust out in the same direction, and so on. At the same time, especially when the animal was still confined within a cell, there were frequent active twisting movements. In the interior of the mobile protoplasm of the parasite were a good many small rounded and rod-shaped particles of a greenish colour. These were most abundant about the middle, almost completely absent at the anterior extremity. A little behind the middle was a rounded space free from these green particles; this proved, when staining agents were used, to be a rounded nucleus with a distinct nucleolus. At the anterior end was usually a very slight notch. In most cases there was no flagellum; but in a considerable number a flagellum was present and exerted a considerable influence on the movements of the animal.

The movements of the animals within the cells were very remarkable. They seemed rarely to be at rest, almost incessantly creeping actively round and round the interior of the cell. Sometimes they could be distinctly seen to brush aside filaments in the cell-protoplasm, sometimes to thrust on one side the nucleus, restrained always apparently within the interior of the cell by a firm membrane which resisted perforation. Usually there was only one in a cell; frequently there were two, occasionally even three. In several cases they were observed to be undergoing multiplication by fission—the division beginning, as represented in figure 1, at the clearer anterior end.

The Rhabdocœle hosts appeared to be in full vigour and activity, notwithstanding the hundreds of the parasites in incessant movement in the cells. But in one instance the cell containing the parasite contained also a number of actively-moving *Vibriones*, so that in some cases at least a destructive effect would appear to be produced.

The relationship of the parasite to the Euglenoids is unmistakable; and it bears a considerable resemblance to *Euglena deses*, Ehr., the young of which is described as devoid of flagellum and moving by peristaltic contractions.* But no member of this family, or, so far as I can ascertain, any other group of *Flagellata*, has ever been observed living as an intra-cellular parasite. Pfeiffer in a recent work, "Die Protozoen als Krankheitserreger,"† states: "Aus Klasse I., die Infusorien und Flagellaten umfassend, sind obligate Zellschmarotzer unter den parasitisch lebenden Species noch nicht bekannt." But as far as the *Flagellata* are concerned, the statement would still be correct were the word "obligate" omitted. Several cases of parasitic *Flagellata* are mentioned by Bütschli‡; but these occur in the mucus of various organs, such as the alimentary canal, opening on the exterior, and, in the case of *Trypanosoma* and *Herpetomonas*, in the blood§; none of them inhabit the interior of cells. I think the observation now recorded is of some importance as suggesting a different origin for some at least of the *Sporozoa* than that suggested by Ray Lankester.||

* Saville Kent, "Manual of the Infusoria," p. 383, pl. xx. figs. 52 and 53.

† I am indebted to Professor J. T. Wilson for directing my attention to this work.

‡ "Protozoa" of Bronn's 'Thier-Reich,' p. 868.

§ Lewis, 'Q. J. Micro. Sci.,' Vol. xxiv. (1884).

|| Zoological Articles from the 'Encyclopædia Britannica,' "Protozoa," p. 26.

NOTES AND EXHIBITS.

Mr. Hedley exhibited living specimens of *Panda atomata*, Gray, drawing attention to the marked difference in sculpture between the embryonic and adult shells, a feature of much importance from a systematic standpoint. Also living specimens, lately procured from Scone by Dr. Cox, of an *Helicarion* presumed to be *leucospira*,* Pfeiffer, a long lost species which has not been heard of since it was originally described in 1856 as coming from "Australia": a specimen of *Cystopelta petterdi*, collected by Mr. J. D. Cox, at Mt. Wilson, the most northerly locality from which this mollusc has yet been obtained: and examples of *Helicarion thomsoni*, Ancey, received from Dr. Thomson of New Bedford, U.S.A., and collected at Geographe Bay, West Australia, by an American whaler, this novelty being interesting as the first of the genus known from that colony.

Mr. Brazier exhibited typical specimens, received from the author, of *Diplomorpha delatouri*, Hartman, and he contrasted them with a new member of this genus, of which he showed specimens, from Siegend Island, Santo Espiritu, New Hebrides: also examples of *Pupa fallax* from New Bedford, U.S.A., its distinctness from the Australian *P. pacifica*, Pfr., with which some writers have confounded it, being pointed out.

Mr. Maiden showed a collection of interesting plants from the Richmond River, and kindly intimated that they might be added to the Society's herbarium.

Mr. Trebeck exhibited a specimen of a flying fish, *Dactylopterus orientalis*, from Port Jackson.

* Mr. Smith, after kindly comparing these specimens with the types in the British Museum, confirms this identification. The Scone examples are, he says, but half the size of the types; they are also half the size of specimens which I have seen from the Richmond River, collected by Messrs. Petterd and Helms. C. H., 20th July, 1892.

Mr. Froggatt exhibited specimens of a rare sawfly, *Philomastix glaber*, Froggatt, and of its larvæ, which were found feeding on one of the wild brambles, *Rubus moluccanus*; they were obtained by him recently at Mt. Vincent, Maitland, N.S.W., when on a collecting trip for the Technological Museum, Sydney; the species was originally recorded from the Richmond River. Also a collection of Coleoptera, chiefly lamellicorns, among them some rare species of *Bolboceras*, sent to Mr. J. H. Maiden by Mr. Chisholm of Torren's Creek, one of the head waters of the Flinders River, North Queensland. Also two male specimens of a rare fossorial wasp, *Thynnus brenchleyi*, Smith, from the same locality, together with a specimen of the other sex, which may turn out to be the hitherto unknown female of this species; previously recorded only from Champion Bay, W.A., and Narrabri, N.S.W.

Mr. Rainbow showed a spider, in all probability a new species of the endemic and widely distributed genus *Stephanopsis*, from Bungendore.

WEDNESDAY, MAY 25TH, 1892.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

Mr. T. Cooksey, B. Sc., Ph. D., was present as a visitor.

Mr. Finkernagel, Barraba, N.S.W., and the Rev. E. J. Crowe, Cooma, N.S.W., were elected members of the Society.

The President announced that a number of subscriptions to the Macleay Memorial Volume had been received in answer to a circular issued a few weeks ago. It was necessary, however, that a considerably larger sum than had as yet been collected should be contributed by members of the Society and others desirous of giving expression to their sense of the late Sir William Macleay's liberality to science, before the Council would be in a position to proceed with the work, and all intending to contribute were urged to do so without delay.

DONATIONS.

“United States Geological Survey—Tenth Annual Report (1888-89).” Part 1—Geology; Part 2—Irrigation; “Bulletins.” Nos. 62, 65, 67-81. *From the Director.*

“Academy of Sciences, California — Proceedings.” Second Series. Vol. iii., Part 1 (September, 1891). *From the Academy.*

“Records of the Australian Museum.” Vol. ii., No. 1 (April, 1892). *From the Trustees.*

“Archiv für Naturgeschichte.” Ivii. Jahrg. (1891), Bd. ii., Heft 2; Jahrg. Iviii. (1892), Bd. i., Heft 1. *From the Editor.*

“Bulletin de la Société Royale de Géographie d’Anvers.” T. xvi. (1892), 2^e Fasc. *From the Society.*

“Mittheilungen aus der Zoologischen Station zu Neapel.” Bd. x., Heft 2 (1891). *From the Director.*

“Société Nationale des Sciences Naturelles et Mathématiques de Cherbourg—Mémoires.” T. xxvii. (1891). *From the Society.*

“Société Zoologique de France—Bulletins.” T. xvi., Nos. 9-10; T. xvii., No. 1 (1891-92). *From the Society.*

“Perak Government Gazette.” Vol. v., Nos. 7-9 (March-April, 1892). *From the Government Secretary.*

“Zoologischer Anzeiger.” xv. Jahrg., Nos. 387-388 (March-April, 1892). *From the Editor.*

“Royal Society of Victoria—Proceedings.” New Series. Vol. iv., Part 1 (April, 1892). *From the Society.*

“Queensland Museum—Annals.” No. 2 (1892). *From the Trustees.*

“Victorian Naturalist.” Vol. ix., No. 1 (May, 1892). *From the Field Naturalists’ Club of Victoria.*

“Department of Agriculture, Brisbane—Bulletin.” Nos. 15-16 (January, 1892). *From the Under Secretary for Agriculture.*

“Verhandlungen der Gesellschaft für Erdkunde zu Berlin.” Bd. xix. (1892), Nos. 2-3. *From the Society.*

“Mémoires de la Société Royale des Sciences de Liège.” 2^{me} Série. T. xvii. *From the Society.*

“Records of the Geological Survey of India.” Vol. xxv., Part 1 (1892). *From the Director.*

“Agricultural Gazette of N.S.W.” Vol. iii., Part 4 (April, 1892). *From the Director of Agriculture.*

“Supplement to the Descriptive Catalogue of Nests and Eggs of Birds found breeding in Australia and Tasmania.” By A. J. North, F.L.S. Part 2 (April, 1892). *From the Author.*

“Royal Society of London—Proceedings.” Vol. L., No. 305 (March, 1892). *From the Society.*

“British Museum (Natural History)—Catalogue of Birds.” Vol. xx. (1892). *From the Trustees.*

“Zoological Society of London—Abstract,” April 5th, 1892. *From the Society.*

“Bulletin de la Société Belge de Microscopie.” xviii^{me} Année, No. 5 (1891-92). *From the Society.*

“Royal Society of N.S.W.—Journal and Proceedings.” Vol. xxv. (1891). *From the Society.*

“The Australasian Journal of Pharmacy.” Vol. vii., No. 77 (May, 1892). *From the Editor.*

“Department of Agriculture, Victoria—Bulletin.” No. 13 (September, 1891). *From the Secretary for Agriculture.*

“Hooker’s Icones Plantarum.” Fourth Series. Vol. iii., Part 1 (April, 1892). *From the Bentham Trustees.*

“American Geographical Society—Bulletin.” Vol. xxiii., No. 4, Part 2; Vol. xxiv., No. 1 (March, 1892). *From the Society.*

“Johns Hopkins University Circulars.” Vol. xi., No. 97 (April, 1892). *From the University.*

“United States Department of Agriculture — Division of Botany”; “Illustrations of N. American Grasses.” By Dr. G. Vasey. Vol. i. (1891); “Division of Entomology—Insect Life.” Vol. iv., Nos. 7-8 (April, 1892). *From the Secretary of Agriculture.*

“American Naturalist.” Vol. xxvi. (1892), Nos. 302-303 (February and March). *From the Editor.*

“United States National Museum—Proceedings.” Vol. xiv., Nos. 882-883; Vol. xv., Nos. 887-888 (1892). *From the Museum.*

PAPERS READ.

CATALOGUE OF THE DESCRIBED HYMENOPTERA
OF AUSTRALIA.

PART II.

BY WALTER W. FROGGATT.

Family SCOLIIDÆ.

This family has representatives in all parts of the world, and such are plentiful in most parts of Australia, many of them frequenting flowers. Several large species banded with yellow and brown are plentiful about Sydney; another common Sydney species is *S. coronata*, Smith, a large black wasp marked with reddish-orange colour on the head and on either side of the third segment of the abdomen; the markings, however, are very variable. Our largest species is *S. fulva*, the thorax and body of which are densely covered with stiff reddish hairs; its habitat is the Northern parts of Australia. The females form burrows in sand-banks. Westwood says that *Scolia 2-cincta*, Fab., of Europe, burrows to the distance of eighteen inches.

Smith, in his British Museum Catalogue of Hymenoptera, Part iii. (1855), described a number of new species from this country. In the same year Saussure described several in the "Mémoires de la Société de Physique, &c., de Genève"; and later on some others in the "Annales de la Société Entomologique de France" (1858). In 1864 Messrs. Sichel and Saussure wrote a Monograph on this group and added another to our list. Smith, in the Transactions of the Entomological Society of London,

described eight more. While Kirby in going through the British Museum collection revised the genera of this family and added another species in the Transactions of the Entomological Society for 1889.

128. DIMORPHOPTERA.

Dimorphoptera, Smith, Trans. Ent. Soc. 1868.

CLYPEATA, Sm. Trans. Ent. Soc. 1868, p. 240, ♀.

Champion Bay, W.A.

FASTUOSA, Sm. l.c. p. 240, ♀.

Champion Bay, W.A.

MOROSA, Sm. l.c. p. 239, ♀.

Melbourne, Vic.

775 NIGRIPENNIS, Sm. l.c. p. 239, ♂.

Australia.

SABULOSA, Sm. (*Myzine*), Brit. Mus. Cat. Hym. Pt. iii. p. 76 (1855).

Australia.

SCOLIIFORMIS, Sm. Trans. Ent. Soc. 1868, p. 238, ♀.

Moreton Bay, Q.

SIGNATA, Sm. (*Myzine*), Brit. Mus. Cat. Hym. p. 75 (1855).

Australia.

UNICOLOR, Sm. (*Myzine*), l.c. p. 75.

Swan River, W.A.

129. SCOLIA.

Scolia, Fabricius, Syst. Ent. p. 355 (1775).

780 ANTHRACINA, Burm. Abh. Nat. Ges. Halle, I. 16, 3.

King George's Sound, W.A.

BIMACULATA, Sm. Brit. Mus. Cat. Hym. p. 114 (1855).

Pt. Stephens, N.S.W.

CORONATA, Sm. l.c. p. 112.

Adelaide, S.A. ; Sydney, N.S.W.

FERRUGINEA, Fabr. Syst. Ent. II. 231, 14; Syst. Piez. p. 241;

Sm. l.c. p. 114; Sauss. & Sich. Cat. Sp. Scolia, 159 (1864).

Australia ; Ceram.

FLAVIDULA, Sm. l.c. p. 115.

Australia.

- 785 FORMOSA, Guér. Icon. Règn. Anim. t. 69, fig. 10; Voy. Coq. Zool. II. pl. II. p. 252.
Australia.
- FRONTALIS, Sauss. Mém. Soc. Phys. Genève, XIV. pt. 1, p. 38 (1855).
Australia.
- FULVA, Grey, Cuv. Anim. Kingd. (Griffiths), p. 516, pl. LXXI. fig. 1, ♀; Sm. Journ. Linn. Soc. VI. p. 54, No. 9, ♀; Shuck. Trans. Ent. Soc. 1841-43, p. 222; Sauss. & Sich. Cat. Sp. Scolia, pp. 159-165 (1864).
Cape York, Queensland.
- INTRUDENS, Sm. Trans. Ent. Soc. 1868, p. 241.
Champion Bay, W.A.
- LÆVICEPS, Kirby, Trans. Ent. Soc. 1889, p. 447, ♀.
Swan River, W.A.
- 790 PYGMÆA, Sauss. Ann. Soc. Ent. France, VI. (3), p. 217 (1858).
Swan River, W.A.
- RADULA, Fabr. Syst. II. p. 226, 11; Syst. Piez. p. 235, 15.
Australia.
- 7-CINCTA, Fabr. Syst. Ent. 249, 4, ♂.
Pt. Essington, N.A.
- SOROR, Sm. Brit. Mus. Cat. Hym. p. 96 (1855); *Scolia cyanipennis*, St. Farg. Hym. III, p. 524 (1845).
Australia.
- TUBERCULIVENTRIS, Sauss. Mém. Soc. Phys. Genève, XIV. pt. 1, p. 47 (1855).
Australia.
- 795 VERTICOLLIS, Fabr. Ent. Syst. II. p. 234, 25; Syst. Piez. p. 244, 33.
Australia.
- VIRIDIPENNIS, St. Farg. Hym. III. p. 524, 7.
Australia.
- ZONATA, Sm. Brit. Mus. Cat. Hym. p. 116 (1855).
Australia.

130. ELIS.

Elis, Fabr. Syst. Piez. p. 248 (1804).

AUSTRALENSIS, Sauss. & Sich. (*Trielis*), Cat. Sp. Scolia, p. 144
(1864).

Australia.

CONSANGUINEA, Sauss. Mém. Soc. Phys. Genève, XIV. pt. 1,
p. 50 (1855).

Australia.

800 GRACILIS, Sauss. l.c. p. 62.

Australia.

SABULOSA, Sauss. Ann. Soc. Ent. France, VI. (3), p. 234 (1858).

Australia.

TASMANIENSIS, Sauss. Mém. Soc. Phys. Genève, XIV. pt. 1,
p. 61 (1855).

Tasmania.

Family SPHEGIDÆ.

The members of this group of fossorial wasps are numerous in Australia; several species of the genus *Spheg* are black, of large size, and have the front of the thorax covered with silky shining pubescence, which makes them very noticeable when busy excavating their tunnels in the sand; one, *S. vestita*, Sm., is a very plentiful species about Sydney towards the end of summer. Of the genus *Pelopæus*, Latreille, handsome yellow-banded wasps with very slender bodies, we have two described species; these wasps, unlike *Spheg*, form clay nests. Smith described a number in the British Museum Catalogue of Hymenoptera, Part iv. (1856), and added to them in the Transactions of the Entomological Society of London (1868), and in Brenchley's "Cruise of the Curaçoa" (1873). Saussure described several in the Hymenoptera of the "Reise Novara"; while Westwood formed the genus *Aphelotoma* for an insect from Tasmania.

131. AMMOPHILA.

Ammophila, Kirby, Trans. Linn. Soc. IV. (1804).

ARDENS, Sm. Trans. Ent. Soc. 1868, p. 247.

Champion Bay, W.A.

CLAVUS, Fabr. (*Sphex*), Ent. Syst. II. p. 205; Piez. Syst. p. 206.

Australia.

805 IMPATIENS, Sm. Trans. Ent. Soc. 1868, p. 247.

Champion Bay, W.A.

INSTABILIS, Sm. Brit. Mus. Cat. Hym. p. 214 (1856).

Swan River, W.A.; Pt. Essington, N.A.

SUSPICIOSA, Sm. l.c. p. 214.

Swan River, W.A.

132. PELOPÆUS.

Pelopæus, Latr. Hist. Nat. Ins. XIII. (1804).

FORMOSUS, Sm. Brit. Mus. Cat. Hym. p. 230 (1856).

Australia.

LÆTUS, Sm. l.c. p. 229, pl. vii. fig. 1.

N. S. Wales; Pt. Essington, N.A.; Macintyre River, Q.;

Swan River, W.A.; Australia and Ceram.

133. SPHEX.

Sphex, Fabr. Ent. Syst. II. (1793).

810 AMATOR, Sm. Brit. Mus. Cat. Hym. p. 246 (1856).

Australia.

ARCUATA, Christ, Hym. p. 312.

Australia.

ARGENTIFRONS, Sm. Trans. Ent. Soc. 1868, p. 248.

Champion Bay, W.A.

CANESCENS, Sm. Brit. Mus. Cat. Hym. p. 246 (1856).

Australia.

CARBONARIA, Sm. l.c. p. 247.

Sydney, N.S.W.

- 210 CATALOGUE OF THE DESCRIBED HYMENOPTERA OF AUSTRALIA,
- 815 CLAVIGERA, Sm. l.c. p. 247.
Australia.
- COGNATA, Sm. l.c. p. 248.
Australia.
- DECORATA, Sm. Brenchley's Cruise of Curaçoa, p. 461,
pl. XLIV. fig. 4.
N. W. Australia.
- EPHIPPIUM, Sm. Brit. Mus. Cat. Hym. p. 249, pl. vi. fig. 3
(1856).
Pt. Essington, N.A.
- FUMIPENNIS, Sm. l.c. p. 249.
Adelaide, S.A.
- 820 GLOBOSA, Sm. l.c. p. 251.
Tasmania.
- GODEFFROYI, Sauss. Ent. Zeit. Stettin, 1869, p. 57.
Cape York, N.Q.
- LUCTUOSA, Sm. Brit. Mus. Cat. Hym. p. 250 (1856).
Swan River, W.A.
- MODESTA, Sm. l.c. p. 248.
Australia.
- OBSCURELLA, Sm. l.c. p. 251.
Tasmania.
- 825 OPULENTA, Sm. l.c. p. 250.
Richmond River, N.S.W.
- PRÆTEXTA, Sm. Brenchley's Cruise of Curaçoa, p. 461, pl. XLIV.
fig. 5.
Moreton Bay, Q.
- VESTITA, Sm. Brit. Mus. Cat. Hym. p. 248 (1856).
N. S. Wales.
- VIDUA, Sm. l.c. p. 249.
Australia.

134. HARPACTOPUS.

- Harpactopus*, Sm. Brit. Mus. Cat. Hym. (1856).
- AUSTRALIS, Sauss. Reise Novara, Hym. p. 43, fig. 24.
Australia.

830 *SÆVUS*, Sm. Brit. Mus. Cat. Hym. p. 265 (1856); Sauss. Reise Novara, Hym. p. 42.
Swan River, W.A.

135. APHELOTOMA.

Aphelotoma, Westwood, Trans. Ent. Soc. (1) III. (1841).

TASMANICA, Westw. Trans. Ent. Soc. III. p. 226, pl. XII. fig. 4, ♀; Arch. Ent. II. p. 65, pl. LXV. fig. 3, ♂; Sm. Brit. Mus. Cat. Hym. p. 273, pl. VII. fig. 4 (1856).

Tasmania.

Family POMPILIIDÆ.

Some of the tropical species of this family are the largest and most ferocious of known wasps; they belong to the genus *Pepsis*, and are black with beautiful metallic lustre on the wings. Saussure has described one species of this genus from Australia.

Most of our species belong to the genus *Pompilus*; these have long legs armed with large spurs, and run very rapidly over the ground, constantly agitating their wings as they go; several of our larger species have bright yellow wings tipped with black.

From their large size and handsome appearance they were among some of the first of our Hymenoptera described by Fabricius from specimens in the Banksian Museum. In the British Museum Catalogue of Hymenoptera, Part iii. (1855), Smith catalogued these, and others previously described; and he described a number of others in the British Museum. Mr. Smith has since described many new species in the Transactions of the Entomological Society of London, 1862, 1864, 1868, 1869; in the Annals and Magazine of Natural History for 1873; in Brenchley's "Cruise of the Curacoa," and in "New Species of Hymenoptera" (1879), a British Museum publication published after his death in the early part of the year. Saussure, in the "Reise Novara, Hymenoptera," also described a number of this group, and more recently, Kohl, in several papers on this family published in the Verhandlungen z.-b. Gesellschaft in Wien (1886) has greatly enriched our list.

136. POMPILUS.

Pompilus, Fabr. Ent. Syst. Suppl. (1798).

AHASVERUS, Kohl, Verh. z.-b. Gesell. Wien, XXXVI. pp. 317
and 333, ♂ (1886).

W. Australia.

ANTENNALIS, Sm. Brit. Mus. Cat. Hym. p. 161 (1855).

Adelaide, S.A.

APATELUS, Kohl, Verh. z.-b. Gesell. Wien, XXXVI. pp. 315,
330, ♀ (1886).

Swan River, W.A.

835 AURIFRONS, Sm. Brit. Mus. Cat. Hym. p. 161 (1855).

Australia.

AUSTRALIS, Guér. Voy. Coq. Zool. II. p. 260.

Sydney, N.S.W.

CINEREUS, Fabr. Ent. Syst. Suppl. p. 250, 22; Syst. Piez.
p. 194, 31; *Sphex cinerea*, Fabr. Ent. Syst. II. p. 208, 40.

Australia.

CONSIMILIS, Sm. N. Sp. Hym. Brit. Mus. p. 152 (1879).

Queensland.

DISTINCTUS, Sm. Trans. Ent. Soc. 1868, p. 242.

Champion Bay, W.A.

840 DIVERSUS, Sm. l.c. p. 243.

Sydney, N.S.W., or Moreton Bay, Q.

ERYTHROSTETHUS, Sm. Brit. Mus. Cat. Hym. p. 162 (1855).

Australia.

FASCIATUS, Fabr. Syst. Piez. p. 194, 30; *Sphex fasciata*, Fabr.
Syst. II. p. 213, 60.

N. S. Wales, Queensland and Tasmania.

FLAVICORNIS, Sm. Brit. Mus. Cat. Hym. p. 163 (1855).

Pt. Stephens, N.S.W.

FUGAX, Fabr. Ent. Syst. Suppl. p. 250; Syst. Piez. p. 194;
Sphex fugax, Fabr. Ent. Syst. II. p. 213; *Sphex nitida*,
Fabr. Ent. Syst. II. 214; *Pompilus nitidus*, Fabr. Syst.
Suppl. 250; Syst. Piez. 195; Sm. l.c. p. 163 (1855).

Australia.

- 845 **FULVIPENNIS**, Sm. N. Sp. Hym. Brit. Mus. p. 151 (1879).
S. Australia.
- INFANDUS**, Sm. Trans. Ent. Soc. 1868, p. 244.
Australia.
- IRRITABILIS**, Sm. l.c. p. 243.
Australia.
- LABILIS**, Sm. N. Sp. Hym. Brit. Mus. p. 151 (1879).
Queensland.
- LUGUBRIS**, Sm. Trans. Ent. Soc. 1868, p. 422.
Champion Bay, W.A.
- 850 **LUNATUS**, Sm. Brit. Mus. Cat. Hym. p. 164 (1855).
S. Australia ; Sydney, N.S.W.
- MELANCHOLICUS**, Sm. Trans. Ent. Soc. 1868, p. 244.
Champion Bay, W.A.
- MOLESTUS**, Sm. Trans. Ent. Soc. I. (3), p. 54 (1862).
Sydney, N.S.W.
- MORIO**, Fabr. (*Sphex*), Ent. Syst. II. p. 208 ; Syst. Piez. p. 187.
N. S. Wales, S. Australia, Australia.
- NUBILIPENNIS**, Sm. Brit. Mus. Cat. Hym. p. 164, ♀ (1855) ;
N. Sp. Hym. Brit. Mus. p. 152, ♂ (1879).
Adelaide, S.A.
- 855 **OPIMUS**, Kohl, Ver. z.-b. Gesell. Wien, XXXVI. pp. 314,
331, ♀ (1886).
Swan River, W.A.
- ORNATIPENNIS**, Sm. Brit. Mus. Cat. Hym. p. 165 (1855).
Australia.
- PACHYCERUS**, Kohl, Ver. z.-b. Gesell. Wien, XXXVI. p. 317, ♂,
p. 314, ♀, p. 333 (1886).
Australia.
- PICTIFRONS**, Sm. Brit. Mus. Cat. Hym. p. 165, (1855).
Adelaide, S.A.
- PICTIPENNIS**, Sm. l.c. p. 165.
Australia.

- 860 POLLENS, Kohl, l.c. pp. 314, 332.
Tasmania.
RAPTOR, Sm. Trans. Ent. Soc. I (3), p. 54 (1862).
Sydney, N.S.W.
SANGUINOLENTUS, Sm. N. Sp. Hym. Brit. Mus. p. 152 (1879).
Swan River, W.A.
SEMILUCTUOSUS, Sm. Brit. Mus. Cat. Hym. p. 166 (1855).
Australia.
SPECTRUM, Kohl, Ver. z.-b. Gesell. Wien, XXXVI. pp. 314,
329 (1886).
Sydney, N.S.W.
865 TRICOLOR, Sm. Trans. Ent. Soc. 1868, p. 242.
Adelaide, S.A.
TUBERCULATUS, Sm. Brit. Mus. Cat. Hym. p. 166 (1855).
Houtman's Abrolhos, W.A.
VELOX, Sm. Trans. Ent. Soc. 1868, p. 241.
Australia.
VESPOIDES, Sm. l.c. p. 244.
Moreton Bay, Q. ; S. Australia.
VIDUATUS, Sm. Brit. Mus. Cat. Hym. p. 167 (1855).
Australia.

137. PRIOCNEMIS.

- Priocnemis*, Schiödte, Kröyer, Nat. Tidssk. I. (1837).
870 AFFECTATA, Sm. Trans. Ent. Soc. 1868, p. 245 ; Brenchley's
Cruise of Curaçoa, p. 460, pl. XLIV. fig. 2.
S. Australia ; Moreton Bay, Q.
DEFENSOR, Sm. Trans. Ent. Soc. 1868, p. 245.
S. Australia.
EPHIPPIATA, Sm. l.c. p. 246 ; Brenchley's Cruise of Curaçoa,
p. 460, pl. XLIV. fig. 2.
Adelaide, S.A.
POLYDORUS, Sm. Trans. Ent. Soc. 1868, p. 246.
Moreton Bay, Q.

138. FERREOLA.

Ferreola, St. Fargeau, Hym. III. (1845).

COLLARIS, Fabr. (*Sphex*), Syst. Ent. II. p. 208; *Pompilus collaris*, Fabr. Syst. Piez. p. 188; *Salix collaris*, Dahlb. Hym. Europ. p. 441.

Australia.

875 FRONTALIS, Fabr. (*Sphex*), Syst. Ent. II. p. 209; *Pompilus frontalis*, Fabr. Syst. Piez. p. 188.

Australia.

ZEBRATA, Sauss. Reise Novara, Hym. p. 48, fig. 29.
Sydney, N.S.W.

139. CENOCERUS.

Cenocerus, Dahlbom, Hym. Europe, I. (1843).

RAMOSUS, Sm. Trans. Ent. Soc. II. (3), p. 396, pl. XXI. fig. 4 (1864).

Australia.

140. AGENIA.

Agenia, Schiödte, Krøy. Nat. Tidsskr. (1837).

FUSIFORMIS, Sauss. Reise Novara, Hym. p. 53, fig. 34.
Sydney, N.S.W.

NOVARE, Sauss. l.c. p. 54, fig. 36.
Sydney, N.S.W.

141. POGONIUS.

Pogonius, Dahlbom, Hym. Europe, I. (1843).

880 LUNULATUS, Sauss. Reise Novara, Hym. p. 58, fig. 38.
Sydney, N.S.W.

142. MYGNIMIA.

Mygnimia, Sm. Brit. Mus. Cat. (1855).

AUSTRALASIE, Sm. Ann. Mag. Nat. Hist. 1873, p. 259.
N. W. Australia.

143. PEPSIS.

Pepsis, Fabr. Syst. Piez. (1804).

AUSTRALIS, Sauss. Reise Novara, Hym. p. 65, fig. 42.
Sydney, N.S.W.

144. DOLICHURUS.

Dolichurus, Latr. Gen. Crus. Ins. IV. (1809).CARBONARIUS, Sm. Trans. Ent. Soc. 1869, p. 303.
Champion Bay, W.A.

145. MAURILLUS.

Maurillus, Sm. Brit. Mus. Cat. (1855).AUSTRALIS, Sm. Brit. Mus. Cat. Hym. p. 170, ♀ (1855).
N.W. coast of Australia.

Family LARRIDÆ.

Most of the members of this family described from Australia belong to the genus *Pison*, Jurine. They are medium-sized wasps, generally black, and often ornamented with golden pubescence forming bands or fasciæ on the segments of the abdomen. Very little is known of their habits, but Smith says "that these insects are nest-builders, and that they construct cells similar to those of *Pemphredon*, and store them with spiders for their young." In the Transactions of the Entomological Society of London, Vol. II. (1837-40), Shuckard gives a long account of the genus, and describes several new species. Smith, in the Proceedings of the same Society for 1869, catalogued those previously described, and added a number of new ones from Australia, and also formed the genus *Parapison*, under which he described three species from India, Ceylon, and this country. The third genus, *Tachytes*, Panzer, the European species of which are captured in sand-banks according to Westwood, are represented in this country by four described species, all about half an inch in length, and of a shining black colour.

146. PISON.

Pison, Jurine, Ins. Ligur. II. (1808).885 AURATUS, Shuck. Trans. Ent. Soc. II. p. 78 (1837).
Australia.

- AURIFEX, Sm. l.c. 1869, p. 293.
Australia.
- BASALIS, Sm. l.c. p. 292.
Australia.
- COLLARE, Kohl, Verh. z.-b. Gesell. Wien, XXXIII. p. 337.
Duke of York Id. ; N. Australia.
- DECIPIENS, Sm. Trans. Ent. Soc. 1869, p. 294.
Champion Bay, W.A.
- 890 DIMIDIATUS, Sm. l.c. p. 295.
Champion Bay, W.A.
- FENESTRATUS, Sm. l.c. p. 291 ; *Pison nitidus*, Sm. l.c. 1868,
p. 248.
Champion Bay, W.A.
- FESTIVUS, Sm. l.c. 1869, p. 296.
Champion Bay, W.A.
- FUSCIPENNIS, Sm. l.c. p. 294.
Champion Bay, W.A.
- MARGINATUS, Sm. Brit. Mus. Cat. Hym. p. 314 (1856).
Hunter River, N.S.W.
- 895 OBLIQUUS, Sm. l.c. p. 316.
Tasmania.
- PERPLEXUS, Sm. l.c. p. 314.
Australia.
- PUNCTULATUM, Kohl, Verh. z.-b. Gesell. Wien, XXXIII.
p. 336.
Peak Downs, Q.
- RUFIPES, Shuck. Trans. Ent. Soc. II. p. 79 (1837).
Tasmania.
- SEPARATUS, Sm. Trans. Ent. Soc. 1869, p. 294.
Champion Bay, W.A.
- 900 SIMILLIMUS, Sm. l.c. p. 292.
Australia.

SPINOLÆ, Shuck. l.c. p. 76 (1837); Sauss. Reise Novara, Hym. p. 66; *australis*, Sauss. Mém. Soc. Phys. Genève XIV. p. 11 (1855); *tasmanicus*, Sm. Brit. Mus. Cat. Hym. p. 316 (1856).

Sydney, N.S.W.; Tasmania.

TIBIALIS, Sm. Trans. Ent. Soc. 1869, p. 292.

W. Australia.

VESTITUS, Sm. Brit. Mus. Cat. Hym. p. 315 (1856).

Australia.

WESTWOODII, Shuck. Trans. Ent. Soc. II. p. 77 (1837).

Tasmania.

147. PISONITUS.

Pisonitus, Shuck. Trans. Ent. Soc. 1837.

- 905 RUFICORNIS, Sm. (*Pison*), Brit. Mus. Cat. Hym. p. 315 (1856).
Macintyre River, Q.

148. PARAPISON.

Parapison, Sm. Trans. Ent. Soc. 1869.

RUFICORNIS, Sm. Trans. Ent. Soc. 1869, p. 299.

Australia.

149. TACHYTES.

Tachytes Panzer, Krit. Revis. Ins. Deutschl. (1806).

AUSTRALIS, Sauss. Reise Novara, Hym. p. 68.

Sydney, N.S.W.

HYPOLEIUS, Sm. Brit. Mus. Cat. Hym. p. 302 (1856).

Swan River, W.A.

TACHYRRHOSTUS, Sauss. Mém. Soc. Phys. Genève, XIV. p. 18,
fig. 5 (1855); Sm. Brit. Mus. Cat. Hym. p. 301 (1856).

Australia.

150. LARRADA.

Larrada, Sm. Brit. Mus. Cat. Hym. (1856).

- 910 AUSTRALIS, Sauss. (*Tachytes*), Mém. Soc. Phys. Genève, XIV.
p. 20, pl. IX. fig. 6 (1855).

Australia.

CHRYSONOTA, Sm. Trans. Ent. Soc. 1869, p. 304.

Champion Bay, W.A.

CRASSIPES, Sm. Ann. Mag. Nat. Hist. XII. (4) p. 294 (1873).

S. Australia.

FEMORATUS, Sauss. (*Tachytes*), Mém. Soc. Phys. Genève, XIV.

19, t. 8, fig. VII. (1855); Reise Novara, Hym. p. 74;

Sm. Brit. Mus. Cat. Hym. p. 285 (1856).

Australia.

NIGRIPES, Sauss. Reise Novara, Hym. p. 74.

Tasmania.

151. ASTATA.

Astata, Latr. Précis Caract. Ins. (1796).

915 AUSTRALASIE, Shuck. Trans. Ent. Soc. II. p. 72 (1837)

Australia.

Family NYSSONIDÆ.

This group comprises a number of genera, most of which contain only one or two described Australian species. Of the genus *Stizus*, Latreille, we have one species, *S. pectoralis*, Smith, from Queensland, a large ferruginous-coloured wasp somewhat like a *Thynnus*, but the shape of the body and the antennæ enlarged at the tips plainly show that it does not belong to the latter. The genus *Gorytes*, Latreille, contains four described species, black insects of medium size, generally variegated with yellow. Most of the members of this family have been described by Smith in the British Museum Catalogue, Part iv. (1856), in the Transactions of the Entomological Society (1862-64, 1868, 1869), and in the Annals and Magazine of Natural History for 1873.

152. LARRA.

Larra, Klug, Symb. Phys. V. (1829).

HIRTULA, Sm. Brit. Mus. Cat. Hym. p. 344 (1856).

Adelaide, S.A.

220 CATALOGUE OF THE DESCRIBED HYMENOPTERA OF AUSTRALIA,
PSILOCERA, Kohl, Verh. z.-b. Gesell. Wien, XXXIII. p. 355.
Australia

153. ACANTHOSTETHUS.

Acanthostethus, Sm. Trans. Ent. Soc. 1869.

BASALIS, Sm. Trans. Ent. Soc. 1869, p. 307, pl. vi. fig. 3.
Australia.

154. STIZUS.

Stizus, Latr. Gen. Crus. Ins. IV. (1804).

PECTORALIS, Sm. Brit. Mus. Cat. Hym. p. 337 (1856).
Rockhampton, Q.

155. MISCOTHYRIS.

Miscothyris, Sm. Trans. Ent. Soc. 1869.

920 THORACICUS, Sm. Trans. Ent. Soc. 1869, p. 308, pl. vi. fig. 5.
Champion Bay, W.A.

156. GORYTES.

Gorytes, Latr. Hist. Nat. XIII. (1805).

BELLICOSUS, Sm. Trans. Ent. Soc. I. (3), p. 55 (1862-64).
Adelaide, S.A.

DECORATUS, Handlirsch, SB. Ak. Wien, CXVII. Abth. 1,
p. 542 (1889).

Australia.

EXIMIUS, Sm. Trans. Ent. Soc. I. (3), p. 55.
Adelaide, S.A.

ORNATUS, Sm. l.c. 1868, p. 248.
Champion Bay, W.A.

925 TARSATUS, Sm. Brit. Mus. Cat. Hym. p. 336 (1856).
Adelaide, S.A.

157. NYSSON.

Nysson, Latr. Hist. Nat. XIII. (1804).

MYSTICUS, Gerstaecker, Abhandl. Nat. Gesell. in Halle, X.
p. 112.
Swan River, W.A.

158. SERICOPHORUS.

Sericophorus, Shuckard, MSS.; Smith, Ann. Mag. Nat. Hist. 1851.

BICOLOR, Sm. Ann. Mag. Nat. Hist. XII. (4), p. 405 (1873).
Swan River, W.A.

CHALYBEUS, Sm. Ann. Mag. Nat. Hist. VII. (2), p. 32 (1851);
Brit. Mus. Cat. Hym. p. 356, pl. ix. fig. 1 (1856);
Tachyrrhostus cyaneus, Sauss. Mém. Soc. Phys. Genève,
XIV. p. 26, 14 (1855).

Australia.

RELUCENS, Sm. Brit. Mus. Cat. Hym. p. 357 (1856).
Adelaide, S.A.

930 VIRIDIS, Sauss. Mém. Soc. Phys. Genève, XIV. p. 25, No. 13
(1855).

Australia.

Family PHILANTHIDÆ.

These fossorial wasps can always be easily distinguished from any of the other groups of this division by the deep constrictions round each segment of the abdomen. They are generally black, with dense punctures all over them, and some are marked with yellow bands and spots. All our species come under the genus *Cerceris*, Latreille; and with the exception of one described by Saussure in the "Reise Novara," have been worked up by Smith in the British Museum Catalogue, Part iv. (1856), and in the Annals and Magazine of Natural History for 1873.

159. CERCERIS.

Cerceris, Latr. Hist. Nat. Crus. et Ins. XIII. (1804).

ANTIPODES, Sm. Brit. Mus. Cat. Hym. p. 451 (1856).
Australia.

AURANTIACA, Sm. Ann. Mag. Nat. Hist. XII. (4), p. 414
(1873).

S. Australia.

AUSTRALIS, Sauss. Mém. Soc. Phys. Genève, XIV. p. 6, No. 2
(1855); Reise Novara, Hym. p. 93; *nigro-cincta*, Sm.
Brit. Mus. Cat. Hym. p. 450 (1856).

Sydney, N.S.W.; Adelaide, S.A.

FLUVIALIS, Sm, Ann. Mag. Nat. Hist. XII. (4), p. 412 (1873).
Swan River, W.A.

935 OPPOSITA, Sm. l.c. p. 413.

Lower Plenty, Victoria.

S.EVA, Sm. l.c. p. 414.

Lower Plenty, Victoria.

VARIPES, Sm. l.c. p. 413.

Adelaide, S.A.

VENUSTA, Sm. l.c. p. 413.

Queensland.

Family CRABRONIDÆ.

All the Australian wasps belonging to this family are referable to the world-wide genus *Crabro*, Fabricius. They are medium-sized insects, black, and generally banded on the body with red or orange colour. Two from Tasmania were described by Smith in 1856, and three others by the same author from South Australia and Queensland in 1868.

160. CRABRO.

Crabro, Fabr. Ent. Syst. II. (1793).

NEGLECTUS, Sm. Trans. Ent. Soc. 1868, p. 249.

S. Australia.

940 NIGRO-MACULATUS, Sm. l.c. p. 249.

Moreton Bay, Q.

TASMANICUS, Sm. Brit. Mus. Cat. Hym. p. 425 (1856).

Tasmania.

TRICOLOR, Sm. l.c. p. 394.

Tasmania.

TRIDENTATUS, Sm. Trans. Ent. Soc. 1868, p. 250.

Moreton Bay, Q.

Family BEMBICIDÆ.

The genus *Bembex* is well represented in this country, and we have a number of large and handsome described species. The European species are said to make their nests in the sand, and to provision them with flies. Smith has described the greater number of our known species in the British Museum Catalogue, Hymenoptera, Part iv. (1856), and in the Annals and Magazine of Natural History, XII. (4) [1873].

161. BEMBEX.

Bembex, Fabr. Mant. (1787).

ATRIFRONS, Sm. Brit. Mus. Cat. Hym. p. 327 (1856).

Swan River, W.A.

945 CRABRONIFORMIS, Sm. Ann. Mag. Nat. Hist. XII. (4), p. 296 (1873).

Pt. Essington, N.A.

FLAVIFRONS, Sm. Brit. Mus. Cat. Hym. p. 324 (1856).

Australia.

FLAVIPES, Sm. l.c. p. 325.

Australia.

FLAVILABRIS, Sm. Ann. Mag. Nat. Hist. XII. (4), p. 299, (1873).

W. Australia.

FLAVIVENTRIS, Sm. l.c. p. 299.

Swan River, W.A.

950 FURCATA, Erichs. Wieg. Arch. 1842, p. 226; Sm. Brit. Mus. Cat. Hym. p. 328 (1856).

Tasmania; Swan River, W.A.

PALMATA, Sm. Ann. Mag. Nat. Hist. XII. (4), p. 298, (1873); Brit. Mus. Cat. Hym. p. 325 (1856).

N. Australia.

RAPTOR, Sm. Brit. Mus. Cat. Hym. p. 326 (1856).

Adelaide, S.A.

SEVERA, Sm. Ann. Mag. Nat. Hist. XII. (4), p. 297 (1873).

Swan River, W.A.

TRIDENTIFERA, Sm. l.c. p. 298.

Moreton Bay, Q.

955 VARIABILIS, Sm. Brit. Mus. Cat. Hym. p. 325 (1856).

Victoria ; N. S. Wales ; Pt. Essington, N.A. ; Swan River,
W.A.

VESPIFORMIS, Sm. l.c. p. 327.

Adelaide, S.A.

Family MASARIDÆ.

This is a family containing several genera, the members of which are handsome wasp-like insects, parasitic on other wasps, constructing no nests themselves. Shuckard, when he formed the Australian genus *Paragia*, named it "in allusion to its deceptive habit, which is precisely that of a *Vespa*." Saussure wrote a monograph on the tribe *Masaridæ*, forming the third part of his work on the *Vespidae* (Paris, 1856). Previously to this he had written a paper on the family in the *Annales de la Soc. Ent. de France* (1853). Shuckard described the first known Australian species, *Paragia decipiens*, in the *Transactions of the Entomological Society of London* (1837). It is a handsome black wasp with a green tint on head and thorax, and the abdomen of dirty ochre-yellow colour ; this is our commonest species in N. S. Wales. Smith, in the *British Museum Catalogue of Hymenoptera, Part v.* (1857), and in the *Trans. Ent. Society of London* (1864-66-68-69), described a number of others.

162. PARAGIA.

Paragia, Shuck. *Trans. Ent. Soc.* 1837.

AUSTRALIS, Sauss. *Ann. Soc. Ent. France*, I. (3), Bull. p. xxi.
(1853) ; *Mon. Fam. Masar.* p. 58, 6, t. 2, fig. 3, ♂ (1856).

Tasmania.

BICOLOR, Sauss. l.c. p. 21 ; *Mon. Fam. Masar.* p. 58, 6, t. 2,
fig. 3, ♂ (1856).

Australia.

BIDENS, Sauss. *Mon. Fam. Masar.* p. 59, 7, ♀ (1856).

Adelaide, S.A.

- 960 CALIDA, Sm. Trans. Ent. Soc. II. (3), p. 392 (1864-6).
Adelaide, S.A.
- CONCINNA, Sm. Trans. Ent. Soc. 1869, p. 251.
Champion Bay, W.A.
- DECIPIENS, Shuck. Trans. Ent. Soc. II. p. 82, pl. VIII. fig. 3
(1837); Sauss. Mon. Fam. Masar. p. 54 (1856); Ann.
Soc. Ent. France, I. p. 21 (1853); Sm. Trans. Ent. Soc.
II. (3), p. 391 (1864-6).
N. S. Wales; Adelaide, S.A., &c.
- EXCELLENS, Sm. Trans. Ent. Soc. 1869, p. 309.
Champion Bay, W.A.
- MOROSA, Sm. Trans. Ent. Soc. 1868, p. 251.
Champion Bay, W.A.
- 965 NASUTA, Sm. l.c. p. 252.
Champion Bay, W.A.
- ODYNEROIDES, Sm. Trans. Ent. Soc. I. (2), p. 42, pl. v. fig. 2,
♀; Sauss. Mon. Fam. Masar. p. 56 (1856).
Hunter River, N.S.W.
- PICTIFRONS, Sm. Brit. Mus. Cat. Hym. p. 2 (1857).
Swan River, W.A.
- PREDATOR, Sauss. Mon. Fam. Masar. p. 59, 8, ♀ (1856).
Australia.
- SAUSSURII, Sm. Brit. Mus. Cat. Hym. p. 2 (1857); *tricolor*,
Sauss. Mon. Fam. Masar. p. 54, ♀ (1856).
Perth, W.A.
- 970 SOBRINA, Sm. Trans. Ent. Soc. 1869, p. 309.
Champion Bay, W.A.
- TRICOLOR, Sm. Trans. Ent. Soc. I. (2), p. 41, t. 5, fig. 1, ♂
(1850); *smithii*, Sauss. Mon. Fam. Masar. p. 55, 3, t. 2,
fig. 1, ♀ (1856).
Adelaide, S.A.
- VENUSTA, Sm. Trans. Ent. Soc. II. (3), p. 393 (1864-6),
Swan River, W.A.
- VESPIFORMIS, Sm. l.c. p. 393, ♀; l.c. 1868, p. 251.
Swan River, W.A.

Family EUMENIDÆ.

The solitary wasps belong to this family, and most of the foreign genera are represented in Australia. Many of them are handsome insects, black and yellow or orange in colour. They are large and aggressive-looking insects, armed with a large sting; several are commonly known as "mason-wasps," from their building large clay nests in any convenient sheltered place, which they provision with the larvæ of moths or spiders. Saussure, who has made the *Vespidæ* a special study, has described most of our wasps in his "Monograph des Guêpes Solitaires," Vol. I. 1851, and in other papers in the *Annales Soc. Ent. France* (1857), in the *Reise Novara, Hymenoptera* (1865), &c. Fabricius described several of our earliest known species in his *Syst. Piez.* (1804). Guérin described some in the "Voyage de la Coquille" (1830), and St. Fargeau dealt with others in his *Natural History, Hymenoptera*, Vol. IV. (1846). Smith, in his *British Museum Catalogue of Hymenoptera*, Part v. (1857), gave a list of these, and described several new species.

163. ELIMUS.

Elimus, Sauss. Mon. Guêpes Sol. p. 7 (1852).

AUSTRALIS, l.c. p. 8.

S. Australia.

164. DISCOLLIUS.

Discollius, Latreille, Gen. Crus. Ins. IV. (1809).

975 ELONGATUS, Sauss. Mon. Guêpes Sol. Suppl. p. 124, 11, pl. vi fig. 7, ♀.

Australia.

EPHIPPIUM, Sauss. l.c. p. 125, 13, pl. vi. fig. 8, ♀.

Australia.

INSIGNIS, Sauss. l.c. p. 126, 14, ♀.

Australia.

SPINOSUS, Sauss. l.c. p. 125, 12, ♀.

N. S. Wales.

VERREAUXII, Sauss. Mon. Guêpes Sol. p. 26, ♀.

Tasmania.

165. EUMENES.

Eumenes, Latr. Hist. Nat. III. (1802).

- 980 ARCUATUS, Fabr. Syst. Piez. p. 287 ; Sauss. Mon. Guêpes Sol. p. 63 ; Sm. Brit. Mus. Cat. Hym. p. 29 (1857) ; Journ. Linn. Soc. VII. p. 37 (1864) ; *Vespa arcuata*, Fabr. Syst. Ent. p. 371, 40 ; Sp. Ins. I. p. 467 ; Mant. Ins. I. p. 292, 66 ; Ent. Syst. II. p. 276, 83 ; Oliv. Ency. Méth. VI. p. 670 ; *Sphex arcuata*, Christ, Hym. p. 312 (1791).

Australia, New Guinea, &c.

- BICINCTA, Sauss. Mon. Guêpes Sol. p. 44.

Central Australia.

- CIRCINALIS, Fabr. Syst. Piez. 286 ; Sauss. Mon. Guêpes Sol. p. 47, No. 27 ; Sm. Brit. Mus. Cat. Hym. p. 22 (1857).

Australia, India, &c.

- ESURIENS, Fabr. Syst. Piez. p. 286, 7 ; Sauss. Mon. Guêpes Sol. p. 56, No. 40 ; *gracilis*, Sauss. l.c. p. 57, No. 41 ; *campiformis*, Sauss. l.c. p. 55, No. 38.

Australia, India, Africa, &c.

- FLUCTUANS, Sauss. Mon. Guêpes Sol. p. 43.

Australia.

- 985 LATREILLEI, Sauss. l.c. p. 51, pl. x. fig. 5.

Australia.

- PHILANTES, Sauss. l.c. p. 54, 37.

Australia.

166. NORTONIA.

Nortonia, Sauss. Ent. Zeit. Stettin, 1869.

- AMALIE, Sauss. Ent. Zeit. Stettin, 1869, p. 53.

Rockhampton, Q.

167. ABISPA.

Abispa, Mitchell, Exp. E. Aust. (1838).

- AUSTRALIS, Sm. Brit. Mus. Cat. Hym. Pt. v. p. 42 (1857).

Port Essington, N.A.

- EPIHIPPIUM, Fabr. (*Vespa*), Syst. Ent. p. 362, No. 2 ; Mant. Ins. I. p. 287, No. 3 ; Ent. Syst. II. p. 254, 3 ; Syst. Piez. p. 254, 3 ; Christ, Hym. p. 237 ; Oliv. Ency. Méth. VI. p. 677 ; Gmelin. Ed. Linn. Syst. Nat. I. p. 2748, 36 ;

Abispa ephippium, Mitchell, Exped. East Aust. I. 104 ;
Sm. Trans. Ent. Soc. I. (2), p. 180, t. 16, fig. 5 ; *Monorebia ephippium*, Sauss. Mon. Guêpes Sol. p. 100, 2, t. 15,
fig. 9.

Australia.

- 990 SPLENDIDA, Guér. (*Odynerus*), Voy. Coq. Ins. p. 265 ;
Monorebia splendida, Sauss. Mon. Guêpes Sol. p. 99,
No. 1 ; *Abispa splendida*, Sauss. Mon. Guêpes Sol.
Suppl. p. 169, t. 15, fig. 8.

Australia and Tasmania.

168. RHYNCHIUM.

Ryghium, Spin. Ins. Lig. I. (1806) ; *Rhynchium*, Sauss.
Mon. Guêpes Sol. Suppl. 170 (1854-56).

- ALECTO, St. Farg. (*Odynerus*), Hym. II. p. 647, No. 32 ;
Rhynchium alecto, Sauss. Mon. Guêpes Sol. I. p. 114,
20 (1852).

Australia.

- DECORATUM, Sauss. Mon. Guêpes Sol. Suppl. p. 180, No. 72,
t. 9, fig. 6.

Australia.

- MAGNIFICUM, Sm. Trans. Ent. Soc. 1869, p. 310 : Brenchley's
Cruise of the Curaçoa, p. 463, fig. 4, pl. XLV.

Nicol Bay, N.W.A.

- MIRABILE, Sauss. Mon. Guêpes Sol. p. 106, No. 6, t. 14,
fig. 5 ; Sm. Journ. Linn. Soc. Vol. III. p. 163, ♂ (1859).

Tasmania and Australia.

- 995 ROTHII, Kirby, Journ. Linn. Soc. XVIII. p. 324 (1885).

Queensland.

- SUPERBUM, Sauss. Mon. Guêpes Sol. p. 113.

Australia.

169. ALASTOR.

Alastor, St. Farg. Hym. II. p. 668 (1841).

- ALBOCINCTUS, Sm. Brit. Mus. Cat. Hym. Pt. iv. p. 91 (1857).

Tasmania.

- ARGENTIFRONS, Sm. l.c. p. 90.

Australia.

- AUREOCINCTUS, Guér. (*Odynerus*), Voy. Coq. Zool. p. 266,
t. 9, fig. 4; Sauss. Mon. Guêpes Sol. p. 252, No. 5.
Australia.
- 1000 AUSTRALIS, Sauss. l.c. p. 250, 2.
Australia.
- CARINATUS, Sm. Brit. Mus. Cat. Hym. p. 90 (1857).
Adelaide, S.A.
- CLOTHO, St. Farg. Hym. II. p. 668, 1; Sauss. Mon. Guêpes
Sol. p. 250, 1.
Australia.
- CRUENTATUS, Sauss. Reise Novara, Hym. p. 18, fig. 12.
Sydney, N.S.W.
- EMARGINATUS, Sauss. Mon. Guêpes Sol. p. 254, 18.
Tasmania.
- 1005 ERIURGUS, Sauss. l.c. p. 251, 4.
Australia.
- LACHESIS, Sauss. l.c. p. 251, 3.
Tasmania.
- LATERITUS, Sauss. Reise Novara, Hym. p. 17.
Australia.
- PARCA, Sauss. Mon. Guêpes Sol. p. 254, 9.
Australia.
- PICTETI, Sauss. l.c. p. 256, 12.
Tasmania.
- 1010 PUNCTULATUS, Sauss. l.c. p. 255, 10.
Tasmania.
- SIMILIS, Sauss. l.c. p. 256, 11.
Australia.
- TASMANIENSIS, Sauss. l.c. p. 253, 6.
Tasmania.
- TUBERCULATUS, Sauss. l.c. p. 253, 7.
Tasmania.
170. ODYNERUS.
Odynerus, Latr. Nat. Hist. III. (1804).
- ALARIFORMIS, Sauss. Mon. Guêpes Sol. Suppl. p. 165, t. 14
fig. 6.
Australia.

- 230 CATALOGUE OF THE DESCRIBED HYMENOPTERA OF AUSTRALIA,
- 1015 ALARIS, Sauss. Mon. Guêpes Sol. p. 203, 106, t. 18, fig. 5.
Tasmania.
- ALASTORIPENNIS, Sauss. l.c. p. 147, 34, t. 16, fig. 5.
Tasmania.
- ANGULATUS, Sauss. Mon. Guêpes Sol. Suppl. p. 284, 168, t. 14,
fig. 7.
Australia.
- BALYI, Sauss. l.c. p. 283, 167, t. 14, fig. 6.
Australia.
- BICINCTUS, Fabr. (*Vespa*), Ent. Syst. II. p. 271, 65; Syst.
Piez. 265; St. Farg. Hym. II. p. 644; Sauss. Mon.
Guêpes Sol. Suppl. p. 224; *Odynerus bizonatus*, Boisd.
Voy de l'Astrol. Entom. p. 459; Sauss. Mon. Guêpes
Sol. p. 156, 40.
Australia.
- 1020 BICOLORATUS, Sauss. Mon. Guêpes Sol. Suppl. p. 281, 164.
Australia.
- BICOLOR, Sauss. l.c. p. 284, 169.
Macintyre River, Q.
- CITREO-CINCTUS, Sauss. Reise Novara, Hym. p. 10, fig. 5.
Sydney, N.S.W.
- CLYPEATUS, Sauss. Mon. Guêpes Sol. p. 200, 101, t. 18, fig. 6.
Tasmania.
- CONCOLOR, Sauss. l.c. p. 202, 104, t. 18, fig. 7.
Tasmania.
- 1025 CRUENTATUS, Sauss. Mon. Guêpes Sol. Suppl. p. 221, 115.
Australia.
- DECIPIENS, Sauss. Reise Novara, Hym. p. 11, fig. 6.
Sydney, N.S.W.
- DIEMENSIS, Sauss. Mon. Guêpes Sol. Suppl. p. 201, 103.
Tasmania.
- DIETRICHIANUS, Sauss. Ent. Zeit. Stettin, 1869, p. 54.
Rockhampton, Q.
- DREWSeni, Sauss. Ann. Soc. Ent. France, V. (3), p. 318
(1857).
Australia.

- 1030 **EXTRANÆUS**, Sauss. Mon. Guêpes Sol. Suppl. p. 224; *Odynerus exilis*, Sauss. l.c. p. 224.
Tasmania.
- FLAMMIGER**, Sauss. l.c. p. 282, 166.
N. S. Wales.
- FLAVO-CINCTUS**, Sm. Brit. Mus. Cat. Hym. p. 64 (1857).
Australia.
- FLUVIALIS**, Sauss. Mon. Guêpes Sol. Suppl. p. 215, 106.
Australia.
- MACILENTUS**, Sauss. Reise Novara, Hym. p. 16, fig. 10.
Sydney, N.S.W.
- 1035 **METATHORACICUS**, Sauss. Mon. Guêpes Sol. Suppl. p. 286, 171.
Australia.
- NIGROCINCTUS**, Sauss. l.c. p. 201, 102.
Tasmania.
- PUSILLUS**, Sauss. l.c. p. 287, 172.
Australia.
- SANGUINOLENTUS**, Sauss. l.c. p. 221, 116.
Australia.
- SAUCIUS**, Sauss. l.c. p. 280, 163.
Australia.
- 1040 **SUBALARIS**, Sauss. l.c. p. 280, 162, t. 14, fig. 5.
Australia.
- SUCCINCTUS**, Sauss. Mon. Guêpes Sol. p. 204, 107.
Australia and Tasmania.
- TAMARINUS**, Sauss. l.c. p. 203, 105.
Tasmania.
- TASMANIENSIS**, Sauss. l.c. p. 119, t. 18, fig. 5.
Tasmania.
- TRIANGULUM**, Sauss. Mon. Guêpes Sol. Suppl. p. 285, 170,
t. 14, fig. 8.
Australia.
- 1045 **TUBERCULATUS**, Sauss. Mon. Guêpes Sol. p. 253.
Tasmania and Australia.
- VERNALIS**, Sauss. l.c. p. 148, 35.
Tasmania.

Family VESPIDÆ.

This family contains the two genera into which all our social paper-nest wasps are divided ; in habits both groups are alike, but they are easily and naturally divided into the genera *Icaria*, small wasps in which the apical segments of the abdomen telescope into each other, and *Polistes*, wasps usually much larger and having all the segments of the abdomen closely fitted together, and pointed at the apex. The nests of the first are usually irregular in shape, while those of the latter are mostly round, and sometimes they attain a considerable size. The young wasps when hatched hang head downwards, and are fed by the attendant adults with small spiders. Fabricius described several of our commonest species, but it is to Saussure that we are indebted for most of the information about this group (Monograph des Guêpes Sociales [1853-58]).

171. ICARIA.

Icaria, Sauss. Mon. Guêpes Soc. p. 22 (1853).

CABETI, Sauss. l.c. p. 26, 4, t. 5, fig. 2.

Tasmania.

GREGARIA, Sauss. Ent. Zeit. Stettin, XXIII. p. 137 (1862).

PLEBEJA, Sauss. Mém. Soc. Phys. Genève, XVII. pt. 1,
p. 235 (1863).

1050 REVOLUTIONALIS, Sauss. Mon. Guêpes Soc. p. 29, 7, t. 5, fig. 7.

Tasmania and Australia.

ROMANDI, Le Guillou (*Polistes*), Ann. Soc. Ent. France, X.
(1), p. 322 ; Sauss. Mon. Guêpes Soc. p. 41.

Australia.

SOCIALISTICA, Sauss. Mon. Guêpes Soc. p. 27, 5.

Tasmania.

172. POLISTES.

Polistes, Latr. Hist. Nat. Ins. XIII. (1804).

BERNARDII, Le Guil. Ann. Soc. Ent. France, X. (1), p. 23 ;
Sauss. Mon. Guêpes Soc. p. 70, 29.

ERYTHRINUS, Holmgren, Eugénies Resa, Hym. p. 440
(1858-68).

1055 FACILIS, Sauss. Mon. Guêpes Soc. p. 53, 9.

Australia.

- HUMILIS, Fabr. (*Vespa*), Spec. Ins. I. p. 461, 20; Mant. Ins. I. p. 288, 23; Ent. Syst. II. p. 261, 28; Oliv. Ency. Méth. VI. p. 682, 62; Fabr. Syst. Piez. p. 270, 5; Sauss. Mon. Guêpes Soc. p. 52, 8.
N. S. Wales.
- NOVARÆ, Sauss. Reise Novara, Hym. p. 19, figs. 13 & 14.
Australia.
- PICTETI, Sauss. Mon. Guêpes Soc. p. 69, 28, t. 6, fig. 8.
Australia and Ceram.
- SCHACH, Fabr. (*Vespa*), Spec. Ins. I. p. 461, 18; Mant. Ins. I. p. 288, 21; Ent. Syst. II. p. 260, 25; Oliv. Ency. Méth. VI. p. 682, 60; Fabr. Syst. Piez. p. 270, 2; Sauss. Mon. Guêpes Soc. p. 50, 3; *Vespa orientalis*, St. Farg. Hym, I. p. 519.
Australia.
- 1060 SYNÆCUS, Sauss. Mon. Guêpes Soc. p. 65, 22, t. 6, fig. 5.
Australia.
- TASMANIENSIS, Sauss. l.c. p. 66, 23, t. 6, fig. 5.
Australia.
- TEPIDUS, Fabr. (*Vespa*), Syst. Ent. p. 366, 17; Spec. Ins. I. p. 462, 21; Ent. Syst. II. p. 262, 31; Mant. Ins. I. p. 287; Christ, Hym. p. 242; Oliv. Ency. Méth. VI. p. 682, 64; Fabr. Syst. Piez. p. 271, 7; Sauss. Mon. Guêpes Soc. p. 68, 27, t. 8, fig. 1.
Australia, New Guinea, and Solomon Islands.
- TRICOLOR, Sauss. Mon. Guêpes, p. 67, 25.
Australia.
- VARIABILIS, Fabr. (*Vespa*), Syst. Ent. II. p. 274, 73; Oliv. Ency. Méth. VI. p. 690, 104; Fabr. Syst. Piez. 273. 20; Sauss. Mon. Guêpes. Soc. p. 66, 24.
Sydney, S. Australia, &c.

Family ANDRENIDÆ.

Nearly all the species of this family from Australia were described by the late F. Smith, Esq., of the British Museum, and

the majority of the descriptions will be found in the British Museum Catalogue of Hymenoptera (1853), in the Transactions of the Entomological Society of London (1862-64, 1866, 1868), and in "New Species of Hymenoptera, British Museum" (1879). This family contains the bees with short tongues, solitary in their habits, while many of them are parasitic ; but hardly anything is known about the habits of any of our Australian *Andrenidæ*.

173. PARACOLLETES.

Paracolletes, Sm. MSS. ; Brit. Mus. Cat. Hym. Pt. i. p. 6 (1853).

1065 ABDOMINALIS, Sm. New Sp. Hym. Brit. Mus. p. 5 (1879).
Champion Bay, W.A.

CRASSIPES, Sm. Brit. Mus. Cat. Hym. p. 6 (1853).
Swan River, W.A.

FERVIDUS, Sm. New Sp. Hym. Brit. Mus. p. 4 (1879).
N. Holland.

MARGINATUS, Sm. l.c. p. 4.
Queensland.

NITIDUS, Sm. l.c. p. 3.
N.W. Coast, Australia.

174. LEIOPROCTUS.

Leioproctus, Sm. MSS. ; Brit. Mus. Cat. Hym. Pt. i. p. 8 (1853).

1070 ELEGANS, Sm. Brit. Mus. Cat. Hym. p. 9 (1853).
Adelaide, S.A.

FIMBRICATUS, Sm. New Sp. Hym. Brit. Mus. p. 6 (1879).
Australia.

FRONTALIS, Sm. Brit. Mus. Cat. Hym. p. 9 (1853).
N. Holland.

VIGILANS, Sm. New Sp. Hym. Brit. Mus. p. 7 (1879).
Swan River, W.A.

175. LAMPROCOLLETES.

Lamprocolletes, Sm. MSS. ; Brit. Mus. Cat. Pt. i. p. 10
(1853).

AMABILIS, Sm. New Sp. Hym. Brit. Mus. p. 9 (1879).
Australia.

1075 ANTENNATUS, Sm. l.c. p. 10.
Swan River, W.A.

ARGENTIFRONS, Sm. l.c. p. 11.
Swan River, W.A.

AURIFRONS, Sm. Brit. Mus. Cat. Hym. p. 13 (1853).
Adelaide, S.A.

BICOLOR, Sm. New Sp. Hym. Brit. Mus. p. 10.
Swan River, W.A.

BIMACULATUS, Sm. l.c. p. 10.
Swan River, W.A.

1080 CARINATUS, Sm. Brit. Mus. Cat. Hym. p. 11 (1853).
New Holland.

CHALYBEATA (*Andrena*), Erichs. Wieg. Arch. 1842, p. 268,
243.

Tasmania.

CINEREUS, Sm. Brit. Mus. Cat. Hym. p. 12 (1853).
S. Australia.

CLADOCERUS, Sm. Trans. Ent. Soc. I. (3), p. 57 (1862-64);
l.c. II. (3), p. 397, pl. XXI. fig. 3 ♂ (1864-66).
Sydney, N.S.W.

CRISTATUS, Sm. Brit. Mus. Cat. Hym. p. 11 (1853).
Australia.

1085 CUPREUS, Sm. l.c. p. 13.
Adelaide, S.A.

FULVUS, Sm. New Sp. Hym. Brit. Mus. p. 9 (1879).
Queensland.

IRRORATUS, Sm. Brit. Mus. Cat. Hym. p. 12 (1853).
Port Phillip, Vic.

METALLICUS, Sm. New Sp. Hym. Brit. Mus. p. 8 (1879).
Australia.

NANUS, Sm. l.c. p. 9.
W. Australia.

- 1090 *OBSCURUS*, Sm. Brit. Mus. Cat. Hym. p. 11 (1853).
Tasmania.
- *PLUMOSUS*, Sm. l.c. p. 12.
Swan River, W.A.
- PROVIDUS*, Sm. New Sp. Hym. Brit. Mus. p. 8 (1879).
Australia.
- PUNCTATUS*, Sm. Brit. Mus. Cat. Hym. p. 14 (1853).
Adelaide, S.A.
- RUBELLUS*, Sm. Trans. Ent. Soc. 1868, p. 253.
W. Australia.
- 1095 *RUFICORNIS*, Sm. New Sp. Hym. Brit. Mus. p. 10 (1879).
W. Australia.
- VENUSTUS*, Sm. Trans. Ent. Soc. I. (3), p. 57 (1862-64).
S. Australia; Lower Plenty, Vic.
- VERSICOLOR*, Sm. Brit. Mus. Cat. Hym. p. 14 (1853).
Adelaide, S.A.

176. *DASYCOLLETES*.

Dasycolletes, Sm. MSS. ; Brit. Mus. Cat. p. 14.

- HUMEROSUS*, Sm. New Sp. Hym. Brit. Mus. p. 11 (1879).
Melbourne, Vic.
- RUBELLUS*, Sm. Trans. Ent. Soc. I. (3), p. 58 (1862-64).
S. Australia; Lower Plenty, Vic.

- 1100 *VITRIFRONS*, Sm. New Sp. Hym. Brit. Mus. p. 11 (1879).
Swan River, W.A.

177. *ANTHOGLOSSA*.

Anthoglossa, Sm. MSS. ; Brit. Mus. Cat. Hym. Pt. i. p. 16
(1853).

- PLUMATA*, Sm. Brit. Mus. Cat. Hym. p. 16 (1853).
W. Australia.
- SERICEA*, Sm. Trans. Ent. Soc. I. (3), p. 59 (1862-64).
Australia.

178. *EURYGLOSSA*.

Euryglossa, Sm. MSS. ; Brit. Mus. Cat. Hym. Pt. i. p. 17
(1853).

- BICOLOR*, Sm. Trans. Ent. Soc. I. (3), p. 58 (1862-64).
Adelaide, S.A.

- BLANDA, Sm. New Sp. Hym. Brit. Mus. p. 13 (1879).
W. Australia.
- 1105 CUPREO-CHALYBEA, Sm. Brit. Mus. Cat. Hym. p. 17 (1853).
Australia.
- DEPRESSA, Sm. l.c. p. 18.
Australia.
- EPHIPPIATA, Sm. Trans. Ent. Soc. I. (3), p. 58 (1862-64).
Adelaide, S.A.
- FLAVOPICTA, Sm. New Sp. Hym. Brit. Mus. p. 14 (1879).
Champion Bay, W.A.
- HALICTIFORMIS, Sm. l.c. p. 15.
Swan River, W.A.
- 1110 JUCUNDA, Sm. l.c. p. 13.
Champion Bay and Swan River, W.A.
- MACULATA, Sm. l.c. p. 13.
Swan River, W.A.
- NIGRA, Sm. l.c. p. 13.
Australia.
- NITIDIFRONS, Sm. l.c. p. 14.
Australia.
- QUADRIMACULATA, Sm. l.c. p. 13.
Queensland.
- 1115 RUBRICATA, Sm. l.c. p. 14.
Swan River, W.A.
- SIMILLIMA, Sm. l.c. p. 12.
Swan River, W.A.
- TERMINATA, Sm. Brit. Mus. Cat. Hym. p. 18 (1853).
Australia.
- TRICOLOR, Sm. New Sp. Hym. Brit. Mus. p. 15 (1879)
Swan River, W.A.
- VILLOSULA, Sm. l.c. p. 15.
Swan River, W.A.

179. STILPNOSOMA.

- Stilpnosoma*, Sm. New Sp. Hym. Brit. Mus. p. 16 (1879).
- 1120 LÆVIGATUM, Sm. l.c. p. 16.
Queensland.

180. PROSOPIS.

Prosopis, Fabr. Piez. Syst. p. 293 (1804).

- ALBOMACULATA, Sm. New Sp. Hym. Brit. Mus. p. 24 (1879).
Champion Bay, W.A.
- ALCYONEA, Erichs. Wieg. Arch. 1842, p. 267, 241.
Tasmania.
- AMICULA, Sm. New Sp. Hym. Brit. Mus. p. 19 (1879).
Melbourne, Vic.
- BICOLORATA, Sm. Brit. Mus. Cat. Hym. p. 27 (1853).
Adelaide, S.A.
- 1125 BIDENTATA, Sm. l.c. p. 28.
Australia.
- BITUBERCULATA, Sm. New Sp. Hym. Brit. Mus. p. 18 (1879).
Melbourne, Vic.
- COGNATA, Sm. New Sp. Hym. Brit. Mus. p. 18 (1879).
Champion Bay and Swan River, W.A.
- CONFUSA, Sm. Brit. Mus. Cat. Hym. p. 30 (1853); *Prosopis*
perplexa, Sm. Appen. Brit. Mus. Cat. Hym. p. 42 (1853).
Australia.
- DESPONSA, Sm. Brit. Mus. Cat. Hym. p. 31 (1853).
Australia.
- 1130 ELEGANS, Sm. l.c. p. 28.
Adelaide, S.A.
- ELONGATA, Sm. New Sp. Hym. Brit. Mus. p. 18 (1879).
Adelaide, S.A.
- FULVICORNIS, Sm. Brit. Mus. Cat. Hym. p. 27 (1853).
Adelaide, S.A.
- HONESTA, Sm. New Sp. Hym. Brit. Mus. p. 19 (1879).
Tasmania.
- IMPRESSIFRONS, Sm. Brit. Mus. Cat. Hym. p. 31 (1853).
Australia.
- 1135 LATERALIS, Sm. New Sp. Hym. Brit. Mus. p. 23 (1879).
Champion Bay, W.A.
- METALLICA, Sm. Trans. Ent. Soc. I. (3), p. 59 (1862-64).
Australia.

- MOROSA, Sm. New Sp. Hym. Brit. Mus. p. 26 (1879).
Australia.
- NIGRIFRONS, Sm. Brit. Mus. Cat. Hym. p. 30 (1853).
Australia.
- NUBILOSA, Sm. l.c. p. 31.
Port Phillip, Vic.
- 1140 OBTUSATA, Sm. New Sp. Hym. Brit. Mus. p. 17 (1879).
Swan River, W.A.
- PENETRATA, Sm. l.c. p. 25.
Australia.
- QUADRATA, Sm. Brit. Mus. Cat. Hym. p. 28 (1853).
Australia.
- QUADRICEPS, Sm. New Sp. Hym. Brit. Mus. p. 17 (1879).
Australia.
- RUBRICATA, Sm. New Sp. Hym. Brit. Mus. p. 25 (1879).
Swan River, W.A.
- 1145 RUFICEPS, Sm. Brit. Mus. Cat. Hym. p. 29 (1853).
Adelaide, S.A.
- RUFIPES, Sm. l.c. p. 27.
Australia.
- ROTUNDICEPS, Sm. New Sp. Hym. Brit. Mus. p. 19 (1879).
Melbourne, Vic.
- SIMILLIMA, Sm. l.c. p. 26.
Moreton Bay, Q.
- SIMILIS, Sm. Brit. Mus. Cat. Hym. p. 26 (1853).
Australia.
- 1150 SULCIFRONS, Sm. l.c. p. 27.
Australia.
- TORRIDA, Sm. New Sp. Hym. Brit. Mus. p. 25 (1879).
Queensland.
- VARICOLOR, Sm. l.c. p. 24.
Port Bowen, Q.
- VICINA, Sichel, Reise Novara, Hym. p. 143.
Tasmania and New Zealand.
- VIDUA, Sm. Brit. Mus. Cat. Hym. p. 29 (1853).
Australia.

1155 VIOLACEA, Sm. l.c. p. 26.

Swan River, W.A.

181. HYLEOIDES.

Hyleoides, Sm. Brit. Mus. Cat. Hym. Pt. i. p. 32 (1853).

CONCINNA (*Vespa*), Fabr. Syst. Ent. II. p. 263, 38; Cab.

Banks. Mus. Linn. Soc.; Syst. Piez. p. 259, 30.

Port Phillip, Vic.

ZONALIS, Sm. Brit. Mus. Cat. Hym. p. 32 (1853),

Hunter River, N.S.W.

182. MEROGLOSSA.

Meroglossa, Sm. Brit. Mus. Cat. Hym. Pt. i. p. 33 (1853).

CANALICULATA, Sm. Brit. Mus. Cat. Hym. p. 33 (1853).

Port Essington, N.A.

183. SPHECODES.

Sphcodes, Latr. Hist. Nat. XIII. p. 368 (1805).

ANTIPODES, Sm. Brit. Mus. Cat. Hym. p. 37 (1853).

Sydney, N.S.W.

184. PARASPHECODES.

Parasphcodes, Sm. Brit. Mus. Cat. Hym. Pt. i. p. 39 (1853)

1160 ALTICHUS, Sm. Brit. Mus. Cat. Hym. p. 42 (1853).

Tasmania.

HILACTUS, Sm. l.c. p. 39.

Swan River, W.A.

HILTACUS, Sm. l.c. p. 39.

Australia.

LACTHIUS, Sm. l.c. p. 40.

Australia.

LICHATUS, Sm. l.c. p. 40.

W. Australia.

1165 LICHTUSCA, Sm. l.c. p. 41.

Tasmania.

STUCHILA, Sm. l.c. p. 42.

Tasmania.

- SULTHICA, Sm. l.c. p. 40.
Australia.
- TALCHIUS, Sm. l.c. p. 42.
Tasmania.
- TALUCHIS, Sm. l.c. p. 43.
Tasmania.
- 1170 TILACHUS, Sm. l.c. p. 41.
Tasmania.
- TUCHILAS, Sm. l.c. p. 41.
Australia.
185. HALTICUS
- Halticus*, Latr. Hist. Nat. XIII. p. 364 (1805).
- BICINGULATUS, Sm. Brit. Mus. Cat. Hym. p. 57 (1853).
Melbourne, Vic.
- CARBONARIUS, Sm. l.c. p. 58.
Sydney, N.S.W.
- COGNATUS, Sm. l.c. p. 59.
Tasmania.
- 1175 CONSPICUUS, Sm. New Sp. Hym. Brit. Mus. p. 34 (1879).
Australia.
- CONVEXUS, Sm. l.c. p. 35.
Victoria.
- FLORALIS, Sm. Brit. Mus. Cat. Hym. p. 57 (1853).
Australia.
- GLOBOSUS, Sm. l.c. p. 59.
Tasmania.
- HUMILIS, Sm. New Sp. Hym. Brit. Mus. p. 36 (1879).
Champion Bay, W.A.
- 1180 INCLINANS, Sm. l.c. p. 36.
Champion Bay, W.A.
- LANUGINOSUS, Sm. l.c. p. 34.
Australia.
- LANARIUS, Sm. Brit. Mus. Cat. Hym. p. 57 (1853).
Hunter River, N.S.W.
- LIMBATUS, Sm. l.c. p. 59.
Tasmania.

- OBLITUS, Sm. New Sp. Hym. Brit. Mus. p. 35 (1879).
Swan River, W.A.
- 1185 ORBATUS, Sm. Brit. Mus. Cat. Hym. p. 58 (1853).
Tasmania.
- PUNCTATUS, Sm. New Sp. Hym. Brit. Mus. p. 36 (1879).
Champion Bay, W.A.
- REPRESENTANS, Sm. Brit. Mus. Cat. Hym. p. 60 (1853).
Australia and Tasmania.
- RUFIPES, Sm. l.c. p. 56.
Melbourne, Vic.
- SPHECODOIDES, Sm. l.c. p. 58.
Australia.
- 1190 URBANUS, Sm. New Sp. Hym. Brit. Mus. p. 35 (1879).
Champion Bay, W.A.
- VITRIPENNIS, Sm. l.c. p. 34.
Champion Bay, W.A.
- VIVIDUS, Sm. l.c. p. 35.
Swan River, W.A.

186. CALLOMELITTA.

- Callomelitta*, Sm. Brit. Mus. Cat. p. 85 (1853).
- PICTA, Sm. Brit. Mus. Cat. Hym. p. 85 (1853).
Tasmania.

187. NOMIA.

- Nomia*, Latr. Hist. Nat. XIII. p. 369 (1805).
- ARGENTIFRONS, Sm. Trans. Ent. Soc. I. (3), p. 60 (1862-64).
Australia.

188. ANDRENA.

- Andrena*, Fabr. Syst. Ent. p. 376 (1793).
- 1195 ADVENA, Sm. Trans. Ent. Soc. I. (3), p. 60 (1862-64).
Australia.

189. STENOTRITUS.

- Stenotritus*, Sm. Brit. Mus. Cat. p. 119 (1853).
- ELEGANS, Sm. Brit. Mus. Cat. Hym. p. 119 (1853).
Sydney, N.S.W.

SMARAGDINUS, Sm. Trans. Ent. Soc. II. (3), p. 254 (1864-66).
Champion Bay, W.A.

190. MELLITIDIA.

Mellitidia, Guér. Voy. Coq. Zool. II. p. 269 (1830).

AUSTRALIS, Guér. Voy. Coq. Zool. II. p. 269.

Australia.

191. SCRAPTER.

Scrapper, St. Farg. Ency. Méth. X. p. 403.

BICOLOR, Sm. Trans. Ent. Soc. I. (3) p. 61 (1862-64).

Australia.

1200 CARINATA, Sm. l.c. p. 60.

Australia.

192. ÆSTROPSIS.

Æstropsis, Sm. Trans. Ent. Soc. 1864-66.

PUBESCENS, Sm. Trans. Ent. Soc. (1868), p. 253.

Champion Bay, W.A. ; S. Australia.

Family APIDÆ.

This very interesting family is well represented in Australia, although there have been few workers at our Australian bees. Smith has described the majority of our known species in the British Museum Catalogue of Hymenoptera (1853), where he also catalogues those previously described by Fabricius, St. Fargeau, and others. Since then he has contributed further papers in the Transactions of the Entomological Society of London (1862-64, 1864-66, and 1868), in the Zoologist for 1859, and in "New Species of Hymenoptera in the British Museum" (1879).

In the genus *Megachile* we have a great number of handsome bees that form nests in trees and walls, the cells of which they line with leaves; while several species of the genus *Xylocopa* (the carpenter bees) are numerous in Australia, and one species forms its nest in the flower-stem of the grass-tree (*Xanthorrhwa*).

Only one species of native bee (*Trigonia carbonaria*) has been described, though there are certainly two, if not three species in

N. S. Wales ; they form flask-shaped cells to contain the honey, and coat the inner side of the cavity in which they construct their nest with gum.

193. MEGACHILE.

Megachile, Latr. Hist. Nat. III. (1802).

ABDOMINALIS, Sm. Brit. Mus. Cat. Hym. Pt. i. p. 169 (1853).
Australia.

ALBOBASALIS, Sm. New Sp. Hym. Brit. Mus. p. 65 (1879).
Torres Straits, N.A.

APICATA, Sm. Brit. Mus. Cat. Hym. Pt. i. p. 172 (1873).
Adelaide, S.A.

1205 AURIFRONS, Sm. l.c. p. 168.
Australia.

CALIDA, Sm. New Sp. Hym. Brit. Mus. p. 64 (1879).
Queensland.

CANIFRONS, Sm. Brit. Mus. Cat. Hym. p. 171 (1853).
W. Australia.

CHRYSOPYGA, Sm. l.c. p. 173.
Tasmania.

CLYPEATA, Sm. l.c. p. 170.
W. Australia.

1210 ERYTHROPYGA, Sm. l.c. p. 167.
W. Australia.

FABRICATOR, Sm. Trans. Ent. Soc. 1868, p. :56.
Champion Bay, W.A.

FEROX, Sm. New Sp. Hym. Brit. Mus. p. 64 (1879).
Swan River, W.A.

FUMIPENNIS, Sm. Trans. Ent. Soc. 1868, p. 257.
Champion Bay, W.A.

HERIADIFORMIS, Sm. Brit. Mus. Cat. Hym. p. 172 (1853).
Adelaide, S.A.

1215 IGNITA, Sm. l.c. p. 169.
Australia.

IMITATA, Sm. Trans. Ent. Soc. 1868, p. 251.
Champion Bay, W.A.

LATIPES, Sm. Brit. Mus. Cat. Hym. p. 169 (1853).
Australia.

- LEUCOPYGA, Sm. l.c. p. 173.
Tasmania.
- LUCIDIVENTRIS, Sm. l.c. p. 168.
Australia.
- 1220 MACULATA, Sm. l.c. p. 170.
W. Australia.
- MODESTUS, Sm. Trans. Ent. Soc. II. (3), p. 62 (1862-64).
Australia.
- MONSTROSA, Sm. Trans. Ent. Soc. 1868, p. 256 ; Brenchley's
Cruise of Curaçoa, p. 463, pl. XLV. fig. 5, ♀ (1873).
N.W. Australia ; Champion Bay, W.A.
- MYSTACEA (*Apis*), Fabr. Syst. Ent. p. 385, 41 ; Ent. Syst.
II. p. 336, 97 ; *Anthophora mystacea*, Fabr. Syst. Piez.
p. 377, 24 ; Sm. Brit. Mus. Cat. Hym. p. 166 (1853).
Port Essington, N.A.
- NASUTA, Sm. Trans. Ent. Soc. 1868, p. 258.
Champion Bay, W.A.
- 1225 OBLONGA, Sm. New Sp. Hym. Brit. Mus. p. 65 (1879).
W. Australia.
- OBTUSA, Sm. Brit. Mus. Cat. Hym. p. 170 (1853).
W. Australia.
- ORDINARIA, Sm. l.c. p. 174.
Tasmania.
- PICTIVENTRIS, Sm. New Sp. Hym. Brit. Mus. p. 65 (1879).
Richmond River, N.S.W.
- PUNCTATA, Sm. Brit. Mus. Cat. Hym. p. 168 (1853).
Australia.
- 1230 RUGOSA, Sm. New Sp. Hym. Brit. Mus. p. 65 (1879).
W. Australia.
- SEMI-LUCTUOSA, Sm. Brit. Mus. Cat. Hym. p. 172 (1853).
Adelaide, S.A.
- SENEX, Sm. Trans. Ent. Soc. II. (3), p. 61 (1862-64).
Richmond River, N.S.W.
- SEXMACULATA, Sm. Trans. Ent. Soc. 1868, p. 257.
Champion Bay, W.A.

- SIMPLEX, Sm. Brit. Mus. Cat. Hym. p. 169 (1853).
Australia.
- 1235 USTULATA, Sm. Trans. Ent. Soc. II. (3), p. 61 (1862-64).
Australia.

194. LITHURGUS.

- Lithurgus*, Latr. Gen. Crust. et Ins. II. p. 350.
COGNATUS, Sm. Trans. Ent. Soc. 1862, p. 255.
Champion Bay, W.A.
- DENTIPES, Sm. Brit. Mus. Cat. Hym. p. 146 (1854).
Australia.
- RUBRICATUS, Sm. l.c. p. 146.
Australia.

195. ALLODAPE.

- Allodape*, St. Farg. Hym. II. p. 531.
PICTA, Sm. Brit. Mus. Cat. Hym. Pt. ii. p. 231 (1854).
Australia.
- 1240 SIMILIMA, Sm. l.c. p. 229.
Macintyre River, Q.
- UNICOLOR, Sm. l.c. p. 230.
Australia.

196. EXONEURA.

- Exoneura*, Sm. Brit. Mus. Cat. Hym. Pt. ii. p. 232 (1854).
BICOLOR, Sm. l.c. p. 232.
Swan River, W.A.

197. CROCISA.

- Crocisa*, Jurine, Hym. p. 239 (1807).
ALBO-MACULATA, Sm. Trans. Ent. Soc. 1868, p. 258.
Champion Bay, W.A.
- LAMPROSOMA, Boisd. Voy. de l'Astrolabe, p. 653, t. 12, fig. 4;
Crocisa novæ-hollandiæ, St. Farg. Hym. II. p. 450.
Hunter River, N.S.W.
- 1245 LUGUBRIS, Sm. New Sp. Hym. Brit. Mus. p. 107 (1879).
Australia.

NITIDULA (*Melecta*), Fabr. Syst. Piez. p. 386, 2; Latr. Gen. Crust. Ins. IV. p. 172; *Crocisa pulchella*, Guér. Icon. Règ. Anim. p. 454, 74.
Richmond River, N.S.W.

198. TETRALONIA.

Tetralonia, Spinola, Ann. Soc. Ent. Fr. VII. (1838).
BREVICORNIS, Sm. Brit. Mus. Cat. Hym. p. 303 (1854).
Moreton Bay, Q.

199. SAROPODA.

Saropoda, Latr. Gen. Crust. et Ins. IV. p. 179 (1809).
BOMBIFORMIS, Sm. Brit. Mus. Cat. Hym. p. 318 (1854).
Richmond River, N.S.W.

200. ANTHOPHORA.

Anthophora, Latr. Hist. Nat. Cr. et Ins. XIV. p. 45 (1804).
ÆRUGINOSA, Sm. Brit. Mus. Cat. Hym. p. 336 (1854).
Hunter River, N.S.W.

1250 CINGULATA (*Andrena*), Fabr. Ent. Syst. II. p. 314, 30;
St. Farg. Hym. II. p. 46, 20; *Megilla cingulata*, Fabr.
Syst. Piez. p. 332, 18; *Megilla cincta*, Fabr. Syst. Piez.
p. 330.
Australia.

EMENDATA, Sm. New Sp. Hym. Brit. Mus. p. 123 (1879).
Australia.

PULCHRA, Sm. Brit. Mus. Cat. Hym. p. 335 (1854).
Moreton Bay, Q.; Hunter River, N.S.W., &c.

201. XYLOCOPA.

Xylocopa, Latr. Nat. Hist. Ins. III. p. 379 (1802).
ÆSTUANS (*Apis*), Linn. Syst. Nat. I. p. 961, 53; Fabr. Syst.
II. p. 323, 41; St. Farg. Hym. II. p. 193; *Apis*
leucothorax, De Geer, Ins. III. p. 573, 4, t. 28, fig. 7;
Bombus æstuans, Fabr. Syst. Piez. p. 351, 44.
Australia and the islands.

DIMIDIATA, St. Farg. Hym. III. p. 191, 44.
N. Queensland; Timor, &c.

- 1255 MUSCARIA (*Apis*), Fabr. Ent. Syst. II. p. 339, 105; Oliv. Ency. Méth. IV. p. 77, 88; *Centris muscaria*, Fabr. Syst. Piez. p. 358, 20; *Lestis muscaria*, St. Farg. Hym. II. p. 211, 1.

Australia.

- NIGRITA, Sm. Zoologist, 1859, p. 64, 68.

Australia.

- SIMILLIMA, Sm. Brit. Mus. Cat. Hym. p. 357 (1854).

Australia.

202. LESTIS.

Lestis, St. Farg. Hym. II. p. .

- ÆRATUS, Sm. Trans. Ent. Soc. I. (2), p. 180 (1850-51).

Hunter River, N.S.W.; Tasmania.

- BOMBYLANS (*Apis*), Fabr. Ent. Syst. II. p. 338, 104; Sm.

Trans. Ent. Soc. I. (2), p. 180 (1850-51).

Australia.

203. TRIGONA.

Trigona, Jurine. Hym. (1807).

- 1260 CARBONARIA, Sm. Brit. Mus. Cat. Hym. p. 414 (1854).

N. S. Wales.

204. THAUMATOSOMA.

Thaumatosoma, Sm. Trans. Ent. Soc. 1864.

- DUBOULAH, Sm. Trans. Ent. Soc. II. (3), p. 395, pl. XXI.

fig. 1 (1864-66).

Champion Bay, W.A.

ON TWENTY NEW SPECIES OF AUSTRALIAN
LEPIDOPTERA.

By THOMAS P. LUCAS, M.R.C.S.E., L.S.A. LOND., & L.R.C.P. ED.

I have been enabled by the assistance of Mr. E. Meyrick to contribute this further paper to the tabulation of the Australian Lepidoptera. In the greater number of cases the specimens have been examined by Mr. Meyrick, and I have to acknowledge the great trouble he has taken to examine the literature and collections at home, and for the valuable hints and knowledge communicated by him and placed at my service. In one instance he has established a new genus to receive a species. The species not examined by him have been carefully studied by his monographs and other available literature.

Section HETEROCERA.

Group BOMBYCES, Family ARCTIADÆ.

HECTOBROCHA, Meyr.

A. Hindwings ochreous-yellow.

a. Without hindmarginal grey border..... *pentacyma*.

b. With hindmarginal grey border..... *multilinea*.

B. Hindwings not ochreous-yellow.

Grey with cloudy border..... *subnigra*.

HECTOBROCHA PENTACYMA.

Brisbane; March, 1892.

PELOBROCHIS, MEYR., MS., GEN. NOV.

Tongue weak; antennæ in ♂ bipectinated throughout; palpi moderate, loosely haired; forewings with 7 and 8 out of 9, 11 anastomosing with 12; hindwings with 3 and 4 stalked, 6 and 7 stalked, 8 from $\frac{3}{4}$.

Allied to *Nudaria*.

PELOBROCHIS RAVA, Lucas.

This species was provisionally described by me under the genus *Scaeodora* [P.L.S.N.S.W. Vol. iv. (ser. 2), 27th Nov. 1889]. Meyrick has confirmed my opinion there expressed and established for it a new genus.

Family LIPARIDÆ.

ARTAXA LUCIFUGA, ?sp. nov., or a very wide variety of
A. chrysophœa, Walk.

♂. 17-20 mm. Head, palpi, thorax, and abdomen ferruginous-fulvous. Antennæ fulvous, pectinations fuscous. Forewings *oblong obovate*, costa gently rounded, hindmargin obliquely rounded, ferruginous-fulvous tending to orange-brown; two faintly-marked ochreous wavy transverse lines at $\frac{1}{2}$ and $\frac{3}{4}$, but in most specimens hidden by ground-colour diffusion: cilia ochreous-ferruginous. Hindwings *smoky black*; cilia as forewings.

Brisbane; at light.

I sent this to Meyrick, who believed it to be a form of *A. chrysophœa*. I have taken eight or nine specimens at light; they are constant and do not vary: the forewings are elongate-obovate, and not triangular, and the hindwings are black. I have not been able to refer any females to this species. It is very much smaller than *A. chrysophœa*, and a more prim, less lax-looking insect. I found the typical form of *A. chrysophœa* abundant at Cooktown, and again at Eumundi, 70 miles N.N.W. of Brisbane,

but did not meet with any *A. lucifuga*. But, remembering the great variation of *Porthesia fulviceps*, I cannot pronounce with certainty without the ♀; for comparison I will briefly describe *A. chrysophæa* and *A. iobrota*, Meyr. (MS.), which last is certainly, I believe, a variety of the former, and would appear to be a connecting link between it and *A. lucifuga*.

ARTAXA CHRYSOPHÆA, Walk.

♂. 18-28 mm. Head, palpi, thorax, and abdomen light ochreous-fulvous, in some specimens the ochreous prevailing, in others the fulvous becoming browner. Antennæ ochreous, pectinations black. Forewings triangular-obovate, gently dilate, ochreous-fulvous, with two circular transverse ochreous lines at $\frac{1}{3}$ and $\frac{2}{3}$. Hindwings in most specimens same colour as forewings, in others darker.

♀. 22-30 mm. Altogether an ochreous or creamy-ochreous. Pectinations of antennæ short, ochreous, or ochreous-fuscous.

Cooktown to Brisbane.

ARTAXA IOBROTA, Meyr. (MS.), = A. CHRYSOPHÆA, var.

♂. 19-24 mm. Head, palpi, thorax, and abdomen ferruginous-ochreous. Antennæ ferruginous-ochreous, pectinations black. Forewings ferruginous-ochreous, with circular wavy ochreous lines at $\frac{1}{3}$ and $\frac{2}{3}$. Hindwings ferruginous-fuscous.

♀. 24-28 mm. Like dark males of *A. chrysophæa* in forewings, darker brown in hindwings.

Cooktown and Eumundi; flying freely with former.

As I have every variety between *A. chrysophæa* and *A. iobrota*, and as I took them indiscriminately flying together, I feel satisfied that they are one species. Whether or not *A. lucifuga* will prove yet a wider variety must remain a speculation until we can discover its natural haunts and habits.

Group GEOMETRINA, Family GEOMETRIDÆ.

IODIS COMMODA, sp.nov.

♂. 29 mm. Head purple-grey, face purple shading into carmine, fillet ochreous, postorbital rims ochreous-white. Collar narrow, crimson. Palpi crimson-grey, terminal joint short. Antennæ creamy grey, pectinations grey. Thorax greyish-blue-green, with a dorsal ochreous colour streak in posterior two-thirds, undersurface white. Abdomen greyish-blue-green, with an ochreous dorsal streak, sides and apex white. Anterior and middle legs reddish-carmine, pink-white beneath, posterior pair creamy-grey. Forewings with costa straight, gently arched before apex, hindmargin oblique, scarcely rounded, greyish-blue-green; costa at base carmine, thence shaded into light ochreous, which colour forms a gradually-narrowing line to apex; a light ochreous line from $\frac{1}{4}$ inner margin obliquely for one-third the width of wing, and parallel to a second line of same colour, from $\frac{1}{2}$ inner margin to costa just before apex, becoming fainter towards costa, line slightly waved, but scarcely dentate; an indistinct blue-grey discal spot midway between termination of first line and costa at $\frac{1}{2}$: cilia light ochreous. Hindwings as forewings, very slightly angled at vein 4, a dentate circular line from opposite costa at $\frac{1}{2}$ to opposite $\frac{1}{2}$ inner margin; first line indistinctly defined at $\frac{3}{4}$ costa, rapidly shading into ground-colour; cilia as forewings.

Brisbane; one specimen.

Allied to *I. assimilis*, Luc., and *I. dichloraria*, Gn.

IODIS NITIDA, sp.nov.

♀. 29 mm. Head green, becoming white on face. Palpi (?). Antennæ annulated white and green. Thorax green, snow-white anteriorly, patagia green. Abdomen green (? shaded with white). Forewings: costa gently rounded, hindmargin obliquely rounded, bright pea-green, or rather a delicate yellow-green with ochreous white lines; costa broadly banded with snow-white, which narrows to a line at $\frac{1}{2}$ costa, is there tinted with purple to $\frac{3}{4}$ costa, and

with green to apex; an ochreous-white line from $\frac{1}{3}$ inner margin is bent outwardly on itself at right angles to form a rhomboid pocket, thence broadly dentate to opposite costa at $\frac{2}{3}$; a faint fuscous discoidal spot near median vein opposite $\frac{1}{2}$ costa; a 2nd rounded denticulate line from $\frac{1}{3}$ costa to $\frac{1}{3}$ inner margin; hindmarginal line white: cilia white, tinted with purple-grey, but too irregularly to form bands. Hindwings coloured as forewings, a few faint ill-defined crenulate greenish-ochreous lines; a conspicuous black discal spot; cilia white, with a median band of purple-grey. Undersurface of all wings with conspicuous fuscous discal spot, and a dentate band of blue-green, bordered by white, running from $\frac{2}{3}$ costa of forewings to $\frac{2}{3}$ inner margin of hindwings; inner border of forewings and of hindwings freely dusted with white; an interrupted row of black hindmarginal dots; cilia of all wings banded by a fuscous-purple line of detached arches.

Eumundi, Queensland; one specimen.

Unfortunately the ants ate the dorsum of abdomen and the crown of head and face while on setting board.

Family HYDRIOMENIAD.E.

ASTHENA PELLUCIDA, sp.nov.

♀. 27 mm. Head silver-white, face ochreous-fuscous. Palpi silvery-fuscous. Antennæ ochreous-fuscous, basal portion silver-white. Thorax silver-white. Abdomen silver-white, with a pale fuscous-green spot on either side of anterior segments. Forewings triangular, costa gently rounded, hindmargin bowed, oblique, silver- or pearly-white, iridescent; about thirteen transverse greyish-green lines; 1st and 2nd near base wavy dentate, 3rd and 4th at equal distances beyond, straighter, once or twice denticulate, 5th wider, composed of two lines interlacing and diffused from $\frac{1}{3}$ costa to $\frac{1}{3}$ inner margin, 6th and 7th at equal distances with others, dentate, a discal spot at $\frac{1}{2}$, one-third from costa, a band of three lines, 8th, 9th, and 10th parallel with hindmargin, dentate and more or less diffused into a fascia at $\frac{3}{4}$

costa to $\frac{3}{4}$ hindmargin, 11th, 12th, and 13th lines before hindmargin, 11th and 13th more or less indistinct and interrupted: cilia white, base grey-green. Hindwings as forewings, angled in middle of hindmargin, with eight transverse lines; a discal spot at $\frac{2}{5}$, beyond this 1st, 2nd, 3rd, and 4th grouped, the 3rd and 4th more or less diffused and more denticulate, 5th line interrupted and less distinct, 6th, 7th, and 8th lines at equal distances to hindmargin, very denticulate; cilia as forewings.

Brisbane; one specimen.

Appears to come nearest to *A. urarcha*, Meyr.

Group NOCTU.E, Family HELIOTHID.E.

CHARICLEA SANGUINATA, sp.nov.

♂♀. 24-30 mm. Head fuscous, tinted with deep red. Palpi ochreous-fuscous. Antennæ fuscous-red. Thorax ochreous-fuscous, deeply tinted with carmine. Abdomen fuscous tinted with red. Forewings elongate, gently dilate, costa rounded, hindmargin obliquely rounded, light ochreous, with deep lines of carmine to blood-red; a carmine costal band, more diffused toward apex, and prolonged as a band round hindmargin to anal angle; a broad band of carmine from base near inner margin through entire length of wing to $\frac{1}{2}$ hindmargin: cilia carmine, tipped with lighter pink. Hindwings pale greyish-white; cilia white.

Brisbane; very rare.

Easily known by the carmine or blood-colour bands along costa and through middle of wing.

Family ORTHOSIID.E.

LUPERINA DITATA, sp.nov.

♂♀. 30-40 mm. Head light fuscous-grey. Palpi ashy-grey. Antennæ ochreous-fuscous. Thorax fuscous, finely mottled with white and black, white posteriorly. Abdomen ochreous-fuscous, segments fringed with lighter fuscous and bordered laterally by

smoky-fuscous. Forewings : costa gently rounded, hindmargin rounded, fuscous, irrorated with darker fuscous and ashy-grey and marked with black lines ; costa finely irrorated with ashy-grey, a black line, sometimes double, and black dot at base from costa to a basal suffusion of fuscous-ochreous on inner margin, a dotted interrupted irregular black line from $\frac{1}{4}$ costa to $\frac{1}{4}$ hindmargin, a well-defined sinuous black line from $\frac{1}{3}$ costa to $\frac{1}{2}$ inner margin, a black-lined kidney-shape discal ring immediately beyond ; a second rhomboidal black-lined ring immediately beyond and nearer costa, containing a fuscous-grey dot and a suffusion of ashy-grey posteriorly ; a sharply-defined rich black line from $\frac{2}{3}$ costa twice dentate obliquely outwards, thence parallel to 2nd ring beyond and opposite, thence obliquely inwards as a wavy line to $\frac{3}{4}$ inner margin, bordered posteriorly with ashy-grey, and again with a diffused line of fuscous-grey ; another line just before apex of costa in a semilunar wave, then sinuous and twice sharply dentate to just before hindmargin ; a submarginal line of light grey-fuscous dots, followed by a hindmarginal fuscous-ochreous line ; posterior fourth of wing deeply irrorated with ashy-grey : cilia ochreous-fuscous, with median and terminal lines of fuscous-grey. Hindwings deep fuscous-ochreous, with veins fuscous, and a very broad hindmarginal band and suffusion of smoky-fuscous : cilia as forewings.

Duaringa and Brisbane.

Family NOCTUIDÆ.

PRIONOPHORA TORQUESAURIA, sp.nov.

♂♀. 18-23 mm. Head, palpi, and thorax dark chocolate-fuscous. Antennæ fuscous. Abdomen light ochreous-fuscous. Forewings elongate, costa gently rounded, hindmargin obliquely rounded, rich chocolate-fuscous, lined and trellised with fuscous and black, and with short lines or bars of light gold ; costa with a black spot near middle and several toward apex ; a gold bar from $\frac{1}{3}$ to $\frac{2}{3}$ costa and almost touching costa, a 2nd gold bar from centre of

base parallel to median vein as far as $\frac{1}{3}$, narrowed and in some specimens fuscous at base, a deep chocolate or blackish line from above second bar at base runs parallel to costa and near median vein, and has developed upon it two gold bars, extending with a uniting black dot along middle third of wing, a more or less interrupted zig-zag black and chocolate-fuscous line from $\frac{2}{3}$ costa to $\frac{1}{4}$ inner margin, a zig-zag diagonal black line edged with light chocolate from apex of hindmargin, has developed on it more or less completely from point of apex an undulating gold line or linear bar towards middle third of wing, thence the line forks into two branches from another gold bar, the posterior branch runs to near anal angle of inner margin, where it is rounded to run parallel and near to inner margin along its whole distance; the anterior branch runs to $\frac{2}{3}$ inner margin where it crosses the posterior branch; three or four other dark fuscous bands run through entire length of wing parallel to inner margin, but are interrupted by transverse lines and give the appearance of a number of cones pointing to base, these bands are at points diffused with black and are bordered by creamy-chocolate lines and marbled by shadings of darker chocolate; golden bars lined with black on inner border: cilia chocolate with lighter median band and patches of ochreous-fuscous. Hindwings reddish-ochreous, with an undulating dentate fuscous line from costa at $\frac{3}{4}$ to anal angle of inner margin; beyond this is a broad hindmarginal fuscous or fuscous-red border, attenuated before anal angle; cilia ochreous-fuscous, in some specimens irrorated with darker fuscous.

Brisbane; rare.

Family PLUSIAD.E.

HOLOCRYPTIS, Meyr., MS., gen.nov.

Face loosely scaled. Eyes naked. Ocelli absent. Tongue developed. Antennæ in male ciliated. Labial palpi moderate, subascending, very slender, somewhat loosely scaled, terminal joint moderate. Thorax smooth. Abdomen not crested (?). Legs smooth, slender, without spines. Forewings with veins 7

and 8 rising out of 9, 10 free. Hindwings with veins 3 and 4 stalked, 5 well-developed, nearly parallel to 4, 6 and 7 stalked.

The genus agrees with *Ricula* in the neuration of the forewings, but is separable by the slender palpi.

HOLOCRYPTIS PHASIANURA, sp.nov.

♂♀. 15-22 mm. Head white. Palpi light fuscous. Antennæ grey-white. Thorax creamy-white, snow-white on shoulders. Abdomen fuscous-white. Forewings somewhat elongate, gently dilate, costa rounded, hindmargin rounded, white, freely mottled with fuscous markings; two black dots, with a suffused interim at $\frac{1}{5}$ costa, a black discal spot above median before middle of wing, a black outlined **E** suffused with grey-blue on inner margin at $\frac{1}{5}$, two black spots immediately between this and hindmargin, and a conspicuous rich black spot in middle of hindmargin, a light fuscous dash on costa near base, a broad fuscous fascia at $\frac{1}{3}$ inner margin to just before costa at $\frac{1}{6}$, a light fuscous waved line from $\frac{1}{4}$ costa to $\frac{1}{3}$ inner margin, a fuscous fascia from $\frac{1}{2}$ inner margin, suffused toward last line, to $\frac{3}{5}$ costa, thence broadened and rounded to meet a like-coloured fascia from near costa just before apex, and in union with it gradually narrows to anal angle of inner margin; hindmarginal line light fuscous: cilia creamy-white. Hindwings as forewings, a fuscous band at $\frac{1}{3}$ diffused on costal half posteriorly to an elongated black discal spot, a waved dentate band of black from $\frac{2}{5}$ costa to $\frac{3}{4}$ inner margin, broadened posteriorly with grey-blue, a fascia of fuscous between this and hindmargin, hindmarginal line light fuscous; cilia as forewings.

Brisbane to Mackay; in scrubs; rare.

The pattern is like a pheasant's wing.

Family OPHIUSIDÆ.

GRAMMODES EXCELLENS, sp.nov.

♂♀. 36-40 mm. Head fuscous-grey, orbicular rims creamy-white. Palpi fuscous. Antennæ grey. Thorax iron-grey. Abdomen fuscous-grey. Forewings: costa straight, apical third

gently rounded, hindmargin gently rounded, rich fuscous-black, with cream-colour bars; a broad bar from $\frac{1}{3}$ costa to $\frac{2}{3}$ inner margin, 2nd bar from $\frac{2}{3}$ costa to just before $\frac{2}{3}$ hindmargin, where it is bent back on itself *and is continued as a circular line round to inner margin* to just before anal angle, forming a ring, within which is a sharply-defined black ring formed by the continuation of the hindmarginal line; this ring contains a large black spot shot with blue and bounded by a black line and a cream-coloured line prolonged at either angle to hindmarginal line: cilia white, with median bar of brown. Hindwings as forewings, a broad white concavo-convex white bar from a base $\frac{1}{4}$ to $\frac{1}{2}$ costa to a point at $\frac{2}{3}$ inner margin; an interrupted submarginal white line, a hindmarginal black line; cilia white, with a suffusion of brown in middle and gradually to anal angle.

Brisbane to Mackay.

Allied to *G. oculicola*, Walk., but altogether a more handsome insect, with broader bands and with a complete ring of rings or ocellus, which is replaced by a semilunar line in *G. oculicola*; in the latter there is a creamy-fuscous line from a dot in anal angle to before apex of hindmargin, which cuts off a well-defined piece of groundcolour; this is absent in *G. excellens*.

GRAMMODES PULCHERRIMA, sp.nov.

♂♀. 26-30 mm. Head fuscous-grey, orbicular rims white. Palpi and antennæ fuscous-grey. Thorax iron-grey, with a black collar edged anteriorly with creamy-grey. Abdomen lighter fuscous-grey. Forewings: costa nearly straight, hindmargin gently rounded, fuscous-black, with creamy-white bars; 1st bar $\frac{1}{3}$ costa to $\frac{2}{3}$ inner margin, attenuated to a point at costa and hindmargin; 2nd bar $\frac{2}{3}$ costa obliquely to opposite $\frac{2}{3}$ hindmargin, thence sharply angled on itself as a semilunar ring to $\frac{7}{8}$ inner margin, anterior border in costal half bowed toward base; a white line on costa at $\frac{7}{8}$ with an elongated dot subtended in wing; a smoky-grey bar or line from near apex of hindmargin to angle of 2nd bar, thence diffused as ground colour or orbicular ring, and

containing a black dot bordered by blue-grey; a submarginal lunulated grey line, bordered by hindmarginal iron-grey line: cilia fuscous-grey, with median bar of darker fuscous. Hindwings as forewings, with a white bar from a base $\frac{1}{3}$ to $\frac{3}{5}$ costa, slightly concave, deeply convex, to a point opposite anal angle; a light fuscous-grey line immediately beyond; an irregular submarginal diffused broken line of creamy-grey, a black hindmarginal line; cilia white, barred with fuscous in centre and diffused fuscous to anal angle.

Brisbane; rare.

Allied to *G. justa*, Walk., and to *G. oculicola*, Walk., but with finer bars, apical line and dot, and in general appearance a more delicate and showy insect.

GRAMMODES DIVARICATA, sp. nov.

♂♀. 40-46 mm. Head olive-fuscous. Palpi deep fuscous, fringed by purplish-fuscous. Antennæ olive-fuscous, laterally finely annulated with purplish-white. Thorax olive-fuscous, with purple-fuscous on dorsum. Abdomen light olive-fuscous, segments fringed with purplish fuscous. Forewings triangular, broadly dilate, costa nearly straight, hindmargin obliquely rounded, deep olive-fuscous, with a broad median fascia of white, tinted with purple and dusted excepting on borders freely with fuscous, anterior border $\frac{1}{3}$ costa to $\frac{2}{3}$ inner margin slightly concave toward base, posterior border $\frac{3}{5}$ costa to $\frac{3}{4}$ inner margin deeply concave toward hindmargin; a dark fuscous line from $\frac{3}{4}$ costa parallel for $\frac{1}{4}$ to hindmargin, thence obliquely rounded to posterior border of median band on inner margin, bordered posteriorly by a fine white-grey line, becoming fuscous-grey beyond angle; beyond this a suffusion of light fuscous-drab, becoming ashy-grey tinted with purple toward hindmargin; an apical spot of chocolate-fuscous bordered by a grey-white line; veins darker fuscous, bordered on costal edge in hindmarginal eighth with purplish-white: cilia ashy-grey, with a basal and terminal band of fuscous-grey. Hindwings deep olive-fuscous, with a white median band tinted with purple; a short denticulate waved line from apex of inner margin

to one-third distance of wing, and parallel to a hindmarginal diffusion of same colour, which is very narrowly continued to apex; a fuscous black hindmarginal line; cilia ashy-grey, with median band of fuscous-grey.

Brisbane.

GRAMMODES PALLENS, sp.nov.

♂♀. 42-50 mm. Head, palpi, antennæ, thorax, and abdomen a reddish-drab or light ochreous-fuscous. Forewings triangular, broadly dilate, costa slightly sinuous, rounded, apex acute, hindmargin nearly straight, light ochreous-fuscous, sparingly dusted with black; veins raised; an irregular row of five black dots in middle two-fourths of wing opposite $\frac{3}{5}$ costa to opposite $\frac{2}{3}$ inner margin, in many specimens ill-defined; in some specimens an indistinct darker ochreous-fuscous wavy line parallel to hind border at $\frac{7}{8}$; a hindmarginal row of black dots: cilia light ochreous-fuscous. Hindwings as forewings, lighter toward costa and hindmargin; a deep black fascia in middle two-fourths of wing at half its own width from hindmargin and diffused as a light smoky-fuscous shade toward costa and less so toward anal angle; a row of hindmarginal black dots, faint in some specimens; cilia as forewings.

Brisbane.

Family DELTOIDÆ.

HERMINIA SEMICIRCULARIS, sp.nov.

♂♀. 24-28 mm. Head dark fuscous. Palpi fuscous. Antennæ: ♂ pectinated, pectinations shorter on inner border and toward apex; ♀ simple, light fuscous. Thorax dark fuscous, collar ochreous-fuscous. Abdomen grey-fuscous. Forewings: costa nearly straight, hindmargin rounded, deep fuscous; costal border ochreous-fuscous, attenuated to a point at $\frac{1}{3}$ costa, beyond this an ochreous dot and a black diffusion to apex; veins deeper fuscous; a small ochreous dot bordered by black at $\frac{1}{3}$ above median vein, a dark fuscous line from $\frac{1}{2}$ costa to $\frac{2}{3}$ inner margin, not always well

defined, this passes and becomes darker round an ochreous discal spot above median vein ; a very fine ochreous faint line beyond $\frac{1}{2}$ costa obliquely to opposite $\frac{3}{4}$ costa, thence as a well-defined ochreous line to $\frac{2}{3}$ inner margin, denticulate in costal half and bordered anteriorly by an interrupted smoky-fuscous line ; a faint interrupted sinuous ochreous-fuscous line from just before apex of costa to $\frac{7}{8}$ inner margin, more distinctly ochreous and forming an ochreous dot or indent opposite discal spot ; hindmarginal wavy black line : cilia fuscous, barred and tinted with ochreous and darker fuscous. Hindwings as forewings, with median ochreous line continuous with that of forewings from $\frac{1}{2}$ costa to $\frac{3}{5}$ inner margin, with a dark fuscous line on anterior border ; an ill-defined faint line wavy and dentate from $\frac{3}{4}$ costa to $\frac{7}{8}$ inner margin ; a hindmarginal smoky-fuscous line ; cilia as forewings.

Brisbane ; rare.

Group PYRALIDINA, Family HYDROCAMPIDÆ.

Nymphula sinuosa, sp.nov.

♂♀. 8-12 mm. Head, palpi, antennæ, thorax, and abdomen creamy-grey. Forewings elongate-triangular, gently dilate, costa gently rounded, hindmargin rounded, creamy-grey, with smoky-fuscous and ochreous lines ; costa irrorated with smoky-fuscous dots, a smoky-fuscous line beyond base, interrupted in centre of wing, diffused on inner margin ; a faint wavy ochreous line at $\frac{1}{4}$; a median fascia, anterior border $\frac{2}{3}$ costa to $\frac{1}{2}$ inner margin, wavy, dentate on costa and before inner margin, posterior border $\frac{3}{4}$ costa to $\frac{3}{4}$ inner margin, twice dentate, and nearly straight to middle, thence obliquely toward inner margin, the space contained banded by an ochreous line more or less suffused ; a faint ochreous sinuate denticulate line from just before apex of costa to $\frac{7}{8}$ inner margin, in some specimens suffused with fuscous ; a narrow hindmarginal fascia with fuscous linear borders and suffused with bars and lines of fuscous : cilia smoky-fuscous. Hindwings as

forewings, a fascia at $\frac{1}{4}$ anterior border suffused fuscous partly wanting, posterior border a dark fuscous line, space contained more or less ochreous; a median fascia formed of three fuscous black lines interlacing from costa at $\frac{2}{3}$ to a point one-third from inner margin, thence as a single line to just before anal angle of inner margin; an ochreous line beyond, diffused with fuscous in ♀; a hindmarginal fuscous black line; cilia as forewings.

Brisbane; in scrub.

Family BOTYDIDÆ.

NOTARCHA EXCULTA, sp. nov.

♂♀. 22-26 mm. Head creamy-grey, with crown and face fuscous-grey. Palpi fuscous-grey. Antennæ light fuscous. Thorax fuscous-grey, mottled and bordered with creamy-white. Abdomen fuscous-black, segments fringed with creamy-white. Forewings elongate, costa gently rounded, hindmargin rounded, creamy-grey, largely diffused with fuscous mottled with fuscous-grey, and dotted and lined with black; a black dot more or less diffused at base, a semilunar black-grey line enclosing this or suffused with it; a black dot on costa at $\frac{1}{5}$ subtending an irregular row of dots to a large diffused spot at $\frac{1}{6}$ inner margin, centre dots faint; a dot over median vein at $\frac{2}{5}$, another in a line below it, and a faint arch or diffusion of three dots to inner border at $\frac{1}{2}$; a prominent discal spot opposite costa at $\frac{3}{5}$, with a second dot between it and inner border at $\frac{3}{4}$, and surrounded with diffused spots of smoky-fuscous; a denticulate line of dots between veins $\frac{4}{5}$ costa for $\frac{2}{3}$ distance of wing to opposite $\frac{7}{8}$ inner margin, continued to hindmargin as suffused cones; hindmarginal line smoky-black; cilia creamy-white, with median and terminal light fuscous bars. Hindwings white in centre, with a diffused smoky-fuscous costal border, continued as a broad hindmarginal band, which hindmarginal band is marbled by two cream-colour denticulate lines, the one submarginal, the other parallel and half distant to white centre; four dots, 1st diffused at base, 2nd small and fainter near costa at $\frac{1}{5}$, 3rd a square discal spot in centre, and a 4th in

centre denticulate line, opposite $\frac{1}{4}$ hindmargin; hindmarginal line black; cilia creamy-white, with median band and bars of fuscous.

Brisbane; in scrub; rare.

PYRAUSTA STRAMINEA, sp.nov.

♂♀. 20-24 mm. Head ochreous-fuscous, face darker fuscous. Palpi fuscous. Antennæ creamy-fuscous. Collar dark fuscous. Thorax ochreous-fuscous. Abdomen ochreous-fuscous, whiter anteriorly. Forewings straight, rounded at apex, hindmargin obliquely rounded, ochreous-fuscous tinted with light ferruginous on borders, and marked with black dots and fuscous lines; costal edge dark fuscous, a curved row of 4 black dots from opposite $\frac{1}{5}$ costa to $\frac{1}{4}$ inner margin, the third and fourth dots faint and indefinite; a black dot on median vein with a second dot midway between it and costa at $\frac{1}{2}$; a circular fuscous line with darker dots on veins, from $\frac{2}{3}$ costa to a black spot opposite $\frac{2}{3}$ inner margin; a hindmarginal dark smoky-fuscous line: cilia grey, with a smoky-fuscous median line. Hindwings ochreous-fuscous, more or less suffused with smoky-grey, mostly toward hindmargin; a conspicuous black discal spot; a fuscous line of dots between veins nearly parallel with hindmargin from $\frac{2}{3}$ costa to $\frac{2}{3}$ inner margin; hindmarginal line dark smoky-fuscous; cilia as forewings.

Queensland; rare.

PYRAUSTA VIOLACEA, sp.nov.

♂♀. 20 mm. Head fulvous-ochreous. Palpi long, fulvous-ochreous, inclining to fuscous laterally. Thorax sepia-fuscous. Abdomen fulvous-fuscous. Forewings: costa gently rounded, hindmargin, apical half straight, inner half rounded, dark fuscous shaded with purple and iridescent violet, dusted with sepia-fuscous and marked with deep fuscous lines; a sepia-fuscous line from $\frac{1}{4}$ costa to $\frac{1}{3}$ inner margin, space between it and base diffused with sepia-fuscous; a discoidal ring of dark sepia shaded with violet, in some specimens diffused with sepia-fuscous to form a

conspicuous blotch extending to costa at $\frac{2}{3}$; a second sepia-fuscous line on posterior border of this to $\frac{2}{3}$ inner margin; a hindmarginal sepia line: cilia fuscous, with a median band of dark sepia-fuscous. Hindwings as forewings, with inner border broadly diffused with grey, and edged with fulvous-ochreous hairs; a broad Y-shaped figure of sepia-fuscous from $\frac{1}{4}$ and $\frac{3}{5}$ costa stalked opposite $\frac{1}{6}$ hindmargin, stalk curved toward anal angle; hindmarginal line of sepia-fuscous; cilia fuscous, with median and terminal lines of sepia-fuscous.

Brisbane; rare.

CONOGETHES PUNCTIFERALIS, Gn., var. *JOCATA*.

About $\frac{2}{3}$ size of type. Spots and lines identical, but minimised. With a fuscous-red suffusion over centre of forewings.

Hamilton Scrub, near Brisbane.

CONOGETHES NUBIFERA, sp.nov.

♂♀. 12-16 mm. Head and antennæ chrome-yellow. Palpi purple-red. Thorax chrome-yellow, collar purple-red subtending a square dot on dorsum, and a spot laterally of same colour, epaulettes chrome-yellow, with base purple-red. Abdomen chrome-yellow, with base and sides of centre segments purple-red. Forewings: costa rounded, hindmargin gently rounded; light chrome or ochreous-yellow, with purple-red dots, lines, and suffusions, a dot at base on costa, a line or broken into two or three dots near base across wing; a second line from $\frac{1}{4}$ costa to $\frac{1}{4}$ inner margin, curved outward in middle third, in some specimens lines on folds connecting these two lines, a discal dot at $\frac{2}{3}$ near costa; 3rd line from near but not touching costa at $\frac{1}{2}$ to $\frac{1}{2}$ inner margin, parallel to 2nd line, dentate in inner half; 4th line $\frac{3}{4}$ costa to $\frac{1}{3}$ inner margin, thicker at costa and inner margin, enclosed space more or less filled with a suffusion, except on costa, and forming an irregular fascia, a suffusion on centre of posterior border, and three clusters of 8 or 9 dots between 4th line and hindmargin:

cilia chrome-yellow. Hindwings coloured as forewings, but lighter yellow, markings more sparse, a dot near costa at $\frac{1}{4}$, two dots from inner margin at $\frac{3}{4}$ toward centre of wing, a line from $\frac{2}{3}$ costa to anal angle of hindmargin broken up into dots in hindmarginal half, a blotch just before apex of costa, in a line with a series of three or four dots to centre of hindmargin; cilia as forewings.

Birpengarry, Brisbane; six specimens taken by Dr. T. L. Bancroft.

The difference in the markings, the purple suffusion, and the smaller size readily distinguish this from *C. punctiferalis* or var. *jocata*.

Family PHYCITIDÆ.

MYELOIS FLAVEOTINCTA, sp.nov.

♂♀. 17-20 mm. Head grey, freely dusted with black, face fuscous. Palpi fuscous, grey at base. Antennæ smoky-fuscous. Thorax grey, freely dusted with black. Abdomen fuscous, apex of each segment grey, in ♂ the abdomen dusted or tinted with fulvous, and with the apical segment fulvous. Forewings elongate, narrowly dilate, costa gently rounded, hindmargin obliquely rounded, white-grey, freely dusted and mottled with fuscous-grey and black, and marbled with about 7 indefinite black wavy dentate transverse circular lines, at equal distances from base to hindmargin of wing; in most specimens the lines are hidden by the diffusion of fuscous-grey and black; a conspicuous black dot on inner border near base, a 2nd at $\frac{1}{2}$ inner border, with another at $\frac{2}{3}$ costa, a 4th at $\frac{7}{8}$ inner margin, and a 5th just before apex of costa; a hindmarginal smoke-colour line of spots: cilia grey, with a band of smoky-grey. Hindwings hyaline, veins light fuscous; cilia white, with a grey basal band. In the ♂ the bases of all wings when fresh are tinted with a shading of fulvous, more widely on hindwings.

Brisbane; at light.

HOMÆOSOMA DELINEATA, sp.nov.

♂♀. 14-24 mm. Head grey-white, in some specimens a fuscous spot on crown, in others minute scattered fuscous dots. Palpi fuscous. Antennæ fuscous-drab. Thorax and abdomen grey-white. Forewings elongate, costa rounded, hindmargin rounded, grey-white, dusted or more or less diffused with grey, and spotted with fuscous dots, well marked or more or less obscure; costal border fuscous, darker in apical third, the fuscous colour becoming more diffused at apex; a first line of two dots, the one at $\frac{1}{2}$ and near inner border, the second opposite to it on median vein; a dot in middle of wing at $\frac{2}{5}$; a second line of seven dots with interposed dashes from $\frac{5}{6}$ costa to opposite $\frac{5}{6}$ inner border; in some specimens there is a more or less distinct fuscous line between the inner marginal dots; a submarginal line or diffusion of grey dashes; a hindmarginal row of fuscous-grey dots: cilia grey. Hindwings grey, veins smoky-grey; submarginal and hindmarginal lines of fuscous-grey inclose a narrow band of light fuscous; cilia as forewings.

Brisbane; rare.

FURTHER NOTES ON THE OVIPARITY OF
THE LARGER VICTORIAN *PERIPATUS*, GENERALLY
KNOWN AS *P. LEUCKARTII*.

BY ARTHUR DENDY, D.Sc.

(Communicated by Professor W. A. Haswell.)

My observations* on the oviparous habit of the larger Victorian *Peripatus* (hitherto generally regarded as identical with the *Peripatus leuckartii* of Säng.) have excited a good deal of hostile criticism, chiefly emanating from the pen of Mr. J. J. Fletcher. On three different occasions since the publication of my notes Mr. Fletcher has brought the question before the Linnean Society of New South Wales, and his remarks have been published (I do not know whether in full or not) in the Abstracts of Proceedings of the Society.†

I have already replied to the earlier criticisms in a short paper read at the Hobart Meeting of the Australasian Association for the Advancement of Science, which will, I am informed, be published shortly. Mr. Fletcher's latest observations, however, compel me to return to the question, and I am the more willing to do so as I have some further information to communicate in support of my views.

The object of Mr. Fletcher's latest contribution to the literature of the subject is explained in the opening paragraph, which runs as follows:—"This paper is a reply to certain views expressed by Dr. Dendy with regard to the reproduction of the New South

* Proc. Roy. Soc. Victoria for 1891, p. 31; "Nature," September 17, 1891; and "Zoologischer Anzeiger," No. 380, 1891.

† September 30, 1891; February 24, 1892; April 27, 1892.

Wales *Peripatus*, which on the *ipse dixit* of Dr. Dendy himself is *P. leuckartii*, Säng. ; the questions at issue being not whether or no the Victorian *Peripatus* is oviparous, but whether, firstly, Dr. Dendy was justified, on the evidence before him and in the absence of any personal knowledge of the reproduction of the N.S.W. *Peripatus*, in contradicting statements which were quite in order ; and secondly, as Dr. Dendy's views were published in September, 1891, and as certain information on the subject was subsequently brought under his notice, whether it is not now nearly time that Dr. Dendy took steps to explain that his views apply wholly and solely to the Victorian *Peripatus*, and to withdraw his insinuations respecting, and his erroneous interpretation of, 'Mr. Fletcher's observations,' because already Dr. Dendy's statements are finding their way into the records of zoological literature, and confusion and misapprehension may result therefrom."

In reply to Mr. Fletcher's indictment I wish to make the following remarks :—

(1) I do not understand the meaning of the statement that the New South Wales *Peripatus* is, "on the *ipse dixit* of Dr. Dendy himself," *P. leuckartii*. I certainly am not responsible for this identification, which was, I believe, first made by Mr. Olliff, who remarks,* on first recording the animal from New South Wales, that "The species is identical with that recently recorded by Mr. Fletcher from Gippsland, and is probably the *Peripatus leuckartii* of Sänger." I need scarcely point out that the name *leuckartii* has since been applied by Mr. Fletcher himself to the New South Wales species.

Possibly Mr. Fletcher means to refer to the larger Victorian species, of which the first recorded specimen was identified by himself † as "in all probability an example of *P. leuckartii*, Sänger." If Mr. Fletcher will refer to my earliest communication on the subject, ‡ he will find that in recording the discovery of

* P.L.S.N.S.W. Vol. ii. p. 981.

† P.L.S.N.S.W. Vol. ii. p. 450.

‡ "Victorian Naturalist," January, 1889.

two specimens at Warburton (only one specimen having been previously recorded from this colony) I made the following statement: "After carefully studying Professor Sedgwick's full description of *P. leuckartii*, I am fairly certain that they do not belong to that species, but to a new one, which I for the present refrain from naming"—basing my conclusion on the remarkable pattern of the skin. Professor Sedgwick, however, in reply to my observations, expressed the opinion* that the species probably was subject to a considerable range of variation in colour. Having studied more specimens, I myself came to the same conclusion,† and have since then followed Mr. Fletcher in calling the larger Victorian species *P. leuckartii*. This use of the name *leuckartii* on my part seems to be Mr. Fletcher's chief grievance against me, but I would ask him to remember that I have only followed his own lead in this respect.

(2) I am not aware that I have contradicted any statements, for the simple reason that I cannot find that there were any definite statements as to the mode of reproduction of the New South Wales *Peripatus* for me to contradict. There was merely the assumption by Mr. Fletcher (which I quoted and characterised as very natural) that the young animals which he found in company with the parent had been born alive.

(3) I consider that I was fully justified in assuming that the mode of reproduction of the N.S.W. *Peripatus* was the same as that of the Victorian one, as at the time when I wrote there were no definite observations published as to the mode of reproduction of the former, and it was almost inconceivable that different individuals, which Mr. Fletcher himself, in common with all other writers on the subject, regarded as belonging to one and the same species, should be oviparous in the one colony and viviparous in the other. I have no doubt now that the New South Wales *Peripatus* is viviparous, as maintained by Mr.

* "Nature," February 28th, 1889.

† "Observations on the Australian Species of *Peripatus*." Proc. Roy. Soc. Victoria, July 11th, 1889.

Fletcher and Professor Haswell, but I would ask Mr. Fletcher to remember that when I wrote the only published observations as to the mode of reproduction of the New South Wales species were (a) the finding of the young in company with the mother, though there was nothing, so far as the published account goes, to show that they had not been hatched from eggs laid for some time, and (b) a footnote* to one of Mr. Fletcher's observations, stating that a female had been dissected and found to be pregnant; the term pregnant is not defined, and might, in my opinion, be correctly applied to a female containing large but undeveloped eggs in the uterus; nothing is said by Mr. Fletcher about the embryos.

Mr. Fletcher may personally have had abundant evidence that the New South Wales *Peripatus* was viviparous, but that evidence was not published, and not known to me when I wrote, and therefore I consider that I was quite justified in stating that the mode of reproduction of *P. leuckartii* was unknown, and in placing my own interpretation upon the only recorded facts as to the life-history of the New South Wales form. Naturally, I interpreted them in the light of my own observations on the Victorian species. That interpretation I now fully admit to be incorrect, and I congratulate myself that if my observations have had no other good result they have at least elicited some definite information as to the mode of reproduction of the New South Wales *Peripatus*.

(4) Mr. Fletcher seems to be very greatly troubled because my statements are already "finding their way into the records of zoological literature, and confusion and misapprehension may result therefrom." There is not the slightest need for confusion now that we have at length a definite statement as to the reproduction of the N.S.W. species. It must be perfectly obvious to every reader that my own observations were based entirely on Victorian specimens, as stated distinctly in the paper, and that my suggestion as to the New South Wales form was a perfectly

* P.L.S.N.S.W. Vol. iii. p. 892.

justifiable, though, as it turns out, incorrect, deduction from the only published facts. It is perhaps unfortunate that both the New South Wales and Victorian forms should have been included under the name *leuckartii*; but for this Mr. Fletcher himself is at least as much responsible as any one.

(5) Mr. Fletcher states that the question at issue is not whether or no the Victorian species is oviparous. Herein I must beg to differ from him, as this is the real question which I have been all along trying to solve, and compared with which the mere question of nomenclature is, in my opinion, insignificant. In concluding his observations he also indulges in certain offensive and unjustifiable personalities, which I need not quote. It is greatly to be regretted that he should have considered such a proceeding advisable, and, for my own part, I entirely fail to see the advantage to be derived therefrom and must refuse to follow his example in this respect.

Probably the solution of the whole difficulty will be found to lie in the fact that my original opinion was correct after all, and that our larger Victorian *Peripatus* is specifically distinct from *P. leuckartii*. For the present, however, I still refrain from giving it a distinctive name, as I have had very few specimens from other localities to compare it with, and do not wish, if it can be helped, to create a new species merely on account of the oviparous habit. This question, however, is discussed in my communication to the Australasian Association already referred to.

As to the oviparous habit of our larger Victorian species (so called to distinguish it from the smaller *P. insignis*) I have some additional evidence to offer, and I would like at the same time to recapitulate the main arguments in favour of my view. My critics have entirely ignored all that is new in my observations, such as the remarkable sculptured egg-shell, and have suggested that what I have observed is simply a case of abnormal extrusion of eggs such as takes place sometimes in *P. novae-zealandiae*. Professor Hutton, however, who made the observation on the New Zealand species, merely states that the eggs are often

extruded before development is complete and then always die. Professor Sedgwick quotes these statements in his Monograph of the genus, and yet in replying* to my letter in "Nature" he states that "no one knows whether the eggs so extruded undergo complete development"! I suppose that most animals sometimes extrude eggs which never complete their development, but this has really little to do with the question. What I have been endeavouring to prove is that the larger Victorian species of *Peripatus* is normally oviparous. The two principal arguments originally brought forward—both of which have been entirely overlooked by my critics—were (1) that female specimens dissected at various times of the year were never found with embryos in the uterus, as has been so frequently described for other species, but generally with large undeveloped eggs of definite oval shape and with a thick membrane; (2) that the shell or membrane of the eggs after (but not before) being laid is very definitely and characteristically sculptured on the outer surface, in such a manner as to recall the eggs of many insects. This sculpturing alone appears to me to indicate a truly oviparous habit, and, inasmuch as it affords another character common to *Peripatus* and the *Insecta*, to deserve special attention. I am not aware that a sculptured egg-shell has hitherto been observed in *Peripatus*, and I should be glad to learn from Mr. Fletcher whether anything of the kind has ever been found around embryos of the New South Wales species which have, as he informs us,* been extruded in the process of drowning.

The additional evidence on the subject which I now wish to bring forward consists in the subsequent history of the fourteen eggs which were laid in my vivarium between the 18th May and the 31st July last year, and of one which, though possibly laid about the same time, was not discovered until September 16. Before going any further, however, I may premise that the fact that the eggs are really those of *Peripatus* has been absolutely

* "Nature," September 24th, 1891.

* P.L.S.N.S.W. September 30, 1891.

proved by their development. It may also be as well to relate the fate of the parent animals by which the eggs were laid.

It may be remembered that on the 31st July, 1891, when the eggs were first found, there were in the vivarium three females and one male, all apparently in good health. The male specimen died shortly afterwards, but on August 17th the females were still all alive and apparently healthy. On August 31st, as mentioned in a postscript to my first communication on the subject, one of the female specimens was found dead. On being dissected the reproductive organs appeared very well developed, but, although the ovary and oviducts were both large (the former containing a great many ovarian eggs), there was not a single egg in either of the oviducts, all having been doubtless laid.

On September 16th the two remaining females were still alive. I killed and dissected one. The organs appeared healthy and well developed. In the lower part of each oviduct one large egg was found. The eggs presented the usual characters, having a very thick but unsculptured envelope filled with yolk. Both eggs were cut open and examined microscopically, but I did not succeed in recognising any trace of an embryo in either.

On completely turning out the vivarium and examining its contents carefully I found one more *Peripatus* egg amongst the rotten wood (September 16th). It looked much healthier than those which had previously been transferred from the vivarium, many of the latter having already begun to shrivel up and acquire a dark colour. In the newly found egg, and also in the healthier looking of those previously obtained, there now appeared to be a dark spot in the interior, but this was only dimly visible through the thick sculptured shell.

On September 25th the last remaining female was still apparently in good health, but on October 1st it was found dead—how long it had been so I do not know. On dissection I found the internal organs in a bad condition. Neither eggs nor embryos were visible in the oviducts. The ducts of the slime glands were

very much enlarged and swollen out, while the branched portions appeared feebly developed, in fact not distinctly recognisable. The alimentary canal was almost empty, and the animal seemed to have died of starvation.

On October 3rd I dissected one of the eggs from the hatching-box. I could find no embryo in it, but only the same semi-liquid, yolk-like contents as when *in utero*, full of little oil or yolk globules. Inside the thick sculptured "shell" there was, as usual, a very thin and delicate transparent membrane. Probably a young embryo was really present but was broken up in opening the egg and overlooked; even at a much later period the embryonic tissues are extremely delicate.

On November 30th I noted that several of the eggs were showing indications of an embryo appearing coiled up within them, but the shell was so thick and opaque that it was impossible to make out any details. I dissected the egg which was found on September 16th, and which had since then been kept separate from the rest. I found in it a beautiful embryo *Peripatus* in an advanced stage of development. The embryo was surrounded by a delicate transparent membrane, which fitted closely on to it and was very difficult to remove; outside this came the sculptured shell. The embryo possessed a distinct head, with clearly recognisable brain, eyes and ringed antennæ, and there were at least seven pairs of appendages behind the antennæ. It lay tightly coiled up, with the posterior extremity resting against the side of the neck, in such a position as to make it very difficult to count the appendages. The specimen was stained and mounted in Canada balsam.

This embryo, then, developed for more than 10 weeks after the egg had been laid and did not show the least sign of "going to the bad."

I need hardly say that during the heat of the summer months I found it a very difficult matter to keep the eggs in a suitable condition of moisture, especially as I had no previous experience to guide me. Hence it is not to be wondered at that the majority of the eggs perished, shrivelling up and being attacked by a mould.

As I was away from Melbourne for some weeks during the summer, I entrusted the eggs to the care of the Rev. W. Fielder, who most kindly looked after them for me in my absence. Frequent attention was necessary in renewing the supply of moisture.

On April 14th, 1892, only three eggs remained in the hatching box, the others having been removed as they showed signs of going bad. One of the remaining three had been showing dark pigment inside for some days past. This egg I removed and carefully dissected. I found the shell of a much darker (yellow) colour than when laid, a good deal crumpled on the surface, and very soft, as though beginning to decay away. The contained embryo was removed and found to be in excellent condition, although *outside* it there appeared under the microscope a great many very fine threads, which I take to be the hyphæ of a fungus. Possibly this fungus might have ultimately killed the embryo, but the latter was so far advanced that it seemed to be on the verge of hatching. It was enclosed within the usual transparent delicate membrane lying within the thick shell. I could not determine whether the fungal hyphæ had penetrated within this inner membrane, but I think it very doubtful. The embryo was tightly coiled up as in the previous case. When uncoiled it measured about 5 mm. in length (exclusive of the antennæ) and 1 mm. in breadth. *All* the appendages were developed, viz., antennæ, oral papillæ, two pairs of jaws and fifteen pairs of claw-bearing legs. The eyes were conspicuous at the bases of the antennæ, and the antennæ themselves showed each about twenty deeply pigmented annuli. The remainder of the body was nearly white, but very distinct isolated pigment patches (chiefly indigo-blue, with a few specks of orange) appeared scattered pretty abundantly over the legs and back. The mouth was surrounded by the very characteristic, thick, transversely furrowed lip. The dermal papillæ were very obvious and exhibited the characteristic spines, the cuticle being very strongly developed. The claws on the feet were very distinct. The alimentary canal was full of granular food yolk. The specimen was stained with borax carmine and mounted in Canada balsam.

This embryo, then, developed for at least eight months and a half after the egg was laid, and at the end of that time was a perfect young *Peripatus*, differing externally from the adult only in its smaller size and less deeply pigmented skin.

There are still two eggs left in the hatching box, but they do not look to me at present as if they were going to hatch. Whether they do so or not, however, I think I may fairly claim to have now definitely proved that the larger Victorian *Peripatus* at any rate sometimes lays eggs, and that these eggs are capable of undergoing development outside the body until perfect young animals are produced. The great length of time required for the development of the eggs is very remarkable, but is only what one might expect on considering the unusual length of time required for intra-uterine development in other species.

NOTES AND EXHIBITS.

Mr. Palmer exhibited a broken aboriginal stone axe found by him in a cave shelter at Lawson, Blue Mts.

Mr. Pedley exhibited a very fine and perfect saw, about 5 ft. long, of the saw-fish *Pristis zysron*, Bleeker. The fish without the saw was about 19 ft. long, and was captured in a net at Evans River, N.S.W. The number of pairs of rostral teeth for this species is usually given as from 26-32; the specimen exhibited had only 25 pairs, all in place.

Mr. Whitelegge exhibited the following interesting collection of mosses obtained by him at Lord Howe Island, and determined by Professor Brotherus of Helsingfors. Twenty species are represented, of which seven are new, some of the remainder also not having been previously recorded from Lord Howe Island.

Euptychium mucronatum, Hampe.

Euptychium robustum, Hampe.

Macromitrium peraristatum, Brotherus, n.sp.

Macromitrium brevisetaceum, Hampe.

Rhizogonium undulatum, Lindberg.

Rhizogonium Parramattense, C. Müller.

Bryum Whiteleggei, Brotherus, n.sp.

Bryum leucacanthum, Hampe.

Distichophyllum leucoloma, Brotherus, n.sp.

Cyathophorum pennatum, Bridel.

Thuidium protensulum, C. Müller.

Trichosteleum (?) muscicola, Brotherus, n.sp.

Dicranum dicarpum, Hornschuch.

Campylopus bartramioides, Brotherus, n.sp.

Leucobryum pseudo-candidum, Brotherus, n.sp.

Pterobryella praenitens, Hampe.

Pilotrichella trichophorooides, Hampe.

Porotrichum vagum, Hornschuch.

Fissidens (Conomitrium) howeanus, Brotherus, n.sp.

Spiridens Mülleri, Hampe.

Mr. Froggatt exhibited three female specimens of an undescribed species of *Cælostoma* (Fam. *Coccidæ*) found on *Acacia stricta*; the only other known species, *C. australe*, was recently described by Mr. Maskell in the Proceedings of this Society. Also a robber-fly (Fam. *Asilidæ*) together with a bee (*Apis mellifica*), its victim; and he mentioned that one of these flies, *Trupania apivora*, Feitch, in North America was known to be a ruthless destroyer of honey bees.

Mr. Hedley exhibited, on behalf of Mr. Rainbow, a spider of the family *Epëiridæ*. This rare and remarkable insect furnishes an addition to our fauna, and a new genus may be required for its reception.

WEDNESDAY, 29TH JUNE, 1892.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

Mr. Oswald Trebeck was introduced as a visitor.

DONATIONS.

“United States National Museum—Proceedings.” Vol. xiv., Nos. 884-886 (1892). *From the Museum.*

“American Museum of Natural History, New York—Bulletin.” Vol. iv., pp. 33-64 (1892). *From the Museum.*

“Bollettino dei Musei di Zoologia ed Anatomia comparata della R. Università di Torino.” Vol. vii., Nos. 112-119 (1892). *From the Museum.*

Two pamphlets entitled—“On the Oleo-Resin of *Canarium muelleri*, Bailey; together with Notes on *Manila elemi*,” and “Notes on the Exudations yielded by some Australian Species of *Pittosporum*.” By J. H. Maiden, F.C.S., &c. *From the Author.*

Pamphlet entitled—“On Thirty-Four new Species of Australian Lepidoptera, with additional Localities, &c.” By T. P. Lucas, M.R.C.S., &c. *From the Author.*

“Perak Government Gazette.”—Vol. v., Nos. 10-14 (April-May, 1892). *From the Government Secretary.*

“Bulletin de la Société d'Horticulture du Doubs.” No. 16 (April, 1892). *From the Society.*

“Department of Agriculture, Brisbane—Annual Report, 1890-91”; “Bulletin.” No. 17 (May, 1892). *From the Under Secretary for Agriculture.*

“Zoologischer Anzeiger.” xv. Jahrg., Nos. 389-391 (April-May, 1892). *From the Editor.*

“Woodwardian Museum, Cambridge—Catalogue of the Type Fossils in the Museum” (1891). *From the Museum.*

“Verhandlungen des Naturhistorischen Vereines der preussischen Rheinlande, Westfalens und des Reg.-Bezirks Osnabrück.” Fünfte Folge, viii. Jahrg., Zweite Hälfte (1891). *From the Society.*

“Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjöbenhavn for Aaret 1891.” *From the Society.*

“Quarterly Journal of the Geological Society.” Vol. xlvi., Part 2, No. 190 (May, 1892). *From the Society.*

“Entomological Society of London—Transactions for the year 1892.” Part 1 (March). *From the Society.*

“Zoological Society of London—Transactions.” Vol. xiii., Part 4 (April, 1892); “Proceedings, 1891.” Part 4 (April, 1892); “Proceedings—Index 1881-90 (1892)” ; “Abstract, 3rd May, 1892” ; “Additions to Menagerie during March, 1892.” *From the Society.*

“Journal of the Royal Microscopical Society, 1892.” Part 2 (April). *From the Society.*

Two Conchological Pamphlets entitled—“Descriptions of new Species of Shells from New South Wales, New Guinea, the Caroline and Solomon Islands,” and “Descriptions of new Species of Shells from Mauritius and California.” By E. A. Smith, F.Z.S. *From the Author.*

“Report of the Third Meeting of the Australasian Association for the Advancement of Science held at Christchurch, New Zealand, in January, 1891.” *From the Association.*

“University of Melbourne—Examination Papers (Matriculation).” May, 1892. *From the University.*

“The Victorian Naturalist.” Vol. ix., Nos. 2-3 (June-July, 1892). *From the Field Naturalists' Club of Victoria.*

“Société Zoologique de France—Mémoires.” T. iv., No. 5 (1891); T. v., No. 1 (1892); “Bulletin.” T. xvii., No. 2 (1892). *From the Society.*

“Results of Meteorological Observations made in N.S.W. during 1889”; “Results of Rain, River, and Evaporation Observations made in N.S.W. during 1890”; and two pamphlets entitled—“Notes on the Growth of some Australian Trees,” and “A Cyclonic Storm or Tornado in the Gwydir District.” By H. C. Russell, B.A., C.M.G., F.R.S. *From the Government Astronomer, Sydney.*

“Department of Mines, Victoria—Annual Report of the Secretary for Mines for the year 1891.” *From the Secretary for Mines.*

“Nouvelles Archives du Muséum d’Histoire Naturelle.” 3^{me} Série, Tome iii^{me} (1891); “Zeitschrift für wissenschaftliche Zoologie.” liii. Band, 4 Heft u. Supplement. *The Gift of the late Hon. Sir William Macleay, F.L.S. (by the Executors).*

“Sydney Morning Herald.” In monthly numbers for the years 1883, 1884, 1885, 1886 (except October), 1887 (except September and October), 1888 (except October and December), 1889, 1890, 1891 (January to July). *From Dr. J. C. Coe, F.L.S.*

“Institute of Jamaica—A Provisional List of the Fishes of Jamaica; Bulletin No. 1” (1892). *From the Institute.*

“Bulletin de la Société Royale Linnéenne de Bruxelles.” xvii^{me} Année, Nos. 1-6 (November, 1891, to April, 1892). *From the Society.*

“Bulletin de la Société Royale de Géographie d’Anvers.” T. xvi., 3^e Fasc. (1892). *From the Society.*

“Journal of the College of Science, Imperial University, Japan.” Vol. v., Part 1 (1892). *From the University.*

“Société Botanique de Lyon—Bulletin Trimestriel.” ix^{me} Année, Nos. 3 et 4 (Juillet-Décembre, 1891). *From the Society.*

“Naturkundige Verhandelingen van de Hollandsche Maatschappij der Wetenschappen.” 3^{de} Verz., Deel v., 2^{de} Stuk (1892); “Programma, 1889-91”; “Naamlijst, 1889-91.” *From the Dutch Society of Sciences at Haarlem.*

“Agricultural Gazette of N.S.W.” Vol. iii., Part 5 (May, 1892); “Index to Vol. i.” (1890). *From the Director of Agriculture.*

“Australian Museum, Sydney—Catalogue of the Marine Shells of Australia.” No. xv., Part 2—Pteropoda (1892). *From the Trustees.*

“Royal Irish Academy—Transactions.” Vol. xxix., Part 19 (1892). *From the Academy.*

“Australasian Journal of Pharmacy.” Vol. vii., No 78 (June, 1892). *From the Editor.*

“Geological and Natural History Survey of Canada—Contributions to the Micro-Palæontology of the Cambro-Silurian Rocks of Canada.” Part 1 (1883), Part 2 (1889). *From the Director.*

“American Naturalist.” Vol. xxvi., Nos. 304-305 (April-May, 1892). *From the Editors.*

“Canadian Record of Science.” Vol. v., No. 2 (1892). *From the Natural History Society, Montreal.*

“Zoological Society of Philadelphia — Twentieth Annual Report.” April, 1892. *From the Society.*

“Royal Society of Tasmania—Papers and Proceedings for 1891.” *From the Society.*

“Natuurkundig Tijdschrift voor Nederlandsch-Indië, uitgegeven door de Koninlijke Natuurkundige Vereeniging.” Deel li. (1892). *From the Society.*

“Archiv for Mathematik og Naturvidenskab.” Femtende Bind, Nos. 1-3 (1891-92). *From the Royal University of Norway, Christiania.*

“Gesellschaft für Erdkunde zu Berlin—Verhandlungen.” Bd. xix. (1892), No. 4: “Zeitschrift.” Bd. xxvii. (1892), No. 1. *From the Society.*

“Marine Biological Association of the United Kingdom—Journal.” n.s. Vol. ii., No. 3 (May, 1892). *From the Association.*

“K. K. Naturhistorisches Hofmuseum, Wien — Annalen.” Band vi., Nos. 1-2 (1891). *From the Director.*

PAPERS READ.

NOTES ON AUSTRALIAN COLEOPTERA, WITH
DESCRIPTIONS OF NEW SPECIES.

BY THE REV. T. BLACKBURN, B.A., CORR. MEM.

PART XII.

HYDROPHILIDÆ.

VOLVULUS PUNCTATUS, Blackb.

When I described this species (P.L.S.N.S.W. 1888, p. 838) I was unable to ascertain its habitat. I have since received it from the Northern Territory of S. Australia.

LAMELLICORNES.

ONTHOPHAGUS HOSTILIS, Har.

There is little doubt that this is identical with *O. Adelaide*, Hope. Hope's is the older name.

HETERONYX NASUTUS, Blackb.

I find that my description of this species (P.L.S.N.S.W. 1889, p. 147) was founded on an abraded example, and that in fresh specimens the upper surface is thinly clothed with shortish adpressed hairs in addition to the long erect ones. This discovery calls for an alteration in the tabulation, in which the following should be substituted for the last 13 lines of page 141 (*loc. cit.*).

- B. Size considerably exceeding 3 lines.
- C. Prothorax not closely punctulate.
- D. "Trilobed outline" of head very strongly defined, middle lobe (*i.e.*, labrum) very narrow and very prominent.
- E. Prothorax strongly narrowed in front..... *H. fervidus*, Blackb.
- EE. Prothorax but little narrowed in front... .. *H. nasutus*, Blackb.
- DD. "Trilobed outline" of head much less strongly defined *H. granulifer*, Blackb.
- CC. Prothorax closely punctulate..... *H. normalis*, Blackb.
- BB. Size less than 3 lines..... *H. brevicornis*, Blackb.

HETERONYX RHINOCEROS, sp.nov.

Sat elongatus; postice vix dilatatus; minus nitidus; pallide fusco-testaceus; minus distincte pubescens; clypeo crassissime ruguloso fere tuberculato, capite postice prothoraceque fortiter sparsim, elytris (his subtiliter coriaceis et longitudinaliter obsolete carinatis) leviter subtilius sat sparsim, pygidio (hoc pilis erectis sparsim vestito) fere ut elytra sed magis obsolete, punctulatis; labro clypeum fortiter sat late superanti; antennis 9-articulatis; unguiculis bifidis; coxis posticis quam metasternum vix brevioribus, quam segmentum ventrale secundum multo longioribus. [Long. $3\frac{1}{2}$, lat. $1\frac{1}{2}$ lines.

The sculpture of the clypeus (so coarsely rugose as to resemble a system of closely placed tubercles) is in itself almost sufficient to distinguish this species from all its congeners. The outline of the head is also remarkable, the labrum being so prominent and the sides of the clypeus so strongly reflexed that the trilobed outline appears most exceptionally distinct, all the three lobes very well defined, the middle one slightly narrower than the lateral ones, but projecting more strongly. The prothorax is twice as wide as long, very little narrower in front than behind, the front margin moderately emarginate, the base not distinctly

lobed, the front angles almost right angles and scarcely at all produced, the hind angles rounded off, the sides strongly rounded. The lower two external teeth of the front tibiæ are very strong and sharp, the uppermost is very minute. The apical piece of the hind claws is a little longer than the produced apex of the basal piece, which is truncate at the apex.

In my tabulation of the group of *Heteronyx* (Section iii., Group VI., P.L.S.N.S.W. 1889, p. 426-8) in which this species finds a place it falls on p. 427, BB. (line 7) beside *bidentatus*, from which its totally different puncturation and the strongly developed trilobed outline of its clypeus will at once distinguish it.

W. Australia; sent to me by C. French, Esq.

HETERONYX MARCIDUS, sp.nov.

Sat elongatus; postice leviter dilatatus; minus nitidus; piceus, pedibus obscure rufescentibus, palpis antennisque pallidioribus; subtiliter sat sparsim pubescens; capite confertim rugulose nec crasse, prothorace subtiliter sat confertim, elytris subtiliter confertim subsquamose, pygidio sparsim subfortiter, punctulatis; labro clypeum vix superanti; antennis 8-articulatis; unguiculis appendiculatis; coxis posticis quam metasternum sat brevioribus quam segmentum ventrale secundum sat longioribus. [Long. 5, lat. $2\frac{1}{5}$ lines.

This species is exceptional in its group through the very slight prominence of the labrum, owing to which the trilobed appearance of the outline of the head is very feeble, the even curve of the outline (from the most favourable point of view) being disturbed only to the extent of appearing to bulge forward into manifestly greater convexity in the middle. The front tibiæ are strongly but not sharply tridentate externally. The prothorax is much wider than long (as 12 to 7), the base (which is bisinuate but scarcely lobed) much wider than the front (as 11 to 7), the sides gently arched, the front angles sharp but little prominent, the hind angles roundly obtuse (but, viewed from above, appearing right angles). The elytra bear scarcely a trace of striation. The apical piece of the hind claws is about equal in length to the basal piece.

This insect falls in my Section iii., Group V., of *Heteronyx* (vide P.L.S.N.S.W. 1889, p. 1219), which is tabulated in P.L.S.N.S.W. 1889, pp. 141-145. In that tabulation it falls beside *nigricans* on page 142, though the puncturation of its elytra is a little more close than in that species, though markedly less so than in *mulwalensis* and *punctipennis*. From *nigricans* it may be at once distinguished by the imperfect trilobed outline of its head, its clypeus forming an even surface with the rest of the head, &c. Its nearest ally is *consanguineus*, Blackb., (P.L.S.N.S.W. 1891, p. 490), from which it differs *inter alia* by the same characters mentioned above as distinguishing it from *nigricans*.

Victoria ; Swan Hill.

CORYNOPHYLLUS METALLICOLA, sp.nov. (♂)

Castaneus, capite prothoraceque rufescentibus, hoc (exempli typici) nigro-cincto et utrinque macula picea ornato ; subtus dense longe fulvo-hirsutus ; capite sat crebre (postice sparsim) punctulato, ante oculos transversim carinato, carina media breviter acute tuberculiformi ; prothorace quam longiori (et postice quam antice) duplo latiori, sparsim subtiliter punctulato, obsolete canaliculato, antice nec concavo nec tuberculato sed pone marginem anticum fovea parva punctiformi impresso ; elytris leviter geminatim punctulato striatis, interstitiis fere levibus ; antennarum flabello sat lato, intus in medio subangulatim dilatato. [Long. 8, lat 4 $\frac{2}{3}$ lines.

The absolutely simple front margin of the prothorax, which is merely bisinuate without any trace of a tubercle will distinguish this species from all its previously described congeners.

N. S. Wales ; Broken Hill.

ANEURYSTYPUS COLLARIS, sp.nov. (♂)

Ferrugineus, antennis pallidioribus : subtus dense longe fulvo-hirsutus ; capite crebre rugulose (clypeo vix rugulose) punctulato, ante oculos obsolete carinato ; prothorace quam longiori (et postice quam antice) paullo plus quam dimidio latiori, subfortiter minus sparsim punctulato, late obsolete

canaliculato, antice nec concavo nec tuberculato; elytris obscure inæqualiter rugulosis, leviter geminatum striatis; antennarum flabello elongato-ovali, quam stipes sat longiori.

[Long. 6, lat. 3½ lines.

At once distinguished from its two previously described congeners by the front margin of the prothorax of the male not being raised into a tubercle in the middle, and the transverse carina of the head being extremely feeble. The flabellum of the antennæ in the male is intermediate in length between that of *A. calvus*, Blackb., and *A. Richardsæ*, Blackb., being about once and a third as long as the stipes. The puncturation of the prothorax is similarly intermediate, being evidently stronger than in *A. Richardsæ*, but scarcely so strong as in *A. calvus*. The elytra are very evidently more rugulose than in either of the previously described species. The prothorax has a very massive appearance owing to its anterior narrowing not commencing until quite close to the front.

W. Australia; Eyre's Sandy Patch.

BUPRESTIDÆ.

MELOBASIS VITTIGERA, Thoms.

I believe this to be merely a variety of *M. cupreo-vittata*, Saund. I have intermediate forms in my collection.

MELOBASIS SUBCYANEA, sp. nov.

Sat convexa; minus nitida; obscure cyanea, elytris basin lateraque versus indeterminate cupreo-purpurascens, capite (nonnullis exemplis) viridescens; hoc leviter convexo, crebre subrugulose punctulato; prothorace quam longiori fere duplo (postice quam antice circiter tertia parte) latiori, crebre minus fortiter (latera versus magis crebre rugulose) punctulato, vix manifeste canaliculato, lateribus sat arcuatis; scutello vix punctulato; elytris ad apicem rotundatis, antice in disco utrinque gibbosis, obscure punctulato-striatis, interstitiis hic illic inæqualiter convexis, lateribus postice subtiliter denticulatis; corpore subtus crebre punctulato, prosterno antice declivi.

[Long. 5, lat. 2 lines.

The uniform dark blue colour of the under side and legs (which seems constant) and the distinct gibbosity (like a round swelling) on each elytron a little behind the base render this species easy to distinguish. It is a very solid-looking convex insect. The apical ventral segment in all the examples I have seen is deeply emarginate and bispinose.

S. Australia.

ELATERIDÆ.

LACON MANSUETUS, sp.nov.

Opacus; niger, epipleuris antice læte testaceis, antennis pedibusque (et nonnullis exemplis parte circa scutellum corporisque subtus parte mediana) rufis; obscure squamosus; capite prothoraceque crebre sat fortiter punctulatis; illo subdepresso; hoc obscure inæquali haud distincte canaliculato, longitudine latitudini æquali, basi quam margo anticus duplo latiori, lateribus subtiliter crenulatis leviter arcuatis postice vix sinuatis, angulis posticis subacutis retrorsum directis; elytris basi singulatim sat fortiter arcuatis, quam prothorax vix latioribus minus quam duplo longioribus, modice convexis, punctulato-striatis, sutura et interstitiis alternis elevatis, angulis humeralibus acute rectis; sulcis tarsorum in prosterno sat distincte (fere ut *L. brightensis*, Blackb.), in metasterno obsolete, impressis. [Long. $2\frac{3}{5}$, lat. 1 line.

A small ordinary-looking *Lacon*. In Dr. Candèze's tabulation of the genus [Mém. Liège (2) iv.] it would stand in company with *carinulatus*, Cand., and *sculptus*, Cand., from both of which its small size distinguishes it; it differs from the former also *inter alia* by its 5th elytral interstice not more costiform than the 3rd, and by the non-carinate hind angles of its prothorax. It should be noted that strictly speaking this insect would not fit into Dr. Candèze's tabulation at all, as he makes no group in which the tarsal furrows of the metathorax are "feebly defined," but I have no doubt Dr. Candèze would place it in the group devoid of metathoracic furrows; in this and several included in that group the furrows are just barely traceable.

This species falls into the small group of *Lacon* which I tabulated in P.L.S.N.S.W., 1891, pp. 508 and 509. In that tabulation it stands beside *L. lacrymosus*, Cand., from which it differs in its elytral costæ not being tuberculate behind. It is perhaps near *L. granulatus*, Macl., but *inter alia* the prothorax of that species is said to be "much longer than its width."

N. S. Wales; taken by Mr. Musson near Narrabri.

LACON SQUALESCENS, sp.nov.

Minus opacus; piceus, antennis pedibusque ferrugineis; squamis pallide fulvis sat dense vestitus; capite prothoraceque fortiter minus confertim punctulatis; illo depresso postice sulcato; hoc fortiter convexo subgibbo, haud canaliculato, quam longiori paullo latiori, postice quam antice plus quam dimidio latiori, latitudine majori ante medium posita, lateribus antice sat rotundatis postice fere parallelis crenulatis, angulis anticis fortiter productis posticis oblique truncatis; elytris basi fere rectis, quam prothorax vix latioribus plus quam duplo longioribus, modice convexis, punctulato-striatis, interstitiis transversim rugulosis inter se æqualibus, angulis humeralibus oblique truncatis; sulcis tarsorum in prosterno sat distincte impressis, in metasterno fere nullis. [Long. 5, lat. $1\frac{1}{3}$ lines.

The very conspicuous pale fulvous scales clothing the upper surface, together with the shape of the prothorax, which is at its widest very little behind the front, render this a very distinct species. In Dr. Candèze's tabulation of the genus [Mém. Liège (2) iv.] it falls beside *L. humilis*, Er., a very different species.

N. Queensland; in the collection of C. French, Esq.

LACON YILGARNENSIS, sp.nov.

Opacus; fusco-niger, antennis pedibus coxis et abdominis lateribus ferrugineis; obscure squamosus; capite prothoraceque sat fortiter minus confertim punctulatis; illo vix convexo; hoc sat convexo, postice bimpresso, late leviter canaliculato, transverso, subparallelo, apicem summum versus angustato, basi quam margo anticus fere duplo latiori, lateribus subtiliter

crenulatis vix arcuatis postice haud sinuatis, angulis posticis rectis; elytris basi subrectis, quam prothorax haud latioribus plus quam duplo longioribus, sat depressis, vix striatis, seriatim punctulatis, interstitiis alternis elevatis (3° antice plano), angulis humeralibus subrectis; sulcis tarsorum in prosterno sat distincte, in metasterno obsolete, impressis.

[Long. $3\frac{1}{5}$, lat. $1\frac{2}{3}$ lines.

The elytra in places incline to a reddish tone, which is probably variable. In Dr. Candèze's tabulation [Mém. Liège (2) iv.] this species stands beside *L. variabilis*, Cand., and *parallelus*, Cand., from the former of which it differs *inter alia* by the strong carination of the 5th and 7th interstices of its elytra, and its more convex prothorax; from *L. parallelus*, Cand., it differs *inter alia* by its prothorax being transverse.

W. Australia; Yilgarn; sent to me by C. French, Esq.

GLYPHEUS ALPINUS, sp.nov.

Elongatus; parallelus; nitidus; sparsim villosus; piceus vel rufescens; prothorace convexo haud canaliculato, sparsim subtiliter punctulato, angulis posticis vix divaricatis acute carinatis; elytris leviter punctulato striatis.

[Long. $3\frac{1}{2}$, lat. 1 line (vix).

At once distinguished from the previously described species by its elongate, slender and parallel form with the tarsi longer, their joints 2-4 less dilated. The tarsal characters might perhaps justify its being regarded as the type of a new genus.

Victoria; on the higher mountains of the Alpine range.

GLYPHOCHILUS MONTANUS, sp.nov.

Sat angustus; sat parallelus; nitidus; pubescens; obscure rufo-ferrugineus, elytris fuscis; antennis palpis pedibusque testaceis; fronte convexa punctulata; prothorace latitudine (trans angulos posticos) longitudini aequali, hoc antice angustato, subtilius minus crebre (latera versus magis crebre) punctulato, angulis posticis breviter carinatis; elytris minus parallelis, punctulato-striatis, interstitiis leviter rugulosis.

[Long. $4-4\frac{1}{2}$, lat. $1\frac{1}{5}$ lines.

Like *G. leptus*, Cand., but differently coloured and not quite so narrow and parallel, with the puncturation of the prothorax finer. Compared with *G. occidentalis*, Cand., (which I have not seen), it appears to differ by its colour, its prothorax more narrowed anteriorly, &c.

N. S. Wales; Blue Mountains.

MONOCREPIDIUS INGENS, sp. nov.

Latus; sat nitidus; pube tenui vestitus; obscure rufus, prothorace in medio et ad latera et prosterni medio nigris, corpore subtus plus minusve infuscato, elytrorum basi utrinque coccinea; antennarum articulo 4^o quam 3^{us} fere duplo longiori; prothorace quam longiori (maris vix, femine sat evidenter) trans angulos posticos latiori, vix in medio breviter canaliculato, angulis posticis bicarinatis vix divaricatis; elytris quam prothorax vix latioribus, ad apicem emarginatis (haud oblique) et biacutis, seriatim punctulatis (puncturis apicem versus gradatim subtilioribus), interstitiis antice latis planatis postice angustis subconvexis; prosterno in medio canaliculato minus fortiter minus crebre nec rugulose punctulato, suturis prosternalibus arcuatis.

Maris antennis prothoracis basin leviter superantibus; prothorace in medio subsparsim latera versus crebre punctulato. Femine antennis prothoracis basin haud attingentibus; prothorace toto subsparsim punctulato.

[Long. 11-13, lat. 3 $\frac{2}{5}$ -3 $\frac{1}{5}$ lines.

Resembles *M. aphiloides*, Cand., in build, but distinguished *inter alia* by its colour and non-rugulose prosternum; like *M. erubescens*, Cand., in colour, but distinguished *inter alia* by its different shape, arched prosternal sutures and prothorax less closely punctured and canaliculate only very feebly and for a short distance in the middle of its length; from *M. Brucki*, Cand., it differs by the flanks of its prothorax not folded to form a gutter; from all the other large Australian *Monocrepidii* the well-defined channel on the middle of its prosternum in front of the front coxæ will distinguish it. I cannot specify any good character

to distinguish this species from *M. punctatostriatum*, Cand., except the presence of very well defined bright red spots at the base of the elytra which seem to be constant; M. Candèze particularises that *M. punctatostriatum* has "no red spots at the base of the elytra."

Victoria; Alpine district.

MONOCREPIDIUS TERRE-REGINE, sp. nov.

Minus angustus, postice angustatus; subnitidus; pube fulva vestitus; ferrugineus, metasterno elytrisque infuscatis, scutello et elytrorum parte antica declivi rufescentibus, antennis (harum articulo 3^o quam 5^{us} parum, quam 4^{us} manifeste, breviori) palpis pedibusque testaceis; prothorace confertissime subaspere punctulato (puncturis certo adspectu strigas longitudinales formantibus), postice in medio canaliculato antice longitudinaliter obsolete carinato, angulis posticis bicarinatis, leviter divergentibus; elytris quam prothorax vix latioribus, ad apicem vix emarginatis, punctulato-striatis, puncturis in striis antice sat magnis postice fere obsoletis, interstitiis convexis subtiliter punctulatis; prosterno in medio sat fortiter vix crebre punctulato, latera versus æquali, suturis prosternalibus sat rectis; pronoti carina laterali haud in prosternum deflexa; tarsorum lamella sat lata.

Mas (?) latet.

Feminae (?) antennis prothoracis basin nullomodo attingentibus; prothorace quam trans angulos posticos latiori paullo longiori.

[Long. 8, lat. $2\frac{1}{10}$ lines.

Not very near any described species, I think; a robust, dark red insect with the external carina of the hind angles of the prothorax elongate and diverging (from the lateral margin) from the apex of the angle forward. The longitudinally strigose appearance of the pronotum is a strong character, as also is its appearance of being slightly carinate down the middle in the front half.

N. Queensland; presented to me by C. French, Esq.

MONOCREPIDIUS PICTICOLLIS, sp.nov.

Sat angustus; postice minus angustatus; sat nitidus; pube fulva vestitus; brunneo-ferrugineus, elytris basi sanguineis, prothorace antice utrinque macula nigra lævi subverruciformi ornato, antennis (harum articulo 3^o quam 2^{us} duplo longiori, quam 5^{us} manifeste quam 4^{us} fere duplo breviori) palpis pedibusque testaceis; prothorace inæqualiter punctulato, canali mediano subtili integro sat fortiter impresso, ad basin utrinque ante scutellum tumido, angulis posticis unicarinatis sat fortiter divergentibus; elytris quam prothorax paullo latioribus, ad apicem oblique emarginato-truncatis, punctulato-striatis, puncturis in striis sat parvis postice subobsoletis, interstitiis convexis subtiliter granulatis; prosterno in medio sat fortiter vix crebre punctulato, latera versus latissime deplanatis, suturis prosternalibus sat rectis; pronoti carina laterali antice sat fortiter (fere in prosternum) deflexa; tarsorum lamella sat lata. [Long. $8\frac{1}{2}$, lat. $2\frac{2}{5}$ lines.

The large slightly elevated pustule-like shining black blotch on either side of the middle line of the prothorax, a little in front of the middle, renders this species incapable of confusion with any of its congeners.

N. Queensland; presented to me by C. French, Esq.

MONOCREPIDIUS NARRABRENSIS, sp.nov.

Sat angustus, sat parallelus; minus nitidus; pube fulva vestitus; obscure brunneus, scutello et elytrorum parte antica declivi fulvis, antennis (harum articulo 3^o quam 5^{us} fere duplo breviori) palpis pedibusque testaceis; prothorace confertim rugulose punctulato, postice canaliculato, angulis posticis bicarinatis (carina interna perbrevis) sat divergentibus; elytris quam prothorax vix latioribus, ad apicem rotundatis, punctulato-striatis, interstitiis convexis subtiliter punctulatis; prosterno medio sat crebre vix fortiter punctulato; pronoti carina laterali antice in prosternum deflexa sed haud sulcum formanti; suturis prosternalibus sat rectis; tarsorum lamella perangusta.

Maris (?) antennis prothoracis basin articulo apicali superantibus; prothorace quam trans angulos posticos latiori vix longiori. [Long. 7, lat. 2 lines.

This species is isolated from most of its Australian congeners by the very narrow lamellæ of its tarsi. The structure of the lateral margins of its prothorax is also unusual. These margins instead of being continuously lateral (as they are in *M. Australasia*) are deflexed near the front and pass on to the prosternum, but without forming a prosternal gutter (as they do in *M. carinatus*, &c.); nor are the lateral portions of the prosternum (which are very closely punctulate-strigose) explanate, having only the very slight narrow flattening which is seen in *M. Australasia* and numerous other species. These characters, together with the extreme brevity of the inner carina of the hind angles of the prothorax, the decidedly convex elytral interstices, and the distinct (though not very conspicuous) reddish spot on either side of the scutellum will render the species easy to identify. To a casual glance it looks much like *M. Australasia*, though not in reality closely allied to it.

N. S. W.; taken by Mr. Musson, near Narrabri.

MONOCREPIDIUS MENTITOR, sp. nov.

Minus latus: subnitidus: pube grisea sat dense vestitus; obscure brunneus, antennis (harum articulo 3^o quam 4^{as} vix breviori) palpis pedibusque testaceis, elytris juxta scutellum utriusque macula rufa plus minusve distincte ornatis: prothorace confertissime aspere punctulato, longitudine latitudini (trans angulos posticos) æquali, canalicula mediana postice leviter impressa, angulis posticis bicarinatis (carinis antrorsum fortiter divergentibus) divaricatis; elytris quam prothorax vix latioribus, ad apicem emarginatis (leviter oblique), punctulato-striatis, interstitiis sat convexis subaspere (præsertim feminae) crebre punctulatis; prosterno in medio sat fortiter sat crebre nec rugulose punctulato latera versus deplanato, suturis prosternalibus sat rectis: tarsorum lamella sat lata.

Maris antennis prothoracis basin articulis 2 superantibus.

Feminae antennis prothoracis basin vix attingentibus.

[Long. 6-8 $\frac{2}{3}$, lat. 1 $\frac{3}{5}$ -2 $\frac{1}{5}$ lines.

This species may be at once distinguished from *M. Australasiae*, Boisd., *inter alia* by the third joint of the antennæ being very much longer, and the interstices of the elytral striae distinctly convex; from *M. tabidus*, Er., (as described by its author), by the base of its elytra being red; from *M. tabidus* (as described by M. Candèze) by the front margin of its clypeus being quite strongly rounded and the mesosternum not showing the characters described; from *M. Evillardii* (at least in the male) by the 3rd joint of the antennæ being scarcely shorter than the 4th and not at all shorter than the 5th, and by the excessively close asperate puncturation of the prothorax (this character also distinguishing it from *M. Australasiae*); from *erubescens*, Cand., by the absence of a well-defined prothoracic channel; it is superfluous to point out the differences from the other species having the elytra red at the base.

Victoria; Alpine district.

MONOCREPIDIUS OLLIFFI, sp. nov.

Sat angustus; sat parallelus; minus nitidus; pube fulva vestitus; brunneo-piceus, scutello rufescenti, juxta hoc linea brevi utrinque coccinea, antennis (harum articulo 3' quam 2^{us} plus quam duplo longiori, quam 5^{us} vix breviori) palpis pedibusque testaceis; prothorace confertim minus fortiter punctulato postice canaliculato, angulis posticis bicarinatis vix divergentibus, carinis antorsum subparallelis; elytris quam prothorax vix latioribus, ad apicem oblique leviter truncatis vel emarginatis, punctulato-striatis, interstitiis vix convexis confertim punctulatis; prosterno medio sat crebre vix fortiter punctulato, hoc ad latera deplanato suturis prosternalibus rectis; tarsorum lamella sat lata.

Maris antennis prothoracis basin leviter superanti; prothorace quam trans angulos posticos latiori longiori.

Feminae antennis prothoracis basin haud attingenti ; prothorace quam longiori nonnihil latiori. [Long. $6\frac{1}{5}$ -7, lat. $1\frac{1}{5}$ -2 lines.

The well-defined bright red line on either side of the scutellum if constant (I have seen only two examples, so cannot feel confident on the point) renders this species easily recognisable. If it be liable to pass into a red spot like that of *M. Australasice* the species may be distinguished from the others having a red elytral basal spot by the wide flattened or slightly concave lateral margin of the flanks of the prothorax, which however is very different from the gutter formed in some species (e.g. *M. carinatus*, Cand.) by the folding under of the margins of the pronotum ; this structure which may perhaps be best described as the lateral margins of the prosternum being explanate is scarcely traceable in *M. Australasice*, Boisd., but in the present insect is very strongly defined. The lateral portions of the prosternum are much more finely and closely punctulate than the middle piece. If the red mark at the base of the elytra is liable to be altogether wanting this species may be distinguished by the above-mentioned prosternal structure in combination with the elongate 3rd joint of the antennæ, the reddish scutellum, and the hind angles of the prothorax scarcely divergent, from all its congeners having unicolorous elytra and wide tarsal lamellæ.

N. S. Wales ; Blue Mountains.

ÆOLUS QUEENSLANDICUS, sp. nov.

Minus nitidus ; pubescens ; piceus, prothoracis angulis posticis elytrorum vitta lata antennis coxis pedibusque ferrugineis ; capite convexo sat crebre punctulato ; prothorace quam longiori parum latiori, confertim subtilius punctulato, haud canaliculato, angulis posticis brevibus apice penicillatis haud carinatis, carinis lateralibus antice in prosternum deflexis ; elytris punctulato-striatis, interstitiis crebre minus subtiliter punctulatis. [Long. 2, lat. $\frac{3}{5}$ line.

This little species must be referred to *Æolus*, I think, on account of the 4th joint of its tarsi being dilated and produced beneath the 5th joint, but without forming a distinct lamella, while the

front margin of its clypeus is distinctly carinate and very evidently (almost widely) reflexed; the structure of the hind angles of its prothorax places it in Dr. Candèze's "third section" of the genus, of which no Australian species has hitherto been described. The flanks of the prosternum are punctured much more strongly than the median part.

N. Queensland; sent to me by Mr. French.

ELATER.

The little species described below has not altogether the facies of this genus, but its structure seems to place it here. The front of the clypeus presents a clearly defined continuous raised border; the tarsi are quite simple and filiform; the prosternal sutures are straight and in front excavated; the mesosternum is declivous; the hind coxæ are those of a typical *Elater* except that the external hind angle of their dilated portion is very feeble. In the last of these characters this species resembles *E. perplexus*, Cand.

ELATER WENTWORTHENSIS, sp. nov.

Pallide brunneo-testaceus, capite prothoraceque obscurioribus metasterno abdomineque rufescentibus latera versus plus minusve infuscatis, elytris mox pone medium macula obscura fusca ornatis; pube pallide fulva vestitus; capite sat fortiter subcrebre, prothorace subtiliter minus crebre, punctulatis; hoc subparallelo antice parum angustato, haud canaliculato, angulis posticis vix divergentibus carina sat elongata mox intra marginem lateralem instructis; elytris striatis, interstitiis subplanis leviter sat crebre vix subtiliter punctulatis.

♂ prothorace quam latiori paullo longiori.

♀ prothorace quam longiori paullo latiori. [Long. $1\frac{1}{3}$ - $2\frac{1}{5}$, lat. $\frac{3}{5}$ line.

The minute size and general appearance of this insect—its pale brownish testaceous colour, with the head and prothorax reddish, and a distinct (but not very strongly defined) fuscous spot on each of the elytra immediately behind the middle—render it very distinct from any previously described Australian *Elaterid*.

N. S. Wales; near Wentworth Falls.

MALACODERMIDÆ.

MACROHELODES, gen.nov.

Helodi affinis sed major, integumentis magis solidis, corpore supra glabro, elytrorum epipleuris sat latis integris, palporum labialium articulo apicali ad præcedentis apicem adfixo.

The type of this genus is an insect which I described as *Helodes princeps* (P.L.S.N.S.W. 1891, p. 517), remarking on its being only doubtfully referable to *Helodes*, but as I had only a single example I thought it better not to propose a new generic name. Since I described it I have had the good fortune to capture six specimens evidently congeneric with it, and representing four distinct species. These insects occur in very marshy places on the higher mountains and are found clinging to the stems of rushes, &c., generally implanted in water. The readiness of the specimens to drop and the necessity usually to go into the water after them render them difficult to secure. They are quite distinct from *Helodes*, though undoubtedly allied to it. I have failed to discover sexual differences among the specimens before me.

MACROHELODES LUCIDUS, sp.nov.

Late ovalis; convexus; nitidissimus; supra glaber; subtus sat dense breviter sericeo-pubescentis; supra niger, elytrorum sutura anguste rufescenti; subtus rufo-piceis, antennarum basi pedibusque concoloribus; capite subtiliter sat crebre, prothorace subtiliter sparsim, punctulatis; elytris fere lævibus; antennarum articulis 2° 3° que conjunctis quam 4^{us} vix brevioribus; cetera ut *M. princeps*, Blackb.

[Long. 4, lat. 2½ lines.

N. S. Wales; Blue Mountains.

MACROHELODES CRASSUS, sp.nov.

Late ovalis; convexus; nitidus; supra glaber; subtus sat dense breviter sericeo-pubescentis; niger, prothorace (hoc indeterminate nigro-plagiato) elytris (horum sutura, et maculis ternis discoidalibus longitudinaliter positis, nigris) tibiis tarsorum articulis 1° 5° que, antennarumque articulis 2° 3°

que, rufis; capite (hoc inter oculos biimpresso) confertim minus subtiliter, prothorace sparsius subtiliter, elytris crasse sat crebre, punctulatis; antennarum articulis 2° 3° que conjunctis quam 4^{us} vix brevioribus. [Long. 3 $\frac{3}{4}$, lat. 2 lines.

N. S. Wales; Blue Mountains.

MACROHELODES INTRICATUS, sp.nov.

Ovalis, fere ab elytrorum basi retrorsum angustatus; convexus; nitidus, supra glaber; subtus sat dense breviter sericeo-pubescentis; supra pallide luteus, capite prothoraceque (hoc ad latera albo-luteo-marginato et, nonnullis exemplis, indeterminate fusco-maculato) rubris, elytris antice et (ante medium) ad latera fere albidis et ubique plus minus crebre nigro-irroratis; scutello fusco; subtus obscure luteo-brunneus, pedibus (tarsorum articulis 3° 4° que nigris) antennisque (harum articulis 4-7 ad apicem, 8-11 totis, nigris) rufis; cetera ut *M. crassus*. [Long. 4, lat. 2 lines.

In spite of very great differences in colour and markings and a considerable difference in shape (this species being more narrowed hindward), I think it possible that this may be a variety of the preceding, from which it scarcely differs in respect of the puncturation of its several parts.

N. S. Wales; Blue Mountains.

MACROHELODES GRAVIS, sp.nov.

Latissimus, fere ab elytrorum basi retrorsum angustatus; minus convexus; nitidus; supra glaber; subtus sat dense breviter sericeo-pubescentis; totus rufus; capite (hoc inter oculos profunde biimpresso) subtiliter vix crebre, prothorace sparsim subtiliter (fere obsolete), elytris (his obsolete 3-costatis) fortiter sat crebre, punctulatis; antennarum articulis 2° 3° que conjunctis quam 4^{us} manifeste brevioribus.

[Long. 4 $\frac{1}{2}$, lat. 2 $\frac{3}{4}$ lines.

The elytra in this species are evidently less coarsely punctured than those of the preceding two, and the head is considerably more finely punctured.

N. S. Wales; Blue Mountains.

HELODES (CYPHON) FENESTRATUS, sp.nov.

Ovalis; sat convexus; pubescens; fusco-piceus, antennarum basi tibiis tarsisque rufescentibus, elytris fascia communi arcuata ad latera abbreviata mox ante medium posita fulva ornatis; capite prothoraceque crebre subtiliter punctulatis; hoc perbrevis valde transversus, angulis posticis obtusis; elytris subfortiter minus crebre punctulatis, puncturis apicem versus gradatim subtilioribus; antennarum articulis 2^o 3^oque conjunctis (hoc quam ille multo minore) sat brevioribus.

[Long. $1\frac{1}{2}$, lat. $\frac{2}{3}$ line.

Resembles *H. pictus*, Blackb., in shape, but is evidently and uniformly smaller, with the elytra a little more finely punctulate. The uniform fuscous colour of the upper surface interrupted only by a fulvous arched fascia crossing the elytra immediately in front of the middle and not nearly reaching the lateral margins renders this a very distinct species. The antennæ also are exceptionally dark. I hesitate to refer to this species an example (also from N. S. Wales) in which the fulvous mark is wanting and the puncturation seems a trifle coarser, but it is quite possible it may be a variety. The examination of more specimens would be necessary to determine it.

N. S. Wales; Blue Mountains.

PTINIDÆ.

DIPLOCOTES NIGER, v. de Poll. (Notes, Leyd. Mus. 1886, p. 238).

There seems to be little doubt that this is identical with *Diphobia familiaris*, Olliff, published in the P.L.S.N.S.W., same year (1886). I am uncertain which name takes the precedence.

TENEBRIONIDÆ.

LICINOMA PALLIPES, Blackb.

In describing this species (P.L.S.N.S.W., 1891, p. 542) I accidentally omitted to mention its habitat, which is the Victorian Alps.

NOTE ON A NEW DECAPODOUS CRUSTACEAN,
PROSOPOON ETHERIDGEI, H. WOODW., FROM
 THE CRETACEOUS OF QUEENSLAND.

BY HENRY WOODWARD, LL.D., F.R.S. (OF THE BRITISH
 MUSEUM, LONDON).

Communicated, with a Note on the same, by R. Etheridge, Junr.

(Plate iv.)

Having been desired by my friend Mr. Robert Etheridge, Junr., of the Australian Museum, Sydney, to compare the drawing of the carapace of a new crustacean, from the Cretaceous beds of Queensland, I have much pleasure in stating the result of my examination of the figure of this interesting form. There is no recent crab with which I am acquainted sufficiently like the Queensland fossil to institute a satisfactory comparison, unless the recent genera *Dorippe* and *Homola* may serve the purpose; but there are several fossil forms so closely resembling it as to leave no doubt in my mind in referring it to the *Prosopoidea** of Reuss and to the genus *Prosopon*† of Von Meyer.

The forms which most closely resemble the Australian crab are the *Prosopon verrucosum*, Reuss (*Op. cit.*, p. 21, taf. iv. fig. 31), from the Neocomian of Boucherans in the Department of the Jura; *Prosopon aculeatum*, Meyer (*Palaeontographica*, 1860, taf. xxiii, fig. 24); *P. ornatum*, Meyer (*Op. cit.* figs. 25, 26); *P. Heydeni*,

* Prof. Dr. August Reuss, Zur Kenntniss fossiler Krabben: Denkschrift. der Math. Naturwiss. Classe der k. k. Akademie der Wissenschaften, XVII. Band, 12 Nov. 1857. Wien 1859 (24 plates & pp. 90, 4to).

† H. von Meyer, Jahrbuch für Mineralogie, 1835, p. 329. Neue Gattungen fossiler Krabben, aus gebildet von Bunter Sandstein bis in die Kreide. Taf. I-IV. pp. 28. Stuttgart 1840, 4to. *Palaeontographica*, Decr. 1860. Bd. VII. Th. 4, pp. 183-222, Taf. xxii

Meyer (*Op. cit.*, figs. 27 and 28); *P. aequum*, Meyer (*Op. cit.*, fig. 29); *P. torosum*, Meyer (*Op. cit.*, fig. 30); *P. paradoxum*, Meyer (*Op. cit.*, fig. 31); and *P. tuberosum*, Meyer (*Op. cit.*, fig. 33). With the exception of the last-named species, which is from Boucherans, these are all from the White Jura of the Oerlinger Thal, in Württemberg.

I have also figured and described a species belonging to the genus *Prosopon* (*P. mammillatum*, H. Woodw.), from the Great Oolite of Stonesfield, near Oxford (see *Geol. Mag.*, 1868, Vol. v. pl. I. fig. 2, pp. 3-5). In noticing this species I have endeavoured to analyse the series of twenty-nine species of *Prosopon* described by H. von Meyer in the *Palaeontographica*, 1860, and have pointed out that certain of these forms do not belong to the genus *Prosopon*, but should be relegated to the *Pinnotherida* under the genus *Plagiophthalmus* of Bell.* Into this genus should be removed all those forms at present included under the genus *Prosopon*, which have "an evenly egg-shaped carapace with the front slightly produced and bent downwards, the surface nearly smooth, and marked by two shallow transverse furrows, nearly parallel to each other, the orbits very small, elongate-oval, and placed obliquely within the margin, appearing as if pierced in the substance of the carapace." (Bell, *Op. cit.* p. 9.)

Plagiophthalmus, Bell, would thus probably include within it the following species of H. von Meyer's genus *Prosopon*, namely, *Prosopon hebes*, *P. simplex*, *P. rostratum*, *P. spinosum*, *P. elongatum*, *P. depressum*, *P. obtusum*, *P. stotzingense*, *P. subleve*, *P. leve*, *P. punctatum*.† The following are doubtful: *P. insigne*, *P. aequilatum*, *P. marginatum*, *P. grande*, *P. excisum*, and *P. lingulatum*. They all occur merely as small detached carapaces without appendages, and the underside of the fossil usually

* See Prof. Bell's Monograph on the Fossil Malacostracous Crustacea from the Gault and Greensand (*Palaeontographical Society's Vol. xiv. for 1860*), Part ii. p. 9, pl. II.

† I now retain *Prosopon tuberosum*, formerly excluded by me.

adheres firmly to the matrix, and is therefore seldom to be seen or studied.

The new form, from the Cretaceous beds of Queensland, may be thus described :—

Carapace, or cephalothorax—general form oval, truncated behind; the cephalic, gastric, hepatic and cardiac regions covered with smooth wart-like excrescences; the branchial regions “quadrant”-shaped and tuberculated; the branchial furrow, separating the hepatic, cardiac, and branchial regions, strongly marked; the nuchal furrow, separating the frontal and orbital regions from the hepatic, is less marked. Length along the median line of the carapace, 40 millimetres; greatest breadth of carapace, 35 mm. : breadth of posterior border, 28 mm.

The frontal, or cephalic portion of the carapace is rounded, and but very slightly prominent, and is marked by two smooth, sub-central, elongated, wart-like prominences on the median line, their extremities forming the obtuse rostrum, and flanked by three or four smaller rounded tubercles irregularly disposed over the orbital region. The orbits are not distinctly marked. Immediately behind the frontal (rostral) swellings, are four smooth, elongated, rounded, sub-central prominences, upon the epigastric region, the two inner ones being narrow and ridge-like, with their longer axes parallel to the median line, and the two outer ones lying parallel to them, but larger and more oval in outline; behind these again and marking the median line, and the centre of the gastric region, is a single, small, smooth, rounded tubercle, flanked by two sub-central, transversely-elongated, somewhat elliptical prominences (like eyes), each having a small tubercle upon its summit; these are followed by two other similar sub-median, transversely-elongated prominences, widest next the median line, each (like the preceding pair) bearing an eye-like tubercle on its centre. The gastric region is bounded behind by a narrow, transversely-elongated, crescent-shaped prominence, the horns of which are directed slightly forward and bearing a single tubercle upon its centre. The hepatic region is marked by one

large oval prominence projecting on either side upon the hepatic border, and three lesser wart-like elevations on the left side, and two rather larger ones on the right side, which skirt the branchial furrow. The cardiac region occupies the median line between the two large branchial lobes, and is marked by a large peg-top-shaped swelling, having the slender point directed towards the posterior border and separated by a deep clear-cut furrow from the branchial, hepatic, and gastric regions. The branchial regions are roughly quadrant-shaped, having the arc of the quadrant directed forward and inward towards the median line and the cardiac region; the sides and surface are somewhat inflated, and the posterior border is straight and marked by the line of articulation with the abdomen, which by its great breadth indicates that the individual was a female. The branchial region of the carapace is covered with small rounded pustules or tubercles, evenly distributed over the surface. There is a trace on the matrix behind the carapace, which indicates the remains of the abdomen.

Affinities and Differences.—This Queensland crustacean carapace offers points of close affinity with *Prosopon verrucosum*, Reuss, and *P. tuberosum*, Von Meyer, both Neocomian species from the Cretaceous of Boucherans, Dept. Jura. It differs from both these forms in its more rounded contour, its more prominent branchial regions, as well as in the general and well-marked distinctive arrangement of the lobes marking the several regions of the carapace.

There can, however, be no doubt that there is a relationship between these forms and the genus *Dromilites* of the London Clay; we must, however, wait for information as to the appendages before venturing to say more. Meantime, I dedicate this Queensland fossil to my old friend and colleague, Robert Etheridge, Junr., naming it *Prosopon Etheridgei* in compliment to one who has contributed so much to our knowledge of the Palæontology of Australia.

APPENDIX.

NOTE ON QUEENSLAND CRETACEOUS CRUSTACEA.

BY R. ETHERIDGE, JUNR.

No Crustacean has been described from the Queensland Cretaceous rocks up to the present time, but I am in the temporary possession of another specimen from the Queensland Museum collection, in addition to the present species, through the kindness of the Curator, Mr. C. W. De Vis, M.A. This will be further referred to.

Prosopon Etheridgei, H. Woodw., was presented to the Queensland Museum by Mr. H. St. George, and although without precise locality, its general appearance and mode of preservation is so manifestly that of the large *Inocerami* from the Flinders River, that I think the specimen may be said, without much doubt, to come from somewhere in the Central Queensland Cretaceous area. It is on the weathered surface of a concretionary buff-coloured nodule of limestone. It will therefore appertain to the Lower Series of the Queensland Cretaceous, or the "Rolling Downs Series."

The second specimen appears to be a portion of one of the large chelæ of a *Macrourus* Decapod, and is preserved in a blue-grey concretionary limestone, much resembling that of the Walsh River District, and therefore from the same division of the Cretaceous as *P. Etheridgei*. I have not yet succeeded in determining this fossil, but it seems to accord better with the structure of the family Astacomorpha, or that of the Thalassinidæ, than with that of any others.

The first Cretaceous Crustacean found in Australia was by Mr. Norman Taylor, who acted as Geologist to W. Hann's North Queensland Exploring Expedition in 1872. The fossil comes from the Mitchell River, and is perhaps identical with one thus referred

to by Mr. Taylor in a letter to Mr. R. L. Jack, Government Geologist for Queensland. He says:—"In a creek, a short distance to the north-east of camp 81 (return journey), there occur large quantities of ironstone nodules, in one of which I discovered a fine and very perfect Crustacean, which, however, appears to have been lost, as it was not noticed by Mr. Etheridge, Senr., when describing the collection."* Had it not been the mention of the ironstone nodule, I should have concluded that this second specimen in the Queensland Museum was Mr. Taylor's long lost fossil, and it may even yet prove to be so. In a letter recently received from that gentleman he remarks that it was an "imperfect body and claw, like a lobster, but small and very little bigger than a large prawn," which is certainly rather the appearance of the specimen. At any rate, there now remains the obvious fact that representatives of both the Brachyura and Macrura existed in the Queensland Cretaceous seas.

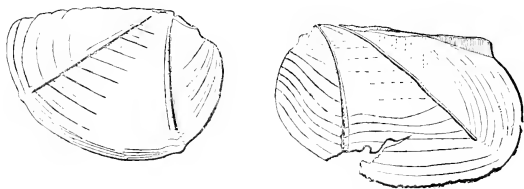
* *i.e.*, the Daintree collection. See Geol. and Pal. Queensland and New Guinea, by R. L. Jack and R. Etheridge, junr., *in lit.* p. 391.

ON *LEAIA MITCHELLI*, ETHERIDGE, FIL., FROM THE
UPPER COAL MEASURES OF THE
NEWCASTLE DISTRICT.

BY R. ETHERIDGE, JUNR.

(PALÆONTOLOGIST TO THE AUSTRALIAN MUSEUM, AND GEOLOGICAL
SURVEY OF N. S. WALES.)

At the present time but one fossil genus of Phyllopora is known from the whole of Australia, viz., *Estheria*, comprising two species. The first discovered was *Estheria Coghlani*, Cox, from the Estheria Shales, above the productive Upper Coal Measures, obtained from



several bores in the Sydney District. The second species was collected by Mr. J. H. Simmonds, of Brisbane, in the Ipswich Coal Measures, and communicated by him to the writer. It does not appear to differ from *Estheria mangaliensis*, Jones,* of the Damuda beds of Central India.

It has often been a matter of conjecture to the writer and several geological friends how to account for the absence, under such favourable conditions, of *Estheria*, from the vast accumulations of estuarine and swamp deposits represented by our Upper

* Mon. Foss. Estheriæ (Pal. Soc.), 1862, p. 78, pl. ii. f. 16-23.

Coal Measures. This hiatus has now been filled by Mr. Mitchell's discovery at Charlestown, between Newcastle and Lake Macquarie, of a *Leaia*, one of the most interesting genera of extinct Phyllopora. As a slight mark of appreciation of my friend's persevering efforts in assisting to unravel the Palæontology of N. S. Wales, I beg to name the fossil *Leaia Mitchellii*.

There are at present known eight forms of *Leaia*, species or varieties,* as the case may be, extending from the Old Red Sandstone to the Permian in Geological time, with which the new form will be compared.

Leaia Mitchellii possesses transversely oblong carapace valves, and as usual a more or less straight dorsal margin, angular at the posterior end, but the anterior and ventral margins rounded. The lateral carinæ, two in number on each valve, increase in thickness as the umbones are receded from, the anterior being slightly curved, the posterior straight and diagonal, and separating the valves into two unequal moieties. The concentric laminae resemble those of other species.

The type species, *L. Leidyi*, Lea, sp.,† is easily distinguished from our form by its remarkably oblong-rectangular outline and very scanty coarse concentric laminae, the direct anterior carinæ, and the sweep of the posterior ridges. The same remarks practically apply to the var. *Williamsoniana*, Jones,‡ from the Upper Coal Measures of Manchester (Eng.).

The second variety of the type species, var. *Salteriana*, Jones,§ is more akin to *L. Mitchellii*, but the much shorter, wider and more robust appearance of the former, and the emarginate posterior end of the latter separate the two. Var. *Salteriana* occurs in the Calciferosus Sandstone Series of Fifeshire (Scot.).

The Coal Measures of Saarbrück, North Germany, have yielded a *Leaia*, known as *L. klieveriana*, Goldenberg, in which there is a

*See Etheridge, junr., Ann. Mag. Nat. Hist. 1879, iii. (5), p. 262; Etheridge, Woodward, and Jones, Brit. Assoc. Report for 1887 [1888], Pt. 1, p. 66.

† Jones, Mon. Foss. Estheriæ (Pal. Soc.), 1862, t. 5, f. 11 and 12.

‡ *Loc. cit.*, t. 1, f. 19 and 20.

§ Jones, *loc. cit.*, t. 1, f. 20.

third carina on each valve, intermediate between the anterior and posterior. It is much shorter than these, reaching across only about one-third of the valves' width. It is obvious that the Newcastle species could not be referred to *L. klieveriana*.

Leaia Jonesi, mihi,* is another species from the Scotch Calciferous Sandstone Series, but here the diagonal carina is entirely absent from both valves; and it is thus equally obvious that no specific relation can exist between it and *L. Mitchellii*. The valves of *L. Jonesi* are thus divided into two very unequal portions.

In the Coal Measures of Illinois, a peculiar species is met with, named by Messrs. Meek and Worthen, *L. tricarinata*.† In general outline it is not dissimilar to the Australian form, but like *L. klieveriana* it possesses a third carina. This, however, is obliquely placed immediately under the dorsal margin, and when the united valves are viewed in apposition from above, the dorsal margin of each valve is seen to be inflected "at right angles to the plane of the valves, so as to form a distinct lanceolate corselet." Now, in all the examples of *L. Mitchellii* I have seen, there is no trace of this third keel.

The remaining species of *Leaia*, *L. wettinensis*, Lespeyres, from the Coal Measures of Wettin, and *L. bentschiana*, Geinitz, from the German Lower Permian, I am not able to refer to, from the absence of the necessary literature, but full references will be found to them in my previously quoted paper,‡ and the "Fifth Report of the British Association Committee on the Fossil Phyllopora of the Palæozoic Rocks."§

It follows from this that we have in our Upper Coal Measures a *Leaia* possessing all the general features of the genus, and most nearly allied to *L. Leidyi* var. *Salteriana*, Jones.

For the figures I am indebted to Mr. Charles Hedley, F.L.S.

The following is the abbreviated diagnosis:—

* Ann. Mag. Nat. Hist. 1879, iii. (5), p. 257.

† Illinois Geol. Survey Report, 1868, iii. p. 541, f. B 1-3, and ? C.

‡ Ann. Mag. Nat. Hist. 1879, iii. (5), p. 262.

§ Brit. Assoc. Report for 1887 [1888], p. 66.

LEAIA MITCHELLI, sp.nov.

Sp. char.—Carapace valves transversely oblong; dorsal margin straight, and without any trace of inflection; anterior outline rather produced and rounded; posterior margin obliquely truncate, slightly emarginate at its junction with the dorsal margin, rounded below and graduating invisibly into the ventral margin; umbones sharp, anterior, but not terminal; lateral carinæ prominent and well marked, increasing in thickness as the umbones are receded from, the anterior slightly curved, but reaching the ventral margins at a point almost vertically beneath the umbones, the posterior straight and diagonal, separating the valves into unequal halves, the anterior being the larger; surface bearing fine, regular, concentric laminae, angulated at the carinæ to correspond with the outline of the valves, but frill-like on crossing the former.

Loc. and Horizon.—Charlestown, between Newcastle and Lake Macquarie :—Upper Coal Measures—*Coll. Mitchell.*

ON THE GENUS *PERRIERIA*.

BY C. HEDLEY, F.L.S.

HAVING occasion to study the shell known to Australian naturalists as *Coelioxys australis*, Forbes, sp., I am surprised to find that the species has no claim to that generic title. On turning to Fischer's "Manuel de Conchyliologie," p. 482, the type of *Coelioxys*, Adams and Angas, is found misquoted as *C. exigua*; further search, however, shows that the authors of that genus instituted not *exigua*, but *layardi* as their type.

The preface (P.Z.S. 1867, p. 907) to the description of *C. exigua*, clearly indicating that "the species upon which *Coelioxys* was founded" was the African *C. layardi*, Adams and Angas, runs as follows:—

"In a paper read at the meeting of the Society on the 10th January, 1865, we gave a description of a new species of land-shell from the Cape of Good Hope, for which the sub-generic name *Coelioxys* was proposed. Adult specimens of a second species, possessing a continuous peritreme and distinct parietal plate, have since been received by us from the Solomon Archipelago, from which it would appear that *Coelioxys* must be considered a distinct genus, having more affinity with *Gibbulina* and *Ennea* than with *Subulina*, to which we at the time referred it. Of the species on which *Coelioxys* was founded, only two examples in the British Museum Collection have their aperture at all complete," &c., &c.

I cannot read in the foregoing quotation the meaning placed upon it by Fischer, who remarks (Jour. de Conch. Vol. xxxi. 1883, p. 99)—"Par le fait, le sous-genre *Coelioxys* de 1865 est supprimé; le genre *Coelioxys* date de 1867 et a pour type le *Coelioxys exigua*, Adams and Angas, des îles Salomon." Messrs.

Adams and Angas show no intention of suppressing their genus, but merely offer a modification of it. If they had deliberately made the alteration imputed to them by Fischer, such an illegal procedure could not be tolerated.

An examination of the figures and description (P.Z.S. 1867, p. 907, pl. XLIII. figs. 16, 17) of *C. exigua* has satisfied me that the authors of that species had before them no Solomon Island shell, but the Queensland (*P.*) *australis*, Forbes. My colleague Mr. Brazier, who at my request compared the Australian shell with the figures and description in question, quite supports this identification. *C. exigua* may therefore be considered an absolute synonym of *C. australis*, and the habitat assigned to the former to be erroneous.

So manifold are the differences between *layardi* and *australis* that no zoologist will be hardy enough to confine the two within the limits of a single genus. *Coelioxys* being appropriated to *layardi*, another genus must be found for the reception of *australis*. It will not, however, be necessary to invent one. In the "Comptes-rendus de l'Acad. des Sciences," Vol. lxxxvi. 1878, p. 1150, Tapparone-Canefri thus defined the genus *Perrieria*:—"Testa sinistrorsa, fusiformis, multispira, apice truncata; apertura elliptica; peristoma continuum expansum; axis sinuosus, basi contortus et columellam truncatam atque subdentatam simulans." A single species, *clausiliaeformis*, Tapparone-Canefri, from Port Dorey and Mount Arfak, Dutch New Guinea, furnished the above generalisation, which with the exception of "sinistrorsa" perfectly agrees with the Australian representative. So many genera, *Partula*, *Pupa*, *Clausilia*, for example, are indifferently dextral or sinistral, the indifference even extending to species, that slight importance can be attached to this feature. With the admission of the second species, *australis*, the definition of *Perrieria* will therefore require modification in this particular.

As Nevill points out in the "Hand List of Mollusca in the Indian Museum," p. 68, Crosse and Fischer have been most lax in the matter of types; Fischer's "Manuel de Conchyliologie," in the main a very useful work, contains many errors of this

description. Thus, not *inaequalis*, but *greenwoodi*, is the type of *Rhytida*; *perlucidus* should have been named as the type of *Hyalimax*, not *maillardi*; and as shown above *exigua* is misquoted as the type of *Coelioxys*, which was, is, and must remain, *layardi*.

The bibliography of *Perrieria australis*, Forbes, 1852, may be thus summarised:—

Synonym.—*exigua*, Adams and Angas, 1867.

Illustrations.—(Shell) Voyage of the Rattlesnake, pl. II. figs. 9a, 9b; P.Z.S. 1867, pl. XLIII. figs. 16, 17; Journ. de Conch. Vol. XXXI. fig. 4; Monogr. Aust. L. Shells, pl. XII. figs. 16, 16a; P.L.S.N.S.W. (2), Vol. VI. pl. XXI. figs. 4, 7; (Animal) *loc. cit.* fig. 9; (Dentition), Journ. de Conch. XXXI. pl. III. figs. 5 & 6.

Descriptions.—Voy. Rattlesnake, II. p. 380; Mon. Hel. Viv. III. p. 584; *op cit.* VI. p. 395; P.Z.S. 1867, p. 907; Monog. Aust. L. Shells, p. 81; (Anatomy) Journ. de Conch. p. 101; (Habits) P.L.S.N.S.W. (2) VI. pp. 559 and 570.

Type in the British Museum.

Habitats.—Not Solomon Islands (Adams and Angas): but Port Mackay (Turner), Port Molle (MacGillivray), Warro Station, Port Curtis (Musson, Blackman), Cania (Musson), North Pine River (Musson), and Caboolture (Wilde); all on the Queensland coast.

NOTES AND EXHIBITS.

Professor Haswell showed an inexpensive adaptation of the simple microscope for the effective exhibition in museum cases of small objects requiring moderate magnification.

Mr. Etheridge exhibited the fossils described in the papers by Dr. Woodward and himself.

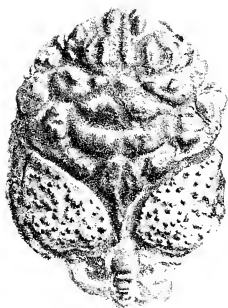
Mr. C. W. Darley exhibited photographs of, and communicated particulars respecting, some extensive aboriginal kitchen middens on the banks of North Creek, a tributary of the Richmond River. Two of the largest have the following dimensions: 590 yards long, 55 feet wide, 10 feet high; and 500 feet long, 30-40 feet wide, and 5-15 feet high. They are composed almost entirely of oyster shells, with occasional traces of ashes and cinders; now and then a few stones or a stone implement—a specimen of the latter was exhibited—are met with. The shells are in course of removal, chiefly for road-metalling, and before very long the mounds, which antedate the occupation of the locality by the white man, will have disappeared. It must have been a favourite haunt of the blacks; oysters, fish and wild fowl were plentiful, while the spot was well sheltered and not liable to danger from floods.

Mr. Maiden exhibited, for Baron von Mueller, flowering and fruiting specimens of a new species of *Acacia* allied to *A. glaucescens*, Wild. Up to the present it has been found on the Richmond River and about Port Stephens. It will be described at the next meeting.

Mr. Froggatt exhibited a living specimen of a small Gecko (*Gymnodactylus milivsi*, Gray) from Bendigo, Victoria; this lizard is found from Sydney southwards round to Champion Bay, W.A.

Mr. Whitelegge exhibited well-preserved specimens of a Physalid (*Alophota* sp.) from Coogee Bay, an addition to our marine fauna; also, from Sydney Cove a specimen of *Rhegmatodes thalassina*, Péron, one of the *Leptomedusæ*, only previously recorded from off the coast of Arnheim's Land, N. Australia.

Mr. Trebeck showed photographs of the coccus and galls of one of the *Brachyscelidæ*; also specimens of the common sow-thistle infested with the leaf-mining larvæ of the fly (*Phytomyza* sp.), so abundant during the spring of last year.



PROSOTHON ETHERIDGEI, Woodward

WEDNESDAY, JULY 27TH, 1892.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

Mr. J. A. Schofield, Dr. C. J. Martin, and Mr. H. Richards were introduced as visitors.

Mr. T. Cooksey, B.Sc. Ph.D., Australian Museum, was elected a Member of the Society.

The President announced that the Rev. R. Collie, F.L.S., a Member of the Society lately deceased, had bequeathed to the Society all his books on Natural History, together with an extensive series of botanical specimens.

The President also called attention to the Programme of the proposed Botanical Congress at Genoa in September next, to which the Society had been invited to send delegates.

DONATIONS.

“Department of Mines and Agriculture, New South Wales—Annual Report for the year 1891.” *From the Hon. the Minister for Mines.*

“Société d’Horticulture du Doubs, Besançon — Bulletin.” Nouvelle Série, No. 17 (May, 1892). *From the Society.*

“Zoologischer Anzeiger.” xv. Jahrg. Nos. 392 and 393 (May and June, 1892). *From the Editor.*

“Société Impériale des Naturalistes de Moscou—Bulletin,”
Année 1891. No. 4. *From the Society.*

“Pharmaceutical Journal of Australasia.” Vol. v. No. 6 (June,
1892). *From the Editor.*

“Royal Physical Society of Edinburgh—Proceedings.” Vol. xi.
Part 1 (Session 1890-91). *From the Society.*

“Société Royale Malacologique de Belgique—Annales.” Tome
xxv. (1890); “Procès-Verbaux des Séances.” T. xix. Nos. 9-12
(September-December, 1890); T. xx. Nos. 1-6 (January-June,
1891). *From the Society.*

“Agricultural Gazette of New South Wales.” Vol. iii. Part 6
(June, 1892). *From the Director of Agriculture.*

“Verhandlungen der Russisch-Kaiserlichen Mineralogischen
Gesellschaft zu St. Petersburg.” Zweite Serie, xxviii. Band
(1891). *From the Society.*

“University of Sydney—Calendar for the year 1892.” *From
the Senate.*

“Perak Government Gazette.” Vol. v. Nos. 15 and 16 (June,
1892). *From the Government Secretary.*

“An Introduction to the Study of Botany” (1892). By Arthur
Dendy, D.Sc., F.L.S., and A. H. S. Lucas, M.A., B.Sc. *From the
Publishers.*

“Abhandlungen herausgegeben vom naturwissenschaftlichen
Vereine zu Bremen.” xii. Bd. 2 Heft (1892). *From the Society.*

“Report on the Proposed National Aquarium in Sydney, New
South Wales” (1892). *From the Trustees of the Australian
Museum.*

“Smithsonian Institution—United States National Museum,
Washington—Annual Report, 1891.” pp. 1-50. *From the
Museum.*

“American Naturalist.” Vol. xxvi. No. 306 (June, 1892).
From the Editors.

“Museum of Comparative Zoology at Harvard College—Bulletin.” Vol. xxiii. No. 2 (April, 1892). *From the Curator.*

“Gesellschaft für Erdkunde zu Berlin—Verhandlungen.” Bd. xix. No. 5 (1892). *From the Society.*

“Société Royale Linnéenne de Bruxelles—Bulletin.” xvii^{me} Année, No. 8 (May, 1892). *From the Society.*

“Bombay Natural History Society—Journal”; Index to Vol. vi. (1891); Vol. vii. No. 1 (1892). *From the Society.*

“Royal Irish Academy—Proceedings.” Third Series, Vol. ii. No. 2 (1892). *From the Academy.*

“Catalogue of Books added to the Radcliffe Library, Oxford University Museum, during the year 1891.” *From the Trustees.*

“Johns Hopkins University Circulars.” Vol. xi. No. 99 (June, 1892). *From the University.*

“Australasian Journal of Pharmacy.” Vol. vii. No. 79 (July, 1892). *From the Editor.*

“Geological Survey of Queensland—Twenty-six Geological Reports by Members of the Survey” (1886-92). *From the Government Geologist.*

Pamphlet entitled—“The Moas of New Zealand.” By Captain F. W. Hutton, F.G.S. *From the Author.*

“Catalogue of the Marine Shells of Australia and Tasmania.” Part i.—*Cephalopoda*; Part ii.—*Pteropoda*. By John Brazier, C.M.Z.S., F.L.S. *From the Author.*

“Journal of Conchology.” Vol. vii. Nos. 1-2 (January-April, 1892). *From the Conchological Society of Great Britain and Ireland.*

“Zoological Society of London—Abstracts.” May 17th and June 14th, 1892. *From the Society.*

“Archives Néerlandaises des Sciences Exactes et Naturelles.” T. xxvi. 1^{re} Liv. (1892). *From the Dutch Society of Sciences, Haarlem.*

“Royal Microscopical Society—Journal, 1892.” Part 3 (June);
“Charter and By-laws, &c.” (1892). *From the Society.*

“Department of Agriculture, Brisbane — Bulletin No. 18 ”
(1892): “Lithograms of the Ferns of Queensland.” By F. M.
Bailey, F.L.S. (1892). *From the Colonial Botanist, Brisbane.*

“Société Géologique de Belgique—Annales.” T. xix. 2^{me} Liv.
(1891-92). *From the Society.*

Pamphlet entitled—“Le Rôle de l'eau dans les Cylindres à
Vapeur.” Par L. Anspach (1892). *From the Author.*

“Bollettino dei Musei di Zoologia ed Anatomia Comparata
della R. Università di Torino.” Vol. vii. Nos. 120-126 (1892).
From the Museum.

PAPERS READ.

OBSERVATIONS ON THE POISONOUS CONSTITUENTS
OF THE VENOM OF THE AUSTRALIAN BLACK
SNAKE (*PSEUDECHIS PORPHYRIACUS*).

By C. J. MARTIN, M.B., B.Sc., LOND.

DEMONSTRATOR OF PHYSIOLOGY UNIV. OF SYDNEY, LATE DEMONSTR.
OF PHYSIOLOGY KING'S COLL., LONDON.

With the exception of a few observations, I can find no record of investigations into the chemistry of the venom of the Australian snakes such as have been undertaken with the poison obtained from Indian and American species.

The first investigation into the chemistry of snake poisons of any importance was by Prince Lucien Bonaparte with the venom of an adder (*Pelias berus*) in 1843. An interesting account of this is given by Sir Joseph Fayrer in a paper in the Proceedings of the Medical Society, London, 1884.

Bonaparte found that the activity of the poison was associated with the portion coagulable by alcohol, and gave the name of viperine to this coagulated material.

In the first volume of the Analyst (1876), Winter Blyth states that he found in cobra poison a crystalline highly poisonous body, to which he gives the name "cobric acid," and that this is the sole poisonous constituent. Blyth's conclusions are criticised by Wolfenden (Journal of Physiology, Vol. vii.) who at the same time shows that the toxic qualities of cobra venom are resident in its proteid constituents.

In 1878 Professor Pedler,* of Calcutta, published an account of his investigations. He made an ultimate analysis of the dried poison, and showed that in percentage composition it closely corresponded with that of albuminous bodies generally. He also claimed to have separated a "semi-crystalline" body of an "alkaloidal nature," to which he ascribed the potency of cobra venom.

* Proc. Roy. Soc. 1878.

Armstrong,* and still earlier Dumas, had made ultimate analyses with similar results.

In 1883 Wall published a very interesting book, "Indian Snake Poisons, their Nature and Effect," in which are two facts of special importance, viz.:—(i) That the whole of the poisonous properties reside in the coagulum by absolute alcohol, and that if the alcohol be absolute, the filtrate is innocuous. (ii) That the poisonous principle is taken up by distilled water from this precipitate by alcohol, and that the solution so obtained possesses all the properties of cobra poison.

Since then three papers by Norris Wolfenden† have appeared in the *Journal of Physiology*. In these papers Dr. Wolfenden establishes the proteid nature of the poison, and excludes the possibility of alkaloids, ptomaines, germs and any body of the nature of cobric acid. He claims to have separated an albumen, an albuminate, and a globulin from cobra venom, to all of which he ascribes poisonous properties.

Investigations into the nature of the poisons of the American rattle-snakes, the mocassin and copper-heads have been carried on by Drs. Weir Mitchell and Reichert, whose results appeared as a preliminary report in the *Medical News*, Philadelphia, 1883.

A complete account was published by the same authors in the *Smithsonian Contribution to Knowledge* for 1890.

They prove the proteid character of snake poison in American snakes, and ascribe poisonous properties to three varieties of globulin, which they separated by "appropriate processes," and a peptone. The reactions given by their so-called peptone are characteristic of that class of bodies which we now know as albumoses.

With the idea of determining the presence of albumoses, in the venom of our Australian snakes, I proceeded in the following manner.

I placed the poison from the ducts, and the squeezings from the glands, of two black snakes under a large volume of absolute alcohol for three months. By this treatment the whole of the

* Snake Comm. Rep. 1874.

† Journ. Physiol. Vol. vii.

proteid was precipitated, and all proteids except albumoses and peptones rendered insoluble.

The alcohol was filtered off and allowed to evaporate very slowly under a bell jar, at the ordinary temperature of the laboratory. This alcoholic extract I shall refer to as solution A.

The precipitate, after the adherent alcohol had been driven off by evaporation at 40° C., was treated with 1% NaCl solution for some hours and filtered. This solution of precipitated proteids I shall refer to as solution B.

By these procedures any body of the nature of an alkaloid, ptomaine, or Blyth's hypothetical cobric acid, would be in solution A, and those proteids not rendered insoluble by the prolonged sojourn under alcohol in solution B. All germs, if such were present, would be destroyed.

Examination of Solution A.

The solution is yellow in colour, with a disagreeable pungent smell, and of a marked acid reaction.

During the slow evaporation of the solution no crystals appeared. The lower portion of the fluid was repeatedly drawn off and examined under the microscope with negative result.

The residue after evaporating off the alcohol was dark brown in colour, greasy, and of an acid reaction. The acid present in it was freely soluble in alcohol and ether. Litmus paper reddened by either of these solutions returned to the neutral tint on drying.

This alcoholic extract contained no proteid and the whole of it was mixed with a little salt solution 7% and injected into the peritoneal cavity of a guinea pig without result.

Examination of Solution B.

This solution was clear, colourless and neutral, and although it was a very weak one, 1 cc. injected into the jugular vein of a guinea pig caused its death in 23 minutes with the usual symptoms of snake poison. The remainder was then submitted to the following chemical tests:—

- (1.) Boiling. No coagulation.
- (2.) Nitric acid. Slight turbidity, on the addition of salt a precipitate, which disappeared on warming and re-appeared on cooling.

- (3.) Copper sulphate and potash. Rose buiret.
- (4.) Saturation with magnesium sulphate. Causes a precipitate.
- (5.) Saturation with ammonium sulphate. Causes a precipitate.

Of a small test tube $\frac{1}{4}$ inch was filled with the crystals of $MgSO_4$ or $Am_2 SO_4$ and then the solution poured on to them so as to cover the crystals by $\frac{1}{8}$ inch. The tubes were then allowed to stand 24 hours in a warm place. At the end of this time the crystals in both tubes were found to be covered with a layer of flocculi.

- (6.) Of the solution 2 cc. were shaken for 24 hours with $Am_2 SO_2$ crystals, to which one drop of 5% $H_2 SO_4$ had been added* and then filtered.

The filtrate was proteid free.

On account of the minute quantity at my disposal I have not been able to accomplish more than this at present, but these few experiments enable me to answer in the affirmative the question whether our snake poison contains poisonous albumoses.

The question whether any other proteid constituents of snake venom, not separated by these means, possess toxic powers (*e.g.*, albumins or globulins), is so far unanswered.

I am at the present time, in conjunction with Mr. T. McGarvie Smith, conducting a systematic investigation into the chemistry of snake poison. The great difficulty we have to contend with is the scarcity of material. For though we have reason to believe that the virulence of the poison of the black snake is as great as that of the cobra, the amount of poison voided at one time by the latter snake is 10 or 20 times as great as that procured from the largest snakes we have had in our possession, some of which have been remarkably fine specimens.

In conclusion, I take this opportunity of acknowledging my indebtedness to Mr. Smith, whose kindness enabled me to compare the effects of the injection of my isolated albumoses with those produced by the fresh poison.

* Vide Neumeister, Zeitschrift f. Biologie, Bd. xxvi.

GALL-MAKING BUPRESTIDS.

BY WALTER W. FROGGATT.

In the following short paper I give an account of three species of the genus *Ethon*, whose larvæ have the rather uncommon habit, for Coleoptera, of producing galls or fleshy excrescences on their food-plants. Through my connection with the Technological Museum as one of its collectors I have had many opportunities of hunting out the immature insects in all stages of their development, and of working at their life-histories during the winter months. In this work I have been greatly assisted by my chief, Mr. J. H. Maiden, who has given me every facility both for collecting entomological specimens, and in the identification of their food-plants.

I consider the latter one of the most important points in the life-history of an insect, and though many of our entomologists have worked at introduced pests attacking cultivated trees and plants, they are often completely in the dark when called upon to say what has killed an indigenous plant : while the habits of very few of even our commonest beetles have been recorded.

ETHON AFFINE, Laporte and Gory, Monograph of the Buprestidae ii., *Ethon*, p. 4 pl. i. fig. 5 (1851).

This pretty little beetle is well described and faithfully figured in the above fine monograph on the Family Buprestidæ ; since then it has been described under the synonyms of *E. auriflua*, Hope, and *E. proximum*, Boheman.

While collecting botanical specimens at Middle Harbour in the early part of last May I noticed a number of rounded excrescences or galls on the stems of several large specimens of *Pultenea stipularis* ; stems not much thicker than one's finger had some

four or five galls placed two or three inches apart. The galls were longer than broad, 1 inch 2 lines long, 10 lines in width, 7 lines deep, round at both ends; many of the largest ones, and all of them on several bushes that had evidently died from their attacks, were marked with a little circular hole in the centre from which the insect had emerged, but from several living bushes I obtained about forty specimens of the gall in all stages of growth.

The larva is a white grub, 7 lines in length, and of uniform thickness, slightly rounded on the segment carrying the mouth parts, and rather pointed at the anal segments; the segments are twelve in number and very distinct, the mouth parts small, situated in the centre of the thoracic segment, the jaws small.

The larva is surrounded with the dust or débris of the wood it has eaten, and it moves about freely in the chamber at the base of the excrescence close to the tree stem of the bush, so that one has to slice off nearly the whole of the gall before coming to the grub.

The galls containing the perfect insect, which were in the majority, were more soft and spongy than those containing the larvæ; as the beetles do not emerge until the early summer months they must stay a considerable time in these galls after having undergone their metamorphoses.

The beetle is a brilliant metallic copper-coloured insect, the elytra covered with finely punctured striæ, and curious scroll-like markings, formed by patches of fine golden scales, which in old specimens are liable to be rubbed; it is from 4 to $4\frac{1}{2}$ lines in length.

ETHON CORPULENTUM, Boheman, Res. Eugen. Entomol. Bid. p. 62
(1858).

This beetle is also described and figured in Laporte and Gory's monograph, but under the synonym *E. fissiceps*, Boisduval; not only had Boheman priority of name, but the specific name *fissiceps* had been given to a very distinct species (also Australian) by

Kirby in his "Century of Insects" [Trans. Linnean Society, xii. p. 458 (1817)].

When insect-hunting over some sandy ground at Botany about the first week of last June I noticed the boring of lepidopterous larvæ in the stem of a *Dillwynia ericifolia*, and when pulling it up to get this specimen I saw a large oval gall on the roots close to the stem. Upon opening it I found it to consist of a thinnish shell containing a perfect specimen of this beetle.

Since then I have carefully hunted the same locality and have found that nearly every bush of *Dillwynia* had its roots more or less attacked by these beetles, some having as many as twenty of the curious excrescences upon their roots. The galls are about 9 lines in length, 6 lines broad, 5 in depth, rounded on the apex.

The larva is a whitish semi-transparent grub, consisting of twelve segments, which are very distinct and almost globose in shape, except the thoracic and anal ones; mouth parts small.

The perfect beetle is about the same length as *E. affine*, but is much broader, the head and thorax bright bronzy colour, the elytra much darker, marked with punctured striæ, the minute scales forming the scroll-like patterns of a silvery tint showing out very distinctly on the apex of the wing covers.

As far as I know this is a more common species than the last, but it is evident that if one looks for the galls they are all plentiful.

ETHON MARMOREUM, Laporte and Gory, Monograph of the
Buprestidæ ii., *Ethon*, p. 3, pl. 1, fig. 3.

There seems to be some misapprehension about this species. Saunders in his paper in Trans. Ent. Soc. 1868, p. 60, gives *Cisseis marmorata*, L. and G., as a synonym of *C. acuducta*; but in his Catalogue of Buprestidæ (1871) *C. marmorata* appears as a recognised species, and *E. marmoreum* is given as a synonym of *C. acuducta*. In Masters' Catalogue *C. marmorata* is omitted altogether, and *E. marmoreum* appears among the synonyms of *C. acuducta*.

On the roots of several bushes of *Dillwynia ericifolia* pulled up by me in the search for the galls of *E. corpulentum*, I found longer

cylindrical swellings away from the base of the stem on the smaller roots which were found to contain beetle larvæ, and after opening several I was rewarded with a specimen of the perfect insect. The galls are regular swellings of the rootlet, the young larva apparently eating round between the wood and the bark; about an inch long, often tapering at the ends, and 6 lines wide at the centre.

The larva is a flat, slender, white grub, about 9 lines in length; jaws small, head segment much larger and rounder than the following—2nd and 3rd small, 4-11th flat, anal segment small and bearing two sharply-pointed spines like a pair of calipers; mouth parts and anal appendages ferruginous; all the segments flat, the outer margins very thin and rounded, the divisions between the segments very truncate.

The perfect beetle is 4 lines in length, 2 lines in breadth, of a much more brilliant reddish copper colour, and not striated or punctured on the elytra like *E. affine*; but the elytra are very closely and minutely punctured, the greater portion being covered with tiny little golden fish-like scales, forming regular scroll-like markings of a very different pattern from the others.

ON THE PLIOCENE MOLLUSCA OF NEW ZEALAND.*

BY PROFESSOR F. W. HUTTON, F.G.S., HON. MEM. L.S.N.S.W.

CONTRIBUTIONS TO OUR KNOWLEDGE OF
CERATODUS.*

PART. I.—THE BLOOD VESSELS.

BY W. BALDWIN SPENCER, M.A., PROFESSOR OF BIOLOGY IN THE
UNIVERSITY OF MELBOURNE.

(Communicated by Professor Haswell.)

NOTES ON AN UNDESCRIBED *ACACIA* FROM
NEW SOUTH WALES.*

BY BARON VON MUELLER, K.C.M.G., M. & PH.D., LL.D., F.R.S.

* These papers will be published in the Macleay Memorial Volume.

NOTES AND EXHIBITS.

Mr. Baker, on behalf of Mr. H. Smith, showed a specimen of Barytes in Hawkesbury sandstone from Gosford, and he stated that in a paper read before this Society on 29th April, 1891, Mr. Smith had called attention to the presence of Barytes at Marrickville, the first record of the occurrence of this mineral in the Hawkesbury Sandstone. In a subsequent paper communicated to the Royal Society of N.S.W., attention was again called to its presence in a second locality some considerable distance from the first, and the opinion was expressed that it was laid down contemporaneously with the shale beds, and that its presence would be found over a large area. The specimen exhibited was from the Ballast Quarry not far from Broadwater, 100 or 200 yards from Gosford Railway Station, and from the same formation as the Marrickville specimens and from about the same level. It was obtained and presented to the Museum by Mr. Wall. Though the specimen exhibited was from the conglomerate, a specimen of shale with Barytes was also obtained at the same place. The occurrence of the mineral at Gosford suggests the probability that the area from Sydney to Gosford, at any rate, is a portion of a lacustrine formation.

Dr. Norton exhibited a portion of a root of *Stenocarpus cunninghamii*, R.Br., showing an extraordinary development of fibrous rootlets.

Dr. Norton also related a remarkable instance of antipathy to the smell of fish on the part of a horse in his possession.

Mr. Rainbow exhibited the two sexes of an undescribed Sydney spider (*Nephila* sp.) the webs of which were said to be strong enough to catch small birds.

WEDNESDAY, AUGUST 31st, 1892.

Mr. Henry Deane, M.A., Vice-President, in the Chair.

Dr. James Graham, Liverpool Street, and Dr. C. J. Martin, Sydney University, were elected members of the Society.

The Chairman with deep regret reminded the members of the Society that since the last meeting there had passed away another of our scientific worthies, Mr. R. D. Fitzgerald, so well and so widely known for his knowledge, and for his artistic and beautiful delineation, of Australian Orchids. He felt sure therefore that the Council in having taken steps to make known to the members of the deceased gentleman's family the feelings which have been evoked by this sad event—the sense of loss sustained by Botanical Science in Australia, the appreciation of his work, the respect for his memory, and the sympathy with those who had been bereaved, the Council had but voiced the sentiments of every member of the Society.

DONATIONS.

“Asiatic Society of Bengal—Journal.” Vol. lx. (1891), Part i. Nos. 2 and 3; Part ii. Nos. 2-4 and Index: Vol. lxi. (1892), Part i. No. 1; Part ii. No. 1: “Proceedings for 1891.” Nos. 7-10; “Proceedings for 1892.” Nos. 1-3. *From the Society.*

“Zoological Society, London—Proceedings for the year 1892.” Part 1 (June). *From the Society.*

“Société Impériale des Naturalistes de Moscou—Bulletin.”
Année 1892, No. 1. *From the Society.*

“Entomological Society of London—Transactions for the year
1892.” Part 2. *From the Society.*

“Perak Government Gazette.” Vol. v. Nos. 17-22 (June and
July, 1892). *From the Government Secretary.*

“Pharmaceutical Journal of Australasia.” Vol. v. No. 7 (July,
1892). *From the Editor.*

“Agricultural Gazette of New South Wales.” Vol. iii. Part 7
(July, 1892). *From the Director of Agriculture.*

“New Zealand Institute — Transactions and Proceedings.”
Vol. xxiv. (1891). *From the Institute.*

“Société d’Horticulture du Doubs, Besançon — Bulletin.”
Nouvelle Série, No. 18 (June, 1892). *From the Society.*

“Zoologischer Anzeiger.” xv. Jahrg. Nos. 394-396 (June and
July, 1892). *From the Editor.*

“Geological Survey of India—Records.” Vol. xxv. Part 2
(1892). *From the Director.*

Pamphlet entitled—“Echinologica.” By Professor Sven Lovén
(1892). *From the Author.*

South Australia—“Further Geological Examination of Leigh”
Creek and Hergott Districts; also, Report upon a Shale Deposit
in the Encounter Bay District.” By the Government Geologist.
Also, papers on “South Australian Lower Silurian and Mesozoic
Fossils.” By R. Etheridge, Junr., F.G.S., &c. (1892). *From the
Government Geologist.*

“Naturwissenschaftlicher Verein für Steiermark, Graz—Mit-
theilungen.” Jahrgang 1891. *From the Society.*

“Technological Museum, Sydney—Illustrations of Types of
Wool.” By A. Hawkesworth. [Technical Education Series,
No. 9 (1892).] *From the Curator.*

“Johns Hopkins University Circulars.” Vol. xi. No. 100
(July, 1892). *From the University.*

“Geological Survey of Queensland—Six Geological Reports.” Nos. 3, 43, 75 (with map), 81, 83, and 84 (“Styx River Coal Field”); Geological Map of Queensland (1886). *From the Government Geologist.*

“United States Department of Agriculture—Division of Entomology—Insect Life.” Vol. iv. Nos. 9 and 10 (June, 1892); “Bulletin.” Nos. 26 and 27 (1892). *From the Secretary of Agriculture.*

“American Naturalist.” Vol. xxvi. No. 307 (July, 1892). *From the Editors.*

“Canadian Institute—Transactions.” Vol. ii. Part 2 (1892); “Annual Archæological Report” (Session 1891); “An Appeal to the Institute on the Rectification of Parliament.” By S. Fleming, C.M.G., LL.D., &c. (1892). *From the Institute.*

“Victorian Naturalist.” Vol. ix. No. 4 (August, 1892). *From the Field Naturalists' Club of Victoria.*

“Royal Society of South Australia—Transactions.” Vol. xv. Part 1 (July, 1892). *From the Society.*

“Royal Society of London—Proceedings.” Vol. li. No. 311 (July, 1892). *From the Society.*

“Société Belge de Microscopie—Bulletin.” Tome xviii. Nos. 6 and 7 (1891-92). *From the Society.*

“Verein für Erdkunde zu Leipzig — Mittheilungen, 1891; Wissenschaftliche Veröffentlichungen.” Erster Band (1891). *From the Society.*

“Société Zoologique de France—Bulletin.” Tome xviii. No. 4 (April, 1892). *From the Society.*

“Zoologische Station zu Neapel—Mittheilungen.” x. Band 3 Heft (1892). *From the Society.*

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“Zoologisch-Botanische Gesellschaft in Wien — Verhandlungen.” xli. Band, 3 u. 4 Quartal (1891). *From the Society.*

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PAPERS READ.

SOME NEW SOUTH WALES PLANTS ILLUSTRATED.

BY R. T. BAKER, ASSISTANT CURATOR, TECHNOLOGICAL
MUSEUM, SYDNEY.

No. ii. TARRIETIA ARGYRODENDRON, Benth. ; with a Note on the
Organs of Reproduction.

(Plate v.)

This plant, under the name *Argyrodendron trifoliatum*, g. et sp.n., was first described by Baron von Mueller in the "Fragmenta" (Vol. i., 2 ; *vide* also Vol. ii., 177). A few years later, in the "Flora Australiensis" (Vol. i., 230), Mr. Bentham referred it to the genus *Tarrietia*, with the specific name which it still bears. At this time, and even as late as the date of the issue of Vol. i. of the "Genera Plantarum" (1862-67), Mr. Bentham had apparently only seen unisexual flowers, for he gives this as one of the generic characters. In his original description Baron von Mueller says: "Flores hermaphroditi vel polygami." Subsequently the Baron subdivided the original species, and described ("Fragmenta," Vol. ix., 42-43) a second species under the name *T. trifolialata* ; the two species being distinguished more particularly by the characters of the leaves and the relative breadth of the anthers. In the description of *T. foliolata* the Baron says: "Flores polygami."

I have recently had the opportunity of examining a good series of specimens of *T. argyrodendron* from the Richmond River district ; and as, I believe, no figure of this species has hitherto been published, it seems to me a good opportunity of remedying the deficiency. The specimens examined by me, like those described by the Baron, are polygamous ; but trees with male and hermaphrodite flowers would seem to be more common than those with male flowers exclusively.

An examination of the hermaphrodite flowers showed that some of the stamens at the base of the ovary were sterile, although in external appearance they resemble the fertile anthers of the staminal column of male flowers on the same tree. The anthers of flowers from trees with exclusively male flowers are somewhat smaller.

I wish to acknowledge my indebtedness to Mr. J. H. Maiden, F.L.S., for his kindness in allowing me the use of his herbarium.

EXPLANATION OF PLATE.

Fig. 1.—Part of plant showing inflorescence (nat. size).

Fig. 2.—Male flower (enlarged).

Fig. 3.—Hermaphrodite flower (enlarged).

Fig. 4.—Anthers and pollen (enlarged).

Fig. 5.—Fruit-carpels at an early stage.

Fig. 6.—Samara (nat. size).

Figs. 7-8.—Parts of sepals magnified.

THE RANGE OF *PLACOSTYLUS*; A STUDY IN
ANCIENT GEOGRAPHY.

BY C. HEDLEY, F.L.S.

The genus *Placostylus* appears a more fruitful subject of study than any other molluscan genus inhabiting the same area. Their large and handsome shells have attracted the attention of the most superficial and unscientific collectors; as a result an extensive series of them have been brought to our knowledge from remote localities. Close and attentive scrutiny would scarcely justify an observer in declaring that a particular minute shell did not inhabit any given island, whereas a casual survey would decide whether a conspicuous shell like *Placostylus* did or did not compose a portion of that island's fauna. A larger mass of evidence, both negative and positive, is therefore at our disposal in dealing with *Placostylus* than awaits us in studying smaller species.

The genus ranges from Faro Island, Solomons (*P. founaki*), in the north, to Whangarei, New Zealand (*P. bovinus*), in the south, and from Lanthala, Fijis (*P. morosus*), in the east, to Lord Howe Island (*P. bivaricosus*) in the west; and, so far as is yet known, is distributed as follows:—New Caledonia, 34; Solomons, 16; New Hebrides, 3; Fiji, 16; New Zealand, 1; Lord Howe, 1. The area of distribution of *Placostylus* corresponds generally to that great arc of volcanic activity which stretches across the South-west Pacific from the Solomons through the New Hebrides to New Zealand. On either side of this earth wave extend banks to New Caledonia, Fiji and Lord Howe, indented by abyssal gulfs. This plateau, which for want of a better name I will call the MELANESIAN PLATEAU, is probably circumscribed by the 1300 fathom zone and probably the various archipelagoes upon it are connected by comparatively shallow banks, but the fragmentary knowledge we

yet possess of the contour of the floor of the South Pacific does not enable us to trace its margin.

Eastwards of Fiji, the molluscan fauna indicates the abrupt termination of the Melanesian Plateau. Between the Samoas and Fijis a sounding of 2600 fathoms has been obtained. Significant of this is the absence of *Placostylus* from Savaii, Upolu or Tutuila. The Samoan Islands appear as well fitted as the Fijian to nourish an extensive series of *Placostylus*. They are large, densely wooded, with a warm, moist and equable climate. The distance from their western neighbours is no greater than from the latter to the groups to the westward, and not to be compared to the spaces between New Caledonia and Lord Howe or New Zealand, which have proved no obstacle to the spread of the genus. Yet the Samoas possess a distinctly oceanic mollusc fauna comparable to that of Tahiti, while the mollusc fauna of the Fijis is as distinctly continental.

On the westward we learn from the "Challenger" soundings that about the 20th parallel a bank of a maximum depth of 1300 fathoms connects the Melanesian Plateau with the Great Barrier Reef. This bank was not actually plumbed, but its existence is inferred from the fact that soundings in the Coral Sea diminished in temperature down to 1300 fathoms, and below that level to 2450 fathoms the thermometer readings were stationary. The inrush of cold water from the Antarctic abyss is therefore stopped by banks, whose lowest depth is 1300 fathoms, hemming in the abyss of the Coral Sea. But the canal whose floor is the 1300 fathom level MAY lie, not between the Great Barrier Reef and New Caledonia, but at the head of the gulf between the Loyalties and the New Hebrides.

Wallace, in his "Island Life," advances the theory* that Australia and New Zealand were formerly connected by a bridge of dry land

*"Confining ourselves strictly to the direct relations between the plants of New Zealand and of Australia, . . . I think I may claim to have shown that the union between the two countries in the latter part of the Secondary epoch . . . does sufficiently account for all the main features of the New Zealand Flora"; 2nd Ed. p. 506.

occupying somewhat the position of the Caledonian-Barrier bank. This theory is totally opposed to the distribution of the *Placostylus* in particular and of the Melanesian mollusc-fauna in general. Were it true, then Lord Howe, the furthest western outpost of the Melanesian Plateau, would be tenanted by forms bearing some resemblance to Queensland mollusca. Had the stream of life reached Lord Howe from the north-west instead of from the north-east, then *Placostylus* would have been replaced by *Hadra* and *Chloritis*, while *Pupina* and *Helicina* would have been substituted for *Realia* and *Omphalotropis*.

The various islands inhabited by *Placostylus* would seem to have been joined, if not into one continuous and contemporaneous whole, yet into larger fragments, which, temporarily united, allowed the passage of snails from one tract to another. Should it be proved that the islands occupied by *Placostylus* are now sundered by deeper channels than that between Australia and the Melanesian plateau, even that would not defeat the argument of their former union and of their eternal separation from Australia. Not the depth but the permanence of the ocean is the real limit to the distribution of forms of life. The geology of the Solomon-New Zealand arc, imperfectly as it is yet read, shows a most tempestuous record of lands now sunk in the stillest ocean deeps and anon flung into lofty mountain ranges. The history of the North-East Australian coast exhibits no such vicissitudes, but it appears to have retained its present outline for long ages past. The channel joining the abysses of the Coral and of the Tasman Seas would therefore be more permanent than channels, possibly deeper, intersecting the Melanesian plateau.

The genus *Placostylus* divides itself naturally into halves. The southern portion are inhabitants of New Caledonia, Lord Howe and New Zealand. Almost all are heavy massive shells, dark in colour, confined to the ground by the mere weight of the shell and singularly unfitted to cross distant seas by any means that I can imagine. The northern portion are usually tree dwellers, the shell of a light structure and sometimes brilliantly coloured. Between New Zealand and Fiji a line of soundings has been

recorded of over 2000 fathoms, while between New Caledonia and the New Hebrides two soundings of 2650 and of 2525 fathoms would indicate that a gulf running south-east from the Coral Sea here intervenes. The differences between the northern and southern types of *Placostylus* are supplemented by other features of their respective mollusc faunas. The northern type is everywhere accompanied by *Trochomorpha*, which is never associated with the southern. Species of the so-called *Melanopsis* occur in New Zealand and in New Caledonia, but are unknown in the northern archipelagoes. These scanty data appear to show that early in the history of the existing fauna the Melanesian plateau was rent in twain and has never since been united.

The forms of *Placostylus* inhabiting the Fijis resemble in shape and colour sundry of the Solomon Island species. Thus *elobatus* from Levuka and *christovalensis* from San Christoval are much alike, both in shape and colour-pattern, and *seemanni* from Kandavu finds a close parallel in *macfarlandi* from the Solomons. The remainder of the land mollusca of each archipelago contribute further evidence of affinity, thus *Nanina nitidissima* from the Solomons resembles *N. casca* from Fiji; both areas also possess a *Pupina*. Such affinity would warrant the deduction that the Solomons were the source of the Fijian molluscan fauna; though the former group had probably not then received from Papua the newer genera of *Chloritis* and *Pupina*. Eastwards from the Melanesian plateau *Placostylus* was unable to extend its range; but its derivative and representative *Partula*, together with other Melanesian emigrants, *Endodonta*, *Tornatellina*, *Helicina*, and similar minute forms, drifting eastwards from island to island, colonised the oceanic groups of the south-east Pacific.

Summary.—I would remark, firstly, on the essential unity of the *Placostylus* area as a zoological province, embracing the archipelagoes of Solomon, Fiji, New Hebrides, Loyalty, New Caledonia, Norfolk I. (?), Lord Howe and New Zealand; a unity explicable only on the theory that they form portions of a

shattered continent and are connected by shallow banks formerly dry land. This continental area I propose to call the Melanesian plateau. Secondly, that this Melanesian plateau was never connected with, nor populated from Australia ; probably its fauna was derived from Papua via New Britain. The presence of genera common to Australia and New Zealand is explicable on the ground that they migrated, not from the one territory to the other, but each from a common source, New Guinea. Thirdly, that New Zealand and New Caledonia were early separated from the northern archipelagoes and ceased to receive overland immigrants therefrom. Fourthly, that the Fijis remained to a later date in communication with the Solomons, but were severed from that group before the latter had acquired from Papua much of its present fauna.

JOTTINGS FROM THE BIOLOGICAL LABORATORY OF
SYDNEY UNIVERSITY.

BY PROFESSOR WILLIAM A. HASWELL, M.A., D.Sc.

No. 17. THREE ZOOLOGICAL NOVELTIES.

I. The occurrence of a second species of *Phoronis* in Port Jackson.

Phoronis australis, shortly characterised by me some years ago* and more recently described in detail by Benham,† differs widely from all the known European species, not only in its relatively gigantic size (two and a half to five inches), but also in the form of the lophophore and the arrangement of the tentacles. In these respects it approaches a species obtained by the "Challenger" Expedition to the south of the Philippines, and described by McIntosh‡ in the "Reports" under the name of *Phoronis Buskii*. *Phoronis australis* has only been found in one part of Port Jackson—far up opposite the promontory of Ball's Head, in a depth of about 12 fathoms. Its mode of occurrence is extremely remarkable, and, as both Benham and Cori§ have misunderstood my statements|| on the subject, it may be well to repeat them here.

Phoronis australis occurs in communities of twenty or thirty in spaces in the substance of the wall of the tube inhabited and formed by a species of *Cerianthus*. Each worm has a tube of its

* 'P.L.S.N.S.W.' Vol. vii. (1882).

† 'Quart. Journ. Micro. Sci.' Vol. xxx. (1889).

‡ "Zoology," Vol. xxvii. (1888).

§ 'Zeitschr. f. wiss. Zool.' li. Bd. (1891).

|| 'P.L.S.N.S.W.' Vol. ix. p. 1019 (1884).

own, very delicate and transparent, made up of several layers—the mouth opening on the outer surface of the tube of the *Cerianthus*. The *Cerianthus* tubes sometimes come up empty, as we should naturally expect—the anemone having dropped out; but a sufficient number of occupied tubes are found to show that under ordinary circumstances a living *Cerianthus* occupies the interior of the tube, and a community of *Phoroncs* live in its wall. This species of *Phoronis* is never found anywhere else; and the species of *Cerianthus* is very rarely found without the *Phoroncs*.

I had long since observed two kinds of *Actinotrocha* on the surface of Port Jackson, differing considerably not only in size but in other respects; but the second adult form was only found recently. It was dredged some weeks ago in considerable abundance in the same locality as that inhabited by the large species, growing thickly over empty mussel shells. This second species is no larger than the European kinds, being only about a half to three-quarters of an inch in length. The tubes are membranaceous, tough and flexible, almost hyaline, closely twisted together. On a comparison with the descriptions of the European species I can find hardly any point of any importance to distinguish the Port Jackson form from *P. psammophila* of Cori from Messina; the number of tentacles is greater (about 100), and there are no sand-grains affixed to the tubes; but these are perhaps not constant differences.

II. An Alloiocele Turbellarian inhabiting the underground waters of Canterbury, New Zealand.

The Alloiocele Turbellaria hitherto known are all, with only two exceptions, inhabitants of the sea. The exceptions are *Plagiostoma Lemani*, Forel et Duplessis, and *Monotus mesopharynx*, Diesing—the former found at depths of 2 to 300 metres in various of the Swiss lakes, the latter—the position of which is, however, very doubtful—at the Cape of Good Hope.* The occurrence, therefore, of a fresh-water representative of this group in New Zealand is of considerable interest.

(1) Von Graff. "Monographie der Turbellarien," I. Rhabdocœlida.

I am indebted to Mr. Chas. Chilton, B.A., of Port Chalmers, New Zealand, for specimens of this very interesting Turbellarian, obtained from deep wells in two localities about a hundred miles apart in the province of Canterbury. All are devoid of eyes and completely destitute of pigment. They are of comparatively large size, the largest being nearly an inch and a half in length. A detailed account of them will be published shortly.

III. A new genus of the *Temnocephalea*.

Temnocephala is such an aberrant member of the *Platyhelminthes* that the discovery of a related form is of considerable interest. In *Temnocephala* there are at the anterior end of the body a number (four to six) of long slender tentacles; at the opposite end a large ventral sucker. In the new genus, which I propose to call *Actinodactylus*, twelve tentacles are present distributed along the lateral margins of the body and radiating outwards from it. A ventral sucker occupies the same position as in *Temnocephala*. Eyes are completely absent; but in most other respects the resemblance to *Temnocephala* is fairly close. The new form occurs in the branchial cavities of *Engaeus fossor*, the burrowing land-crayfish of Gippsland.

Postscript.—Since the above was written I have had the opportunity of examining living specimens of *Actinodactylus*, and certain features not recognised in the alcohol specimens separate the new form so widely from *Temnocephala* that I do not think that it can be included in the same family. An account of this remarkable new form will be published in the Macleay Memorial Volume.

OBSERVATIONS UPON THE ANATOMY OF THE
MUZZLE OF *ORNITHORHYNCHUS*.*

BY J. T. WILSON, M.B., PROFESSOR OF ANATOMY IN THE
UNIVERSITY OF SYDNEY, AND C. J. MARTIN, M.B., B.Sc.,
DEMONSTRATOR OF PHYSIOLOGY IN THE UNIVERSITY OF
SYDNEY.

ON THE PECULIAR ROD-LIKE TACTILE ORGANS IN
THE INTEGUMENT AND MUCOUS MEMBRANE
OF THE MUZZLE OF *ORNITHORHYNCHUS*.*

BY J. T. WILSON, M.B., PROFESSOR OF ANATOMY IN THE
UNIVERSITY OF SYDNEY, AND C. J. MARTIN, M.B. B.Sc.,
DEMONSTRATOR OF PHYSIOLOGY IN THE UNIVERSITY OF
SYDNEY.

* These papers will be published in the Macleay Memorial Volume.

NOTES AND EXHIBITS.

Mr. Brazier exhibited, in a good state of preservation, a copy of a very old work, *Index Testarum Conchyliorum*, by Gualtier, printed and published in Florence, Italy, in 1742. Also a specimen of *Cassis nana*, Tenison-Woods, from Ballina, Richmond River, the first record of this species from the N.S.W. coast, the type having been found at Moreton Bay by the late Mr. C. Coxen. Also examples of *Murex octogonus*, Quoy, from Auckland, received from Professor Hutton, and of *M. umbilicatus*, Tenison-Woods, from South Australia; the latter was named *M. scalaris* by A. Adams in 1853, but the name being preoccupied, that of *umbilicatus*. T.-Woods, must be reverted to.

Mr. J. H. Maiden exhibited fruits and seeds of the following from Bellenden Ker Range, N. Queensland:—*Garcinia mestoni*, Bail.; “Coohoy,” *Cryptocarya palmerstoni*, Bail.; *C. insignis*, Bail.; *Eleocharpus bancrofti*, F.v.M. et Bail. Also from the Herbert River, fruits of the “Herbert River Cherry,” *Antidesma dallachyanum*, Bail., (*Euphorbiaceæ*).

Mr. A. G. Hamilton sent for exhibition photographs of the trunk of a fossil tree *in situ* in the bank of American Creek, Mt. Kembla, Illawarra, 355 feet below the 4-foot seam of coal. The tree is embedded in soft coarse sandstone underlying a bed of clayey shale of considerable thickness. Six to ten feet below is a larger trunk under water in the bed of the creek. The trunks lie horizontally, or nearly so, in the matrix. All the creeks in the neighbourhood contain many loose blocks of fossil wood among the stones in their beds.

Mr. W. W. Froggatt exhibited leaves of *Eucalyptus obtusifolia* attacked by an undetermined coccid, which forms little pits in the leaves and twigs in which it buries itself, the pits afterwards turning into large blisters.

Mr. Harry Stockdale exhibited, and made some remarks upon, three oil-paintings—portion of a series intended for the Chicago

Exhibition—illustrative of the mode of the disposal of the dead in vogue among the aborigines in the neighbourhood of Alligator River, Port Essington.

Mr. Baker showed drawings and specimens of the *Tarrietic* referred to in his paper, together with microscopic preparations.

Professor Wilson and Dr. Martin showed series of micro-photographs, sections, and dissections illustrative of the anatomical characters of the muzzle of the *Ornithorhynchus*, described in their papers.

Mr. A. Sidney Olliff exhibited photographs of some remarkable native gods at Banks Island in the New Hebrides.

Mr. John Mitchell communicated the following "Note on the occurrence of certain fossils in previously unrecorded localities in N.S.W., with remarks on the correlation of certain beds in the Newcastle and Illawarra districts."

Thinnfeldia odontopteroides, Feistm.—Some months back I obtained a good specimen of this fossil from a cutting on the main Southern Road at Razorback. Long ago the Rev. W. B. Clarke recorded it from Clark's Hill near Cobbity, associated with several other fossil ferns that have not since been met with by any other collector: and doubts are entertained in some quarters whether in the case of *Odontopteris microphylla*, McCoy, there was not a mistake in quoting it from this locality. Specimens which I have lately collected at Glenlee will tend to confirm Clarke's quotation. Razorback is about eight miles southerly from Clark's Hill and on the same horizon of the Wianamatta series. I have obtained what appear to be fragments of the same fossil from a railway cutting near Glenlee.

Macroteniopteris.—I have collected several specimens of this fossil from the railway cutting opposite Glenlee homestead, contained in a very dark friable carbonaceous shale.

Teniopteris.—From a railway cutting near Glenlee.

Sphenopteris, *Pecopteris*, and *Alethopteris*.—From Glenlee I have collected specimens of each of these genera embracing of the first two several species. This discovery of *Pecopteris* is of considerable interest. The only *Pecopteris*, as far as I am aware, described from the Wianamatta Beds up to the present time is the very doubtful *P. tenuifolia*, McCoy, from Clark's Hill.

Neuropteris.—From Glenlee. Several specimens by their neuration appear to belong to this genus.

Odontopteris.—Among the specimens from Glenlee are some that I must rank in this genus, for the present, notwithstanding that it is such a pronounced carboniferous one. One of my specimens bears some resemblance in the form of the pinnules to a *Rhacopteris*; but the venation is too indistinct to admit of determination; and as the genus has not been met with above the Lower Carboniferous Beds, up to the present, to do more than note the resemblance would not be prudent. From the same locality are a number of pinnules I am unable to identify; but I have little doubt that some of them are referable to the genus *Podocamites*. All are from the Wianamatta Beds.

The specimens will be described later on.

On the sea-shore near the Bellambi Jetty (Illawarra) in July last, from a fragment of rock apparently washed from the reef stretching out from Bellambi Point, I obtained *Glossopteris linearis*, *G. densinervis* (?), and other species which appear to be *G. tenuopteroides* and *G. gangamopteroides*, and one other which in the character of its venation differs so much from all the Australian species figured by Feistmantel* that I am inclined to believe it will turn out to be a new species. Associated with the above is *Niggerathiopsis*, and some impressions bear a strong resemblance to *Gangamopteris*. The occurrence of these fossils (some of which are characteristic of the Newcastle Beds), and the outcrop of the Upper Marine Beds at Wollongong, leave little room to doubt that the Newcastle and Illawarra Coal Beds are identical.

* Coal and Plant-bearing Beds of Paleozoic and Mesozoic Age in Eastern Australia, &c. Published by Department of Mines, N.S.W.

In June, 1890, in company with Mr. Englehardt, I examined the Upper Marine Beds at Jamberoo, and found the common fossils identical with those most common in the same beds at Campbell's Hill, West Maitland. On Stockyard Mountain, and about 700 feet above the Marine Beds, and immediately beneath what is there known, in descending order, as the second coal-seam, we found a *Glossopteris* Bed, in which I recognised a number of the Newcastle species, together with *Vertebraria australis*, and *Phyllotheca australis*. These fossils are incontestible proofs of the identity of the Southern Coal-bearing Beds with the Newcastle Beds.

Mr. Geological Surveyor David (now Prof. David) in the annual report of the Department of Mines, N.S.W., for 1890, declares the Newcastle and Illawarra Beds to be identical; but if I mistake not, his opinion was arrived at from other evidence than the occurrence in the Illawarra district of the typical Newcastle fossil flora.

WEDNESDAY, SEPTEMBER 26TH, 1892.

Mr. Henry Deane, M.A., Vice-President, in the Chair.

Mr. Henry Richards, Leichhardt, and Mr. A. Lea, Dept. of Agriculture, Sydney, were elected Members of the Society.

DONATIONS.

“Journal of the Linnean Society of London—Botany.” Vol. xxvi. No. 176; Vol. xxviii. Nos. 194-196; Vol. xxix. Nos. 197-201: “Zoology.” Vol. xxiii. No. 148; Vol. xxiv. Nos. 149-151: “Proceedings.” November, 1888,-June, 1890: “List of Fellows.” 1891-92. *From the Society.*

“Royal Society of London—Proceedings.” Vol. i. Nos. 306-307 (1892); Vol. li. Nos. 308-310 and 312 (1892). *From the Society.*

“Australian Museum, Sydney—Records.” Vol. ii. Nos. 2 and 3 (August, 1892). *From the Trustees.*

“Royal Geographical Society of Australasia, Queensland Branch—Proceedings and Transactions.” Vol. vii. Part 2 (1891-92). *From the Society.*

“The Pharmaceutical Journal of Australasia.” Vol. v. No. 8 (August, 1892). *From the Editor.*

“Geological Society of London—Quarterly Journal. Vol. xlviii. No. 191 (August, 1892). *From the Society.*

“Société d’Horticulture du Doubs, Besançon—Bulletin.” Nouvelle Série, Nos. 19-20 (July and August, 1892). *From the Society.*

“Naturwissenschaftlicher Verein des Regierungs-Bezirks, Frankfurt a/O”: “Monatliche Mittheilungen.” vii. Jahrgang, Nr. 3-12 (June, 1889,-March, 1890); viii. Jahrgang, Nr. 1-3 und 12 (April-June, 1890, and March, 1891): “Helios.” ix. Jahrgang, Nr. 1-6 (April-September, 1891): “Societatum Litteræ.” iii. Jahrgang, Nr. 4-12 (April-December, 1889); iv. Jahrgang, Nr. 1-6 (January-June, 1890); v. Jahrgang, Nr. 2-8 (February-August, 1891). *From the Society.*

“College of Science, Imperial University, Japan—Journal” Vol. v. Part 2 (1892). *From the University.*

“Royal Society of Tasmania — Abstracts for April-August, 1892.” *From the Society.*

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“Hooker’s Icones Plantarum.” Fourth Series, Vol. ii. Part 1 (July, 1892). *From the Bentham Trustees.*

“Royal Irish Academy—Transactions.” Vol. xxix. Part 18 (1892); “Proceedings.” Third Series, Vol. ii. No. 1 (1892). *From the Society.*

“Geological and Natural History Survey of Canada—Catalogue of Canadian Plants.” Part vi.—Musci. By J. Macoun, M.A., F.L.S., F.R.C.S. (1892). *From the Director.*

“Victorian Naturalist.” Vol. ix. No. 5 (September, 1892).
From the Field Naturalists' Club of Victoria.

“Zoologischer Anzeiger.” xv. Jahrg., Nos. 397-398 (August, 1892). *From the Editor.*

“The Perak Government Gazette.” Vol. v. Nos. 23-27 (July August, 1892). *From the Government Secretary.*

“American Naturalist.” Vol. xxv., No. 300 (December, 1891); Vol. xxvi., No. 308 (August, 1892). *From the Editors.*

“American Geographical Society—Bulletin.” Vol. xxiv. No. 2 (June, 1892). *From the Society.*

“Smithsonian Institution—United States National Museum—Report for 1890.” pp. 253-383, 395-680: “Proceedings.” Vol. xv. Nos. 889-904 (1892): “Bulletin.” No. 39, Parts F. and G. (1892). *From the Museum.*

“Kansas University Quarterly.” Vol. i. No. 1 (July, 1892).
From the University.

“Société Entomologique de France—Annales.” 6^e Série, Tome x^{me} (1890-91). *From the Society.*

“Journal de Conchyliologie.” 3^e Série, Tome xxxi. Nos. 1-4 (1891). *From the Director.*

“Société Zoologique de France—Bulletin.” Tome xvi., No. 3 (March, 1891): “Mémoires.” Tome iii. No. 5 (1890). *From the Society.*

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PAPERS READ.

DESCRIPTION OF A NEW *HAKEA* FROM
EASTERN NEW SOUTH WALES.*

BY BARON VON MUELLER, K.C.M.G., M. & PH.D., F.R.S., AND
J. H. MAIDEN, F.L.S., F.C.S.

* This Paper will appear in the Macleay Memorial Volume.

NOTES ON THE FAMILY *BRACHYSCELIDÆ*, WITH
SOME ACCOUNT OF THEIR PARASITES, AND
DESCRIPTIONS OF NEW SPECIES.

PART I.

BY WALTER W. FROGGATT, TECHNOLOGICAL MUSEUM, SYDNEY.

(Plates VI.-VII.)

These curious woody-gall-forming coccids, one of the most well-defined and interesting groups of the *Coccididæ*, were until lately said to be peculiar to Australia; but in a recent paper Mr. W. M. Maskell* places in this family the genus *Carteria*, several species of which have been described from America, and he forms several new genera for the reception of allied forms found chiefly on the Casuarinas and Melaleucas of this country. The members of the genus *Brachyscelis* are distinctly Australian, confining their attacks to the Eucalypts, and at one time I believed that each species of coccid had a partiality for a particular species of Eucalyptus, but observations extending over several years have proved that, though some of the rarer species may keep to one tree, most of them thrive on various Eucalypts; *Brachyscelis ovicola*, Schrader, one of our commonest species, has a very wide range over the southern parts of Australia, and is found on at least a dozen very different sorts of Eucalypts.

Mr. H. L. Schrader, a resident of Sydney, was the first to record observations on this group in two interesting communications to the Entomological Society of New South Wales in 1862.†

* Trans. and Proc. of the New Zealand Institute, 1891, Vol. xxiv.

† Trans. Ent. Soc. N.S.W. 1862, Vol. i. pp. 1 and 6.

In these papers he described a number of the common species, illustrated with numerous drawings. These, or almost identical, papers were afterwards published in Germany.*

Finding that these Brachyscelid galls were much subject to the attacks of parasitic Hymenoptera, I first collected them while studying the habits of the *Chalcididae* for theinquilines they might contain, but becoming interested in their curious homes, I have obtained a large amount of material from various parts of Australia, and have made so many observations both on the coccids and on their parasites that I think it desirable that both should be published together.

The field is large, and I still have the promise of much new material from additional sources, hence in the present communication I propose to deal only with the genus *Brachyscelis*, leaving the allied genera *Opisthocelis* and *Ascelis* for future treatment. Accordingly, for completeness, I have re-described all Schrader's species, and have added eight new species from material obtained from various parts of Australia.

To the following gentlemen, and others mentioned in the paper, I am greatly indebted for specimens, for the identification of the Eucalypts or general information, namely, Mr. J. J. Fletcher, Mr. J. H. Maiden, Curator of the Technological Museum, his assistant Mr. R. T. Baker, and Mr. R. Thornton, of Newcastle, while to the kindness of Mr. A. Sidney Olliff, Government Entomologist, I am indebted the use of a series of drawings of Brachyscelid galls prepared by his assistant, Mr. C. Fuller, of the Department of Agriculture.

The male galls are small tube-like excrescences with the apex dilated into a bell or cup-like rim, generally bright red or yellow, and are always found upon the leaves or very slender twigs, except when they spring direct from the female galls, as in *Brachyscelis pharetrata*, Schrader, and several allied species, in which the male galls are attached to the side of the female gall, forming a cockscomb-

* Verhandlungen der K. K. Zoologisch-botanischen Gesellschaft in Wien, Jahrg. 1863, p. 189, Taf. iii.

like growth consisting of a number of cylindrical tubes massed together, enveloped by a protective overlapping sheath, often many times the size of the female gall. The female galls are variable in shape, green or brown coloured, smooth outwardly, generally oval or oblong, often surmounted with horns or other appendages, and always, with the exception of the cockscomb-like galls which form on the leaf, growing out from the branches or branchlets. Both male and female galls have an opening always at the apex.

The female coccid is a top-shaped, cylindrical, fleshy, white or yellow grub, enveloped in a floury substance secreted by the coccid; the head and thoracic segments are round, much crenulated on the face; it is difficult to say which is the head, as the segment one would take for the head has two rudimentary, three-jointed antennæ, as well as the simple three-jointed fore-legs, which are placed just under them, while the eyes or eye spots are situated close on either side of this overlapping segment. The second and third thoracic segments each bear a pair of short legs, while the abdominal segments are regular, well defined, and taper to a point, the tip being surmounted with a pair of pointed anal appendages, which Schrader says are used to keep the orifice of the gall clear of obstructions; but I consider it more likely that they are of use to the coccid in drawing herself towards the opening. The coccid lies in the fleshy gall, which is sometimes a quarter of an inch thick, head downwards, the tail pointing outwards; she is generally smaller than the gall chamber, and has plenty of room to move backwards and forwards. When full grown the males emerge from the neighbouring galls, and by means of their slender, pointed abdomen impregnate the imprisoned female through the apical orifice, through which the latter can exert her anal appendages.

After impregnation the males die, and the females become a mass of eggs, from which the young larvæ soon emerge, crawling through the opening in the gall and leaving the empty shell of their mother behind in the ripe gall. The larvæ [*e.g.* of *Brachyscelis munita*] are microscopic, yellow, active creatures, having a circular, shield-like body margined with a fringe of cilia, distinct eyes, antennæ, and legs. They move about quickly, and those

that survive after escaping from the gall immediately bury themselves in the bark or leaves, and commence a fresh crop of young galls. I believe that the virgin female is capable of bringing forth larvæ, as I have frequently found clusters of active larvæ in the chamber with the perfect and evidently unimpregnated female coccid.

The male of *Brachyscelis* [e.g. of *B. munita*] is a very beautiful little two-winged creature, not much more than half a line in length, having many jointed antennæ as long as the whole length of the head, thorax, and abdomen combined, terminating in three hairs or filaments; the joints of the antennæ are short and the divisions indistinct. The eyes are black, globular, and very prominent, divided from each other, as looked at from above, by a wedge-shaped bar between, widest in front. The prothorax is rounded, broadest in front, bright yellow, and shining; the wings are large, round at the tips, constricted at their junction with the shoulder, and bear a strong costal (transverse of Ashmead) nervure with a fainter one (discoidal of Ashmead) across to the apex of the under side of wing, forming an elongated V. The legs are long, the femora robust, the tibiæ slender, the tarsi short. The abdomen consists of eight constricted segments, and a small pointed anal one bearing the genitalia; from either side of the eighth segment shoots out a long white filament, twice the length of the whole insect; the whole covered with scattered white hairs.

The perfect males are very delicate, and their galls are so small that it is very difficult to breed them out; but of three very distinct species of galls from which I have obtained specimens of the insects, I can find no difference in any particular in the perfect males. The characters of the males, therefore, seem to me unimportant in discriminating species. To a casual observer the female coccids would appear very much alike, but though there is a very strong general resemblance in most cases, there are, besides the difference in form, several very good specific peculiarities: firstly, in the form, shape, and situation of the anal appendages; secondly, in the hairy coating on the abdominal segments; and thirdly, in the number, shape, and regularity of the distribution of the

tubercles and fine-toothed spines covering the upper side of the abdominal segments.

The female galls of the different species are usually very distinct in form from each other; and though with single specimens of some it might be difficult to determine the species from the gall alone, yet in a large series they are unmistakable.

The female galls are all very much liable to attacks by parasites, and many of the minute micro-hymenoptera belonging to the *Chalcididae* and *Proctotrupidae* will be found to emerge from the outer skin of the gall, possibly being parasitic upon smaller plant-eating larvæ which they have destroyed. Other parasites lay their eggs upon or in the coccid, the larvæ which hatch therefrom feeding upon her fleshy body, and undergoing their metamorphoses in her skin. I have obtained 100 specimens of a small black Chalcid from a single dead Brachyscelid. The larvæ also of several different moths likewise manage to obtain a footing inside the galls, true inquilines, for they soon smother the rightful owner. I once opened a gall of *B. ovicola* in which I found an exceedingly active moth larva together with a live coccid; but the former was having much the best of it, for the coccid was not more than half the size of a number of its companions taken from the same bunch of galls. I have never been able to breed out the perfect moths from these larvæ, for as the galls become dry the food supply fails them and they die.

A large number of plant-eating beetles are also obtainable from the galls, most of them belonging to the *Curculionidae*, chief among which are members of the genera *Haplonyx*, of which I have bred five different species, and *Rhadinosomus*, a remarkable, goat-like little Curculio. Several others belonging to the genus *Omalium* (Family *Cleridae*) were hatched out of the galls of *B. minor*.

Great numbers of young Eucalypts are annually attacked by these insects, which if they do not in consequence actually die become stunted in their growth from the foliage and young growth being robbed of so much sap, and tissue diverted from the proper channel, to form these peculiar excrescences; it is therefore of

some economic interest for us to be acquainted with the habits and mode of growth of the Brachyscelids together with the parasites by which they are kept in check, for as they come forth in such countless numbers and in their earlier stages mine out of sight, they might under favourable circumstances become a serious pest in plantations of young Eucalypts.

BRACHYSCELIS DUPLEX, Schrader, Trans. Ent. Soc. N.S.W. 1862,
Vol. i. p. 5, pl. II. fig. A, h, l, o, s.

♀. Gall springing from the branch on a square four-sided stalk varying from a quarter to half an inch in length, swelling out from this into a four-sided gall with ridged edges; $1\frac{1}{2}$ inches in diameter; $2\frac{1}{4}$ inches in length from top of stalk to apical orifice; the latter a broad and very narrow slit, on either side of which the gall is prolonged into a flattened broad horn, which is often 5-6 inches long; as many as four of these large galls may be on a small twig a few inches long. Chamber containing coccid long, cylindrical, and pointed at both ends; the walls 4 lines in thickness and very solid.

♀. Coccid golden yellow; apical segments broad, slightly depressed in centre; legs very short, the joints of the middle and hind legs almost globose, tarsal claws small and blunt; abdominal broad and well defined, of a uniform breadth until about the third above the anal segment, thence forming a blunt rounded base from which the anal segment, which has a v-like mark on either side, projects, bearing two long slender anal appendages widely apart, $1\frac{1}{2}$ lines long, the pointed tips turned outwards and surmounted with three long filaments or hairs; long scattered hairs all over the abdominal segment, forming distinct tufts on the lower part of the outer edges of the last four apical segments; the upper side of the apical four marked with fine tubercles; the first with very small and scattered tubercles, the following and anal segments with the tubercles in regular rows, conical, spinose, all the segments fringed along the outer edges with tufts of long white hairs. Length 12 lines, at widest point of thorax, $5\frac{1}{2}$ lines broad.

♂. Gall growing from the leaves and also from the horns of the young female galls; not cylindrical, but four-sided, but instead of the circular rim at apex, divided into two flat sides opening out into a v-form. Height 3 lines, diameter $\frac{3}{4}$ of a line.

Hab.—Newcastle, on *Eucalyptus* sp. (R. Thornton); Lawson, Blue Mts., on *E.* sp. (E. Palmer).

In Schrader's paper this species is very briefly described, and the gall of the specimen figured has very short horns, whereas in most well-shaped galls the latter are often six inches in length. I had received several dried specimens of this fine gall on various occasions, but without any information as to where they were obtained, and had never obtained any fresh green ones until a short time ago, when among a collection of galls and botanical specimens received by the Curator of the Technological Museum from Mr. R. Thornton of Newcastle, were about a dozen very good fresh specimens of the gall of this Brachyscelid.

BRACHYSCELIS MUNITA, Schrader, l.c. p. 6, pl. II. fig. x.

♀. Gall sessile on twigs, round at base, but with four distinct angles above, from the corners of which arise a long horn broad at base, slender at the tip, and generally curling backwards; height 10 lines, width 7 lines, horns 2 inches in length; walls of chamber solid but thin; chamber broad, oval, and conical at apex, apical orifice circular, small and situated in the centre of apex, where the four ridges running back from the horns conjoin.

♀. Gall of slender variety stalked, the stalk broad, angular; the surmounting gall four-sided, swelling out from and about twice the length of the stalk, and broadest at apex; from each angle springs out a straight cylindrical horn, broadest at base and attenuated towards the tip; length of gall $1\frac{1}{2}$ inches, including the stalk, width at apex of stalk 3 lines, width at base of horns 6 lines, horns often attaining a length of 6 or 7 inches; apex of gall flat or slightly rounded between the horns.

The measurements are very variable, as the galls can be found of all shapes and sizes growing in great clusters, sometimes one growing out from another. I should consider this an aborted

variety of the more regularly formed one, for when a tree is attacked by this one its sap becomes so impoverished by the quantity of galls it has to support that they in turn become slender and attenuated from want of building material. This variety grows upon *Eucalyptus robusta*, the large, succulent leaves of which seem to be attacked by many insect larvæ.

♀. Coccid dull yellow to semi-transparent; 8 lines long, 5 lines broad; head and thoracic segments much wrinkled; legs small and short; abdominal segments short and broad, thickly clothed towards the apex and sides with long yellow hairs; anal appendages short, blunt, narrowly divided at base, turned slightly outwards at the tip, upper side rather flat; anal segments densely clothed with long yellow hairs; two lower thoracic and first abdominal segment covered with very fine ferruginous tubercles, the remaining abdominal segments margined above the apex with a row of fine pointed tubercles, largest and stoutest towards the tip.

♂. Galls growing in a cluster on a small twig, the cluster composed of several hundred short twisted or straight male cells sticking out at all angles; many of them are doubtless sterile; slightly dilated at the apex and of a bright red colour, the whole forming an irregular rounded or oval mass, often over an inch in diameter.

In the straight-horned variety the male galls are clustered together in irregular masses, but never in such large numbers or so closely together, each gall standing out and more independent of the others.

This is a well-defined species, and does not vary much from two forms which are evidently variations caused by the stems being attacked by only a few coccids or else by a large number; the large typical form is not common about Sydney, and is more an inland species, while the small variety seems to be much the commonest in the neighbourhood of Sydney.

In the *Ent. Mo. Mag.* (1880, Vol. xvii. p. 145), there is an article on "Eucalyptus galls," by Mr. R. McLachlan, in which he describes and figures two galls handed over to him by Dr. M. F.

Masters, Editor of the Gardener's Chronicle, who received them from Baron von Mueller, Government Botanist of Victoria. With the first, which is a slender, finger-like gall and is the production of a *Cynips* or *Cecidomyia*, we have nothing to do; but the second is a bunch of the female galls of *Brachyscelis munita*, though it is described as the gall of a moth, and Mr. McLachlan says of it: "Fortunately in this instance it is possible to fix with certainty the order to which the gall-maker belongs. Baron von Mueller extracted larvæ from some similar galls and forwarded them in fluid. They are Lepidopterous." He minutely describes the gall, and considers the apical orifice as a breathing pore for the larvæ, left open on account of the walls of the galls being so solid.

Hab.—Botany, on *E. robusta* (W. W. Froggatt); near Parramatta, on *E. sp.* (J. J. Fletcher); Wellington, on *E. sp.* (W. W. Froggatt); Newcastle (R. Thornton); Melbourne, on *E. sp.* (C. French).

From some specimens obtained from near Parramatta by Mr. Fletcher I bred one specimen of *Haplonyx ustipennis*, Pascoe (Journ. Linn. Soc. 1870, x. p. 488); the larva was an obese white grub; though I opened the gall before I noticed the grub, it thrived and came out a perfect insect three months later.

BRACHYSCELIS TRICORNIS, n.sp.

♀. Gall triangular, the angles rounded, smallest at base where attached to the twig, sessile, swelling out and widest at apex; the horns standing out at right angles, sword-shaped, very thick and swollen at base, terminating in a broad tip; gall 10 lines high, 9 broad at base of horns; length of horns, $2\frac{1}{2}$ to 3 inches; apical orifice very small, circular, situated in centre between the horns; chamber containing coccid rounded at base, of a uniform width for two-thirds of height, coming to an obtuse point at the apex; walls of chamber of a medium thickness.

♀. Coccid yellow to dull brown, rounded at apex; thoracic segments well defined; basal joint of middle and hind legs short and globose, second joint short, cylindrical; tarsal claw sharp and hooked; abdominal segments narrow and tapering to a sharp tip

with a few scattered hairs on apical margins; anal appendages ferruginous, stout, close together at base, but cleft in a wedge-shaped opening outwards at the apex, truncate at tips; upper side of abdominal segments with a few long hairs on apical portion, outer edges thickly fringed with long hairs, last four with a short irregular row of tubercles along their apical margin; length $7\frac{1}{2}$ lines, $4\frac{1}{2}$ broad.

♂. Gall unknown.

Hab.—Rookwood, on the broad-leaved iron-bark, *E. siderophloia* (J. J. Fletcher).

This is a distinct species closely allied to *B. munita*, but the difference in shape and in the number of the horns renders it very easily recognisable.

BRACHYSCELIS PILEATA, Schrader, l.c. p. 3, Pl. i. fig. 1, *a*, *h*, and *l*.

♀. Gall narrowest at base of attachment to the twig, generally growing with the apex inclined downwards towards the branch, elongate-oval in form, but truncate at apex, which forms two broad lips separated by the narrow slit-like apical orifice; length, 14 to 16 lines; diameter, 7 lines; chamber containing coccid narrow at base, jug-shaped at apex, wall thin. When immature the gall is enveloped in a reddish cap covering the gall and produced into a slender horn often several inches in length, which appears to be an abnormal growth of the bark of the twig above the burrowing coccid; as the gall increases in size this envelope becomes a dry papery substance, splits off at the base, and drops off when the gall is about three-parts grown.

♀. Coccid dull brown to almost transparent; head and thoracic segments rounded at base; legs rather short; tarsal claws black; abdominal segments narrow, not tapering, but broadly rounded towards the apex, each segment ornamented at the apical sides with a tuft of white silky hairs; anal appendages situated on either side of the broad anal segment, separated from each other at base, long, slender, black, and each surmounted with three long stout hairs; upper side of head and thoracic segments much depressed, often almost flat, covered with fine white hairs;

abdominal segments clothed with long white hairs, which overlap the junction of the segments and form large tufts at the apex of each; the 2nd and 3rd thoracic segments with numerous small scattered spines; 1st and 2nd abdominal segments with an irregular double row of spines; 3rd with a regular row of close short spines in clusters of twos and threes, with three longer stout spines at either margin; 4th and 5th with the spines stouter, disposed either in twos or threes, with two longer curved spines at either margin; 6th and last above the anal segment carrying four large stout spines and a single longer one on either side; length $6\frac{1}{2}$ lines, 4 lines broad.

♂. Gall reddish-brown, short and broad, growing on the leaves, pear-shaped and often ribbed, the apex broadest, this in the mature gall opening out into a bell-mouthed rim; $3\frac{1}{2}$ to 4 lines high.

Hab.—Rose Bay, on *E. piperita* (W. W. Froggatt); Mossman's Bay, on *E. sieberiana* and on *E. capitellata* (W. W. Froggatt); Newcastle, on *E. sp.* (R. Thornton).

This, the common Sydney species, is confined to the coast country, generally attacking small trees, which, when once infested, produce galls year after year. I have noted a tree at Double Bay for the last four years which has had a large crop every season.

The galls obtained from *E. capitellata* are very much broader and more squat than the typical ones, with the walls very stout and thick; and when immature have very small spined caps unlike those on *E. piperita*.

BRACHYSCELIS MINOR, n.sp. Pl. VI. fig. 1.

♀. Gall round at base, constricted about two-thirds up from base, and truncate at apex, the small and circular apical orifice placed in the centre of a shallow depression; walls of chamber moderately thick, solid, the chamber oval, coming to a sharp point at the apical orifice; length 7 lines, diameter $4\frac{1}{2}$ lines.

♀. Coccid dull yellow, round at apex and coming down to a sharp tip; plump and top-shaped; legs slender; abdominal segments very regular and distinct, clothed with fine long hairs, thickest on the sides; anal appendages short, close together,

opening out slightly at the apex ; upper side all clothed with fine white hairs lightly scattered over the head and thoracic segments, very close and dense on the abdominal segments, the latter with a row of small acuminate tubercles along their lower margins ; anal appendages surmounted on the tip with several fine hairs ; 5 lines long, 3 lines wide.

♂. Gall 3 lines high, width $\frac{1}{2}$ line ; bright red ; tubular, with a disc-like rim at the apex.

I have bred the male coccid from these galls, but under the microscope I could not find any difference between them and those of *B. pharetrata*.

Hab.—Botany and Berowera on *E. hæmastoma* : Wollongong on a stunted Eucalyptus (W. W. Froggatt).

This is a rather small gall that might be taken for a small variety of *B. ovicola*, but is very constant in its form ; while the female coccid is very distinct from that of the latter species.

I obtained a great number of the galls of both sexes on the leaves and twigs of a number of small stunted Eucalypts growing on the hillside opposite the railway station at Wollongong ; the twigs were covered with the little seed-capsule-like galls, sometimes clustered together in bunches of a dozen or more, while the leaves were completely aborted by the immense number of male galls growing out of them. In other localities I have only found them scattered in twos or threes on the branches.

BRACHYSCELIS VARIABILIS, n.sp. Pl. VII. fig. 2.

♀. Gall oval, sessile, growing directly from the stem, about two-thirds from base constricted to a third, the apex curved inwards ; $2\frac{1}{4}$ inches high, $1\frac{3}{4}$ inches wide ; dome $\frac{3}{4}$ inch high, 1 inch wide ; walls of chamber above the base 7 lines in thickness ; top of true gall almost flat at the apex, with a small circular orifice ; above this the dome-shaped covering springs up, with thin walls enclosing an irregularly-shaped cavity with a large opening on top above the orifice of the lower chamber.

The above measurements are taken from an exceptionally fine specimen ; many are much smaller, more rounded than pear-shaped,

and much aborted on the outside cuticle by the mining of parasitic Hymenoptera.

♀. Coccid dark yellow; 8 lines long, 5 broad, rounded at head and thoracic segments, swelling out on the sides in a line with the middle pair of legs; fore-legs more prominent than usual; all the legs small, ferruginous, and projecting out from the body; abdominal segments covered with fine silky hairs, which are very dense on the last three segments; anal appendages very short and stout, close together at the base, straight, but slightly open at the apex, the tip of each concave, armed with a fine tooth on both sides; on the upper side the abdominal segments clothed with fine white hairs; the last three segments only margined across the lower edge with a row of very small regular acuminate tubercles.

♂. Galls small, reddish, tubular; 2 lines long, with a bell-shaped swelling at the apex.

Hab.—Thornleigh, near Sydney, on *E. piperita* (W. W. Froggatt); Newcastle, on *E.* sp. (R. Thornton); Cambewarra, on *E.* sp. (W. Bäuerlen); Lismore, on *E.* sp. (R. Helms).

This is a very variable species, but is very constant in having the chamber walls very thick at the base, the apex surmounted by a dome-like cup rising above the true apical orifice and forming another cavity with a large irregular opening at its apex. They are usually found singly, often on stout stems, but sometimes in clusters, and appear to have a wide range over the coastal districts of New South Wales.

Some immature specimens obtained lately at Hornsby give some idea as to how this curious double-celled gall is constructed; they are generally formed in a stout stem of a young sapling; the true gall is formed of the woody substance of the stem, while the bark growing rapidly covers the outer sides and rises above the wooden portion of the gall, a cavity forming on the apex between the bark and the growing gall.

BRACHYSCELIS CONICA, n.sp. Pl. VI. fig. 3.

♀. Gall cylindrical, rounded at the base, generally widest in the middle and tapering towards the apex, which is truncate, some-

times ovate; variable in form, fresh galls always of a bright green colour with a granulated surface; a growth of brown-coloured wood forms several distinct rings at the apex surrounding the apical orifice; the latter small, circular, situated at bottom of a shallow depression; walls of chamber containing female solid, chamber long, narrow, cylindrical; length 14 lines, diameter 8 lines.

♀. Coccid dull yellow, head and thoracic segments rounded on top, large and not much wrinkled; legs short and thick, posterior ones prominent; abdominal segments attenuated towards the anal segment, lightly clothed with hairs on the sides; anal appendages short and blunt, deflexed outwards, forming a triangle at tip; the head and thoracic segments on upper side rather flat; a few scattered tubercles on the first abdominal segments, the rest of segments each armed with a regular row of fine sharp spines; length 9 lines, breadth 4 lines.

♂. Gall large and tubular, swelling out into a regular bell-shaped apex; generally growing out from the small twigs, but sometimes upon the leaves; length 5 lines, diameter 1 line.

Hab.—Yass, Goulburn, and Cooma, N.S.W., on *E. viminalis* (W. W. Froggatt); Gippsland, Victoria, on *E. sp.* (F. O. Hill).

This gall is very plentiful in the Goulburn and Yass districts, growing upon several of the *White Boxes*, and also has a much wider range, as I have had a number sent me from Gippsland, collected by my friend Mr. F. O. Hill, of Melbourne.

This species is much attacked by a small hymenopterous parasite, the larvæ of which, after destroying the female coccid, form little oval wooden cocoons, often quite filling up the chamber; the lepidopterous larvæ so common in *B. munita* are also common in this gall.

Of parasitic Coleoptera I have bred out several specimens of that curious goat-like little *Curculio Rhadinosomus Lacordairei*, Pascoe, which I have also obtained from the female galls of *B. minor*.

BRACHYSCCELIS POMIFORMIS, n.sp. (Pl. VII. fig. 7.)

♀. Gall apple-shaped, slightly depressed at the base where attached to the branch, swelling out on the sides and slightly narrowing towards the top; at the apex is a circular depression or little pit about 3 lines in depth, in the centre of which is the very small orifice; colour greyish-brown; diameter 3 inches, height 2 inches; thickness of walls $\frac{1}{3}$ to $\frac{1}{2}$ inch; size of chamber doubtful.

The smaller ones almost spherical in shape, but the large ones more squat at the base.

Only one gall contained the remains of a female; the anal segments appear to be robust and dark coloured.

♂. Gall unknown.

Hab.—Torrens' Creek, N.Q., on *E.* sp. (— Chisholm); Barrier Range, King's Sound, N.W.A., on *E.* sp. (W. W. Froggatt).

This remarkable gall is a northern species, not found in the vicinity of Sydney; my specimens were obtained at King's Sound, N. W. Australia, where they grew on a stunted Eucalypt under the Barrier Range, about a hundred miles inland. The natives there eat the large gall, which when fresh is soft and acid, not unlike a sour apple, and they look upon the fat white Brachyscelid as a very dainty morsel. Through the kindness of Mr. J. H. Maiden, I have received a very large specimen of the gall obtained by Mr. Chisholm, of Torrens' Creek, near Charters Towers, N. Queensland, together with an interesting letter from the latter gentleman, in which he says "it is known as the 'blood-wood apple,' and the blacks are very fond of eating it."

BRACHYSCCELIS OVICOLA, Schrader, l.c. p. 5, pl. ii. fig. 3, *a, e, f.*

♀. Gall pale green, smooth, narrowest at base of attachment to twig, forming an oval with a slight depression at the apex, in the centre of which is situate the apical orifice, which is minute and circular; length 14 lines, diameter 9 lines; thickness of chamber walls 2 lines; chamber round at the base, coming to a sharp point just below the apical orifice.

♀. Coccid pale canary-yellow, shining when the white floury excretion is brushed off; centre of the first segment rounded at

top, widest in the middle ; central pair of legs, thoracic segments, and head very distinct ; legs, eyes, and antennæ ferruginous ; abdominal segments narrow, rapidly tapering to a point, the last four apical segments ferruginous ; anal segment long and slender ; anal appendages black, deeply divided but cohering, long, slender and pointed ; on the upper side all the abdominal segments covered with fine hairs, the thoracic segments and first abdominal segments covered with fine tubercles ; on the rest of the abdominal segment these tubercles produced into small ferruginous coloured spines, which form regular rows along the lower margins of these segments, but half hidden by the fine hairs clothing the body ; length 8 lines, diameter $4\frac{1}{2}$ lines.

♂. Gall formed on the leaves ; reddish-brown ; short and broad ; $2\frac{1}{2}$ lines in height, slightly ridged and of a uniform thickness ; the apical opening large but not much dilated or bell-mouthed.

Hab.—Wellington, N.S.W., on *E. sp.* ; Bendigo, Victoria, on *E. gracilis*, and on *E. leucoxydon* (W. W. Froggatt).

Of parasitic Coleoptera (Family *Curculionidæ*) I bred a single specimen of the beetle *Haplonyx myrrhatus*, Pascoe, from a gall of this species obtained in the Whipstick scrub, near Bendigo, and I noticed a large number of galls obtained in this locality bearing circular openings through which the perfect beetles had already escaped.

This species has a wide range over the southern portion of Australia, and forms its galls upon a number of very distinct species of Eucalypts. Though not very common in the neighbourhood of Sydney, it is often met with on the white gums in the western country ; like most species it grows on the young twigs, but I have several fine specimens growing out of young flower buds.

In consequence of the thick fleshy walls of the gall being much mined by the attacks of parasitic Chalcids, they often swell out into great puffy masses, losing all their fine oval contour, while the helpless female is also subject to inquilines that either eat or crowd her out.

BRACHYSCELIS BAEUERLENI, n.sp. (Pl. VII. fig. 4.)

♀. Galls round, clustered together in bunches of three or four at intervals along the branch, broadly attached to the twig, depressed at the apex; 9 lines high, 7 lines wide; the walls consisting of a double shell, the inner one hard and thin, the outer one thick and spongy; sometimes a very slight cavity on either side of the apical orifice, the point of the inner shell carrying the orifice level with the top of the gall; chamber broad, rounded, conical at apex; orifice very small and situated in centre of a hollow.

♀. Coccid dark yellow, round at apex, the first three thoracic segments very large; abdominal segments very small; head and thoracic segments very much wrinkled; legs short and globose; abdominal segments regular, narrow, lightly fringed with fine hairs, the apical ones ferruginous; anal appendages black, close together, short, thick, pointed, and slightly parted at the tips, rather rugose on their outer edge; on the upper side the last thoracic and all the abdominal segments armed with a regular row of fine acuminate tubercles; length 7 lines, width 4 lines.

♂. Gall unknown.

Hab.—Ballina, on *E.* sp. (W. Bäuerlen).

I have seen only one lot of these galls, which were obtained by the botanical collector of the Technological Museum in the Richmond River district; they are quite unique, and I have great pleasure in dedicating the species to the finder, my old comrade in arms Mr. William Bäuerlen.

BRACHYSCELIS RUGOSA, n.sp. (Pl. VII. fig. 5.)

♀. Gall sessile, dull brown, hemispherical in shape, externally very rugose, warty and irregularly ridged; depressed at apex; double-shelled, the inner sheath very thin and hard, the enveloping husk spongy, containing numerous small cavities between it and the inner shell; opening at the apex above orifice in first shell rough and irregular; apical orifice small, circular; length 8 lines, diameter 8 lines.

♀. Coccid dull yellow, broad and squat; the head and thoracic segments wrinkled, rather flat; the second thoracic segment

rounded and rising up on either side to a level with the top of first segment, which is depressed at top; legs small; abdominal segments very small, lightly fringed on the margins with fine hairs, and coming to a point above the anal appendages, which are ferruginous, black at tips, short and thick, lying close together, and rugose on their outer margins; upper side of abdominal segments covered lightly with fine hairs and each armed with a row of fine tubercles; length 6 lines, $4\frac{1}{2}$ wide.

♂. Gall unknown.

Hab.—Allalong, N.S.W., on *E.* sp. (W. W. Froggatt).

These galls were obtained by me in considerable numbers upon the twigs and stems of a stunted Eucalypt at Allalong, in the Maitland district. I have never seen any other specimens.

BRACHYSCOLIS PHARETRATA, Schrader, l.c. p. 4, pl. i. fig. 2, *o-s*; pl. ii. fig. 3, *g*.

♀. Gall springing from the leaf, generally on the midrib, narrow at base of attachment, swelling out in the middle and coming to a more or less conical point at apex; the apical orifice small; length 5 lines, $2\frac{1}{4}$ diameter.

♀. Coccid yellow, obese, top-shaped; the head and thoracic segments spherical; legs small; abdominal segments very narrow and regular, thinly clothed with fine hairs on the underside, but much thicker on the upper side; no spines or tubercles on the upper side of the abdominal segments; the anal appendages black, short, deeply divided; tips thick and stout; length $3\frac{1}{2}$ lines, diameter $2\frac{1}{2}$ lines.

♂. Galls in large irregular mass appearing upon the side of the female gall after it is nearly mature; it is generally smooth on the outside, which consists of an overlapping sheath, often when full grown brilliantly tinted with red and yellow colours; in this sheath are a mass of small tubular cells opening outwards, each containing a male larva, the whole being five or six times the bulk of the small female gall; length of tubes 3 lines.

♂. Coccid pale yellow with large grey wings and black eyes; length $\frac{1}{2}$ line.

The description given of the specimens bred from *B. munita* would not differ in any particular from that of this species.

Hab.—Botany, on *E. sieberiana*; Berowera, on *E. corymbosa*; Mossman's Bay, on *E. capitellata* (W. W. Froggatt); Newcastle, *E. sp.* (R. Thornton); Cambewarra, on *E. sp.* (W. Bäuerlen).

This is known as the "cockscomb gall," from the cock's-comb-like appearance of the male gall mass. It is not an uncommon gall about Sydney, and I have watched a patch of trees at Botany attacked by this coccid, from which I obtained galls for several years, but they have been all destroyed by the larvæ of *Haplonyx Hopei*, which get inside and feed upon the female galls.

Of parasitic Coleoptera (Family *Curculionidæ*) I have bred *Haplonyx Hopei*, Bohm., from the galls of this Brachyscelid.

Schrader in his paper gives a drawing of the male galls of this species on the twigs, but there must be some mistake, as I am certain that the male galls are always produced upon the females.

BRACHYSCELIS THORNTONI, n.sp. (Pl. VI. fig. 6.)

♀. Gall small, slightly rounded at base, cylindrical, faintly ribbed on the sides, narrowing towards the apex, which is truncate, the apical orifice small, encircled by a slight ridge; length 8 lines, diameter $1\frac{3}{4}$ lines; chamber containing coccid conical, walls solid but thin.

♀. Coccid pale yellow, cylindrical, rounded at top of head and thoracic segments, which are much wrinkled; legs small; abdominal segments narrow, divisions sharply defined, lightly fringed with hairs on the outer margins; coming to a sharp point at anal segment; anal appendages long, slender, distinctly separated at the base, but close together until close to the tips, where they open outwards, tips truncate; upper side shining, head and thoracic segments with a few scattered hairs; abdominal segments fringed on the outer edges with short hairs; 1st segment spineless; 2nd and 3rd with a few scattered spines along the centre; 4th and 5th with a regular line of spines along the apical edges; 6th with row of stout spines along the apex; anal segment ferruginous, slender; length 4 lines.

♂. Galls growing out from the side of the ♀ gall just below the apical orifice into a large mushroom-like mass, the outer side covered with a wrinkled epidermis; on the under side the tubular male galls are all separated from each other, short, straight, reddish-brown in colour, most of them toothed at the apex; a very fine specimen obtained from Newcastle district is 17 lines at its greatest width and contains over three hundred male galls in the one mass.

Hab.—Newcastle, on *E.* sp. (R. Thornton).

This remarkable gall was found in the Newcastle district by Mr. R. Thornton, the well-known bush naturalist, to whom I am indebted for a very fine collection of several species of Brachyscelid galls.

It is closely allied to *B. pharetrata* and *B. nux.* Olliff, but differs considerably from both. The female galls often spring out in clusters of five or six at the base of the leaves, and when immature look like a bunch of finger-shaped excrescences.

EXPLANATION OF PLATES.

Fig. 1.—*Brachyscelis minor*: *a* and *b* two stages of female galls; *c* female galls; *d* adult female coccus.

Fig. 2.—*B. variabilis*: female gall whole (*e*) and in section (*f*).

Fig. 3.—*B. conica*: *g* female galls; *h* male galls.

Fig. 4.—*B. Bäuerleni*: female galls.

Fig. 5.—*B. rugosa*: female galls *i*, and adult female coccus *j*.

Fig. 6.—*B. Thorntoni*: female galls.

Fig. 7.—*B. pomiformis*: *k* female gall seen from above; *l* under view showing attachment to twig.

(All figures of the natural size.)

NOTES AND EXHIBITS.

Mr. R. Etheridge, jun., exhibited the seeds of a palm, 66 feet high, from Giles' Glen of Palms, near the Mission Station, Finck River, Central Australia. Also the seeds of the "Bean-tree," possibly an *Erythrina*, from Macdonald Ranges, Central Australia; the seeds are strung and used as necklaces by the aborigines, who use the wood of the same tree for producing fire by friction, and also for shields, on account of its lightness.

Mr. Maiden exhibited flowering and fruiting specimens of the new *Hakea* from Wallsend.

Mr. Hedley wished it to be noted that he now regards the shell, jointly figured and described (P.L.S.N.S.W. (2), vi. p. 558) by Mr. Musson and himself under the name of *Pupa anodonta*, as a second species of the genus *Heterocyclus*, instituted by Crosse (Journ. de Conch. Vol. xx. 1872, p. 156) for the reception of *H. perroquini*, Crosse, from New Caledonia. This genus is considered by Fischer (Manuel de Conchyliologie, p. 735) equivalent to *Lyogyrus*, a member of the *Valvatidae*.

Mr. Froggatt exhibited a large series of mounted specimens of the Brachyscelid coccids and galls mentioned in his paper, together with a number of the parasites.

Mr. Olliff also showed a fine collection of Brachyscelid galls, with which he proposed to deal at a future meeting.

WEDNESDAY, OCTOBER 26TH, 1892.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

Mr. A. Henn was present as a visitor.

DONATIONS.

“Colonial Museum and Geological Survey of New Zealand—Twenty-fourth and Twenty-sixth Annual Reports (1889-90 and 1890-91): Reports of Geological Explorations during 1888-89.” *From R. Etheridge, Junr., Esq.*

“Imperial University of Japan—Calendar for the years 1890-91 and 1891-92.” *From the University.*

Four pamphlets entitled—“The Tugeri Head-hunters of New Guinea.” By Professor A. C. Haddon (1891): “The newly-hatched Larva of *Euphyllia*.” By Professor A. C. Haddon (1891): “A Revision of the British Actineæ.” Part ii.—Zoantheæ. By Professor A. C. Haddon and Miss A. M. Shackelton, B.A. (1891): “Reports on the Zoological Collections made in Torres Straits.” Actineæ. Part i.—Zoantheæ. By Professor A. C. Haddon and Miss A. M. Shackelton, B.A. (1891). *From Professor Haddon.*

“Royal Irish Academy—Cunningham Memoirs.” No. vii. (July, 1892). *From the Academy.*

“Zoologischer Anzeiger.” xv. Jahrg. Nos. 399-400 (August-September, 1892). *From the Editor.*

“Perak Government Gazette.” Vol. v. Nos. 28-29 (August-September, 1892). *From the Government Secretary.*

“Pharmaceutical Journal of Australasia.” Vol. v. No. 9 (September, 1892). *From the Editor.*

“Société Royale de Géographie d’Anvers—Bulletin.” Tome xvi., 4^e Fasc. (1892). *From the Society.*

“Société Zoologique de France—Mémoires.” Tome v. Nos. 2-3 (1892). *From the Society.*

“Victorian Naturalist.” Vol. ix. No. 6 (October, 1892). *From the Field Naturalists’ Club of Victoria.*

“Hamilton Association—Journal and Proceedings.” No. viii. (1891-92). *From the Association.*

“Geological and Natural History Survey of Canada—Contributions to Canadian Micro-Palæontology.” Part iv. By Dr. D. Rüst (1892). *From the Director.*

“Smithsonian Institution—United States National Museum—Annual Report for 1890.” pp. 384-394 (1892). *From the Museum.*

“American Naturalist.” Vol. xxvi. No. 309 (September, 1892). *From the Editors.*

“Canadian Record of Science.” Vol. v. Nos. 1 and 3 (1892). *From the Natural History Society, Montreal.*

“United States Department of Agriculture—Division of Entomology—Insect Life.” Vol. iv. Nos. 11-12 (August, 1892). *From the Secretary of Agriculture.*

“Australasian Association for the Advancement of Science—Proceedings of Section D.” (one sheet), 1892. *From the Secretary.*

“Geological Survey of India—Records.” Vol. xxv. Part 3 (1892). *From the Survey.*

“Naturhistorisches Museum in Hamburg—Mitteilungen.” ix. Jahrgang, Zweite Hälfte (1891). *From the Museum.*

“Agricultural Gazette of N.S.W.” Index to Vol. ii ; Vol. iii. Part 9 (September, 1892). *From the Director of Agriculture.*

“Société Royale Linnéenne de Bruxelles—Bulletin.” xvii^m Année, No. 9 (September, 1892). *From the Society.*

“Horæ Societatis Entomologicæ Rossicæ.” T. xxvi. (1891). *From the Society.*

“Archiv für Naturgeschichte.” lviii. Jahrgang (1892), i. Band, 2 Heft. *From the Editor.*

“Department of Mines and Geological Survey of N.S.W.—Records.” Vol. iii. Part 1 (1892). *From the Hon. the Minister for Mines.*

“Australasian Journal of Pharmacy.” Vol. vii. No. 82 (October, 1892). *From the Editor.*

“Australian Museum, Sydney—Report of the Trustees for the year 1891.” *From the Trustees.*

“Nederlandsche Entomologische Vereeniging—Tijdschrift voor Entomologie.” xxxiv. Deel, 3-4 Aflevering. (1891). *From the Society.*

“Gesellschaft für Erdkunde zu Berlin—Zeitschrift.” Bd. xxvii. (1892), No. 2. *From the Society.*

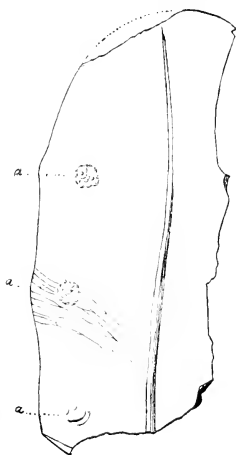
Two pamphlets entitled—“The Great Austral Plain, its Past, Present, and Future.” By E. Favenc (1881); “Aboriginal Songs: A few words of their language and misspelt names of places.” By S. M. Mowle (1891). *From C. Hedley, Esq., F.L.S.*

NOTE ON THE FRUCTIFICATION OF *GLOSSOPTERIS*.

BY JOHN MITCHELL, PUBLIC SCHOOL, NARELLAN.

The detection of fructification on *Glossopteris* is so rare that the record of even suspected cases of its detection must be of interest to paleontologists. It is for that reason that I briefly note what appears to me to be an instance of fructification on a fragment of *Glossopteris browniana* (?). Feistmantel* states that in the Indian variety of *G. browniana* he has observed rounded sori placed in longitudinal rows between the margin and midrib. Mr. Carruthers thought that in a Queensland specimen of the same species, he observed linear sori running along the veins between the margin and midrib, and nearer the former than the latter.† This reference of Mr. Carruthers is all, I believe, that has been written on the fructification of Australian *Glossopteris*, and amounts to nothing affirmative.

My specimen consists of the distal portion of a frond two and one-fifth ($2\frac{1}{5}$) inches in length, and of this the right side is missing from near the midrib. On the left side are three suboval, convex impressions, placed longitudinally between the midrib and



* "Coal and Plant-bearing Beds of Palæozoic and Mesozoic Age in Eastern Australia," &c. Mem. Geol. Surv. of N.S.W., Palæontology, No. iii. (1890).

† Q.J.G.S. 1872.

margin and rather less than half the distance from the margin that they are from the midrib. The two nearest the distal end are very clearly outlined and exhibit just such features as would be expected in sori; the proximal one is rather faint. They are $\frac{1}{2}$ ths of an inch apart, from centre to centre, and $\frac{1}{8}$ of an inch in their greatest diameter. In character these sori (for such I take them to be) approach those which Dr. Feistmantel has observed in the Indian *G. browniana*, and will bring the Indian and Australian fossil into closer relationship than that eminent palæontologist was disposed to admit them. The stone on which the impression is preserved is a very fine-grained chert from the Newcastle Beds at Lake Macquarie Road, near Charlestown.

OBSERVATIONS ON CERTAIN UNDESCRIBED GALL-
MAKING COCCIDÆ OF THE SUB-FAMILY *BRACHY-*
SCELINÆ.*

BY A. SIDNEY OLLIFF, GOVERNMENT ENTOMOLOGIST, NEW SOUTH
WALES.

* This Paper will appear in the Macleay Memorial Volume.

SOME NEW SOUTH WALES PLANTS ILLUSTRATED.

BY R. T. BAKER, ASSISTANT CURATOR, TECHNOLOGICAL MUSEUM,
SYDNEY.

No. iii. ACACIA PUGIONIFORMIS, Wendl.

(Plate VIII.)

My object in delineating this species is to record for the first time a description of the pod, hitherto unknown.

The description of this *Acacia* in the *Flora Australiensis* (Vol. ii. p. 338) reads as follows:—

“A tall glabrous shrub, with slender slightly angular branches. Phyllodia rather numerous, straight or slightly curved, mostly erect, linear-subulate $1\frac{1}{2}$ to 2 rarely 3 inches long, abruptly terminating in a short straight point, nearly tetragonous by a prominent nerve on each side. Stipules minute. Peduncles solitary or 2 together, or 3 lines or rarely $\frac{1}{2}$ inch long, bearing each a globular head of numerous flowers, mostly 5 merous. Sepals linear-spatulate, ciliate, at length free about $\frac{1}{2}$ as long as the corolla. Petals smooth, with a prominent midrib. Pod unknown.”

To this may be added:—

Pod varying in length from $1-1\frac{3}{4}$ inches, with a uniform breadth of about 2 lines; elongated, straight, convex over the seed, and with slightly thickened margins. Seed obovate-oblong, longitudinal, $1\frac{1}{2}$ lines long; funicle shortly folded and thickened into a small aril under the base of the seed.

Hab.—Port Jackson to Blue Mountains (Fl. Austr.), La Perouse, Middle Harbour, Woodford, N.S.W.

EXPLANATION OF PLATE.

(Plate VIII.)

Acacia pugioniformis, Wendl.

- Fig. 1.—Portion of a phyllodium (enlarged).
Fig. 2.—Pistil (enlarged).
Fig. 3.—Unexpanded flower (enlarged).
Fig. 4.—Bracts (enlarged).
Fig. 5.—Front and back views of a stamen (enlarged).
Fig. 6.—Expanded flower (enlarged).
Fig. 7.—Pod (nat. size).
Fig. 8.—Section of pod, seed *in situ* (nat. size).
Fig. 9.—Portion of fruit valve with seed (enlarged).
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NOTES AND EXHIBITS.

Mr. W. W. Froggatt exhibited a twig of *Eucalyptus robusta*, attacked by "lerp"-making *Psyllæ*, together with mounted specimens of the lerp and perfect insects. A large number of the trees have had their foliage entirely destroyed by the countless numbers of the larvæ of the insects.

Mr. A. Sidney Olliff exhibited drawings of the galls and coccids described in his paper. Also specimens of a very large earwig, *Anisolabris colossea*, Dohrn, from the Richmond and Tweed River districts, the examples exhibited being more than twice the size of Dohrn's types.

WEDNESDAY, NOVEMBER 30TH, 1892.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

Baron von Berg, and Messrs. W. H. Elliott and J. Coates were introduced as visitors.

Mr. J. Hill, Demonstrator of Biology, Sydney University, was elected a member of the Society.

The President announced that a Special General Meeting would be held on Monday, December 12th, at 4 o'clock p.m., in the Board Room, Free Public Library, by kind permission of the principal Librarian. Business: to consider the proposed New Rules.

DONATIONS.

“L'Académie Royale des Sciences, Amsterdam—Jaarboek voor 1891; Verslagen.” Derde Reeks, Achtste Deel (1891). *From the Academy.*

“British Museum (Natural History)—Catalogue of Birds.” Vols. xvi. and xvii. (1892). *From the Trustees.*

“Royal Society of London—Proceedings.” Vol. li. No. 313 (1892). *From the Society.*

“Hooker's Icones Plantarum.” Fourth Series. Vol. iii. Part 2 (September, 1892). *From the Bentham Trustees.*

Pamphlet entitled—“A new British Hepatic.” By W. H. Pearson (September, 1892). *From the Author.*

“Cambridge Philosophical Society—Proceedings.” Vol. vii. Part 6 (1892): “Transactions.” Vol. xv. Part 3 (1892). *From the Society.*

“Smithsonian Institution, Washington—Annual Report of the Board of Regents to July, 1890.” *From the Secretary.*

“United States National Museum, Washington: Special Bulletin No. 1—Life Histories of North American Birds.” By C. Bendire (1892): “Proceedings.” Vol. xv. Nos. 905-907, 909-910 (1892). *From the Museum.*

“Bureau of Ethnology, Washington—Bibliography of the Algonquian Languages.” By J. C. Pilling (1891). *From the Director.*

“United States Department of Agriculture—Division of Entomology—Insect Life.” Vol. v. No. 1 (1892). *From the Secretary of Agriculture.*

“Nova Scotian Institute of Science, Halifax—Proceedings and Transactions.” Second Series, Vol. i. Part 1 (1890-91). *From the Institute.*

“American Museum of Natural History—Twenty-third Annual Report” (1891): “Bulletin.” Vol. iv. No. 1, pp. 81-111 (September, 1892). *From the Museum.*

“American Naturalist.” Vol. xxvi. No. 310 (October, 1892). *From the Editor.*

“American Philosophical Society, Philadelphia—Proceedings.” Vol. xxx. Nos. 137-138 (1892). *From the Society.*

“Cincinnati Society of Natural History—Journal.” Vol. xv. No. 1 (April, 1892). *From the Society.*

“Geological and Natural History Survey of Canada—Annual Report for 1888-89.” New Series, Vol. iv. Parts D. and N. (12 sheets). *From the Director.*

“Academy of Natural Sciences, Philadelphia—Proceedings for 1880.” Parts i.-iii.: 1892, Part i. *From the Academy.*

Pamphlet entitled—“Notes on Palaeozoic Crustacea.” No. 2. By A. W. Vogdes (1892). *From the Author.*

“Wisconsin Academy of Sciences, Arts, and Letters—Transactions.” Vol. viii. (1888-1891). *From the Academy.*

“Johns Hopkins University Circulars.” Vol. xi. No. 98 (May, 1892). *From the University.*

“University of Sydney—Chancellor’s Annual Address for the years 1886, 1887, 1890, 1891, and 1892.” *From the Registrar.*

“South Australia—Report of the Board of Governors of the Public Library, Museum, and Art Gallery, with the Reports of the Standing Committees for 1891-92.” *From the General Director and Secretary.*

“Pharmaceutical Journal of Australasia.” Vol. v. No. 10 (October, 1892). *From the Editor.*

“A Bibliography of Australian Economic Botany.” Part i. [Technical Education Series, No. 10]. By J. H. Maiden, F.L.S., F.C.S. (1892). *From the Author.*

“Victorian Naturalist.” Vol. ix. No. 7 (November, 1892). *From the Field Naturalists’ Club of Victoria.*

“Department of Agriculture, Tasmania—Bulletin.” No. 1—“A Handbook to the Insect Pests of Farm and Orchard.” Part 1. By E. H. Thompson (1892). *From the Author.*

“Geological Survey of India—Contents and Index to Vols. i.-xx. of the Memoirs” (1859-1883): “Index to the Genera and Species described in the Palaeontologia Indica up to the year 1891.” *From the Director.*

“Asiatic Society of Bengal—Journal.” Vol. lxi. (1892), Part i. No. 2; Part ii. No. 2: “Proceedings, 1892.” Nos. 4-7 (April-July). *From the Society.*

“Perak Government Gazette.” Vol. v. Nos. 28-29, 32-34 (August-October, 1892). *From the Government Secretary.*

“Zoologischer Anzeiger.” xv. Jahrg., Nos. 401-402 (September-October, 1892). *From the Editor.*

“Société d’Horticulture du Doubs, Besançon—Bulletin.” Nouvelle Série, No. 21 (September, 1892). *From the Society.*

“Archives Néerlandaises des Sciences Exactes et Naturelles.” Tome xxv. 5^{me} Livraison; Tome xxvi. 2^{me} Livraison (1892). *From the Society.*

“Société des Naturalistes de la Nouvelle-Russie, Odessa—Mémoires.” T. xvii. No. 1 (1892). *From the Society.*

“Königlich Böhmisches Gesellschaft der Wissenschaften in Prag—Abhandlungen.” vii. Folge, 4 Band (1892): “Jahresbericht für das Jahr 1891”: “Sitzungsberichte, 1891.” *From the Society.*

“Société Belge de Microscopie—Bulletin.” Tome. xviii. Nos. 8-9 (1891-92). *From the Society.*

“Naturhistorischer Verein der Preussischen Rheinlande, Westfalens und des Reg.-Bez. Osnabrück—Verhandlungen.” Fünfte Folge, ix. Jahrgang (1892). *From the Society.*

“Senckenbergische naturforschende Gesellschaft in Frankfurt a. M.—Abhandlungen.” xvii. Band (1884-91); Bericht, 1892; “Katalog der Batrachia-Sammlung im Museum” (1892). *From the Society.*

“K. K. Naturhistorisches Hofmuseum in Wien—Annalen.” Band iv. Nr. 1 (1889). *From the Museum.*

“Société Zoologique de France—Mémoires.” Tome v. Part 4 (1892); “Bulletin.” T. xvii., No. 6 (1892). *From the Society.*

“Royal Society of Victoria—Proceedings.” New Series. Vol. iv. Part 2 (1892). *From the Society.*

“Department of Mines, N.S.W. — Memoirs: Palæontology. No. 5—A Monograph of the Carboniferous and Permo-Carboniferous Invertebrata of New South Wales.” Part ii. By R. Etheridge, Junr. (1892). *From the Hon. the Minister for Mines.*

“Agricultural Gazette of N.S.W.” Vol. iii. Part 10 (October, 1892). *From the Director of Agriculture.*

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PAPERS READ.

ON THE SUPPOSED NEW ZEALAND SPECIES OF
LEPTOPOMA.

BY O. F. VON MOELLENDORFF, PH.D.

(Communicated by C. Hedley.)

Mr. H. Suter sent me a few examples of the so-called *Leptopoma* species of New Zealand, expressing some doubts on the systematic position hitherto assigned to them, and asking my opinion on the subject, as he himself was in want of the necessary literature and specimens for comparison, whilst he supposed that I, living in the centre of distribution of the *Cyclophoridae*, viz., Eastern Asia, should have more experience in the study of operculate pulmonata. Mr. Suter points out the evident relation of these shells with *Cyclophorus cytora*, Gray, and proposes they should form, together with that species, a separate subgenus of *Cyclophorus*.

The study of the rather scant material before me and the comparison of the numerous small cyclophoroid forms of Eastern Asia and Indonesia have led me to the conclusion that the New Zealand species in question belong to *Lagochilus*, Blfd. The operculum is certainly that of *Cyclophorus*, *Lagochilus* or *Leptopoma*, there existing but minute differences in this respect between the three genera. Likewise the dentition and the outer aspect of the animal as described by Prof. Hutton correspond perfectly with that of the subfamily of *Cyclophorinae*. The conical shape, the small size, the thin but opaque and scarcely transparent shell, its more or less dark colour, the peculiar structure of the cuticula, forming thin, deciduous ribs occasionally produced into membranaceous processes or *fimbriae*, the angle formed by the upper margin of the peristome at its insertion, all decidedly point to

Lagochilus. The chief peculiarity of that genus, expressed by its name, viz., a slit or incision in the upper lip at its insertion, is formed by the margins, or rather the upper margin and the parietal callosity, meeting in an angle and is of course distinctly visible only in those species which have a thickened lip and connected margins, but there are many recognised species of *Lagochilus* with a thin lip and remote margins in which the above-mentioned formation is only represented by the angular insertion of the upper margin. Of the New Zealand species *Lagochilus cytora*, Gray, belongs to the first group, having a double lip and continuous peristome and showing a distinct slit or groove at the upper angle of the aperture, whilst *L. pannosum*, Hutt., *calvum*, Hutt., *pallidum*, Hutt., and the new species, *L. torquillum*, Suter, are formed in the latter way.

The question whether my classification is correct or not can only be decided with certainty by the examination of the animals, as *Lagochilus* is characterised by a glandular slit in the extremity of the foot. Judging, however, from the shells alone, I have very little doubt that the species in question belong to *Lagochilus*. They differ from the species known to me by the absence of elevated spiral lines or keels and by the more conically elevated, almost pyramidate shape, but I do not think it necessary to create a special section for them, at least not before the geographical distribution of *Lagochilus* is more fully known. The genus ranges from India and China to the Philippines, the Malayan Archipelago and New Guinea (*L. triliratum*, Pfr., *poirierii*, Tapp.-Can., and perhaps also *rugatellum*, Tapp.-Can., described as *Cyclotus*). I am all but sure that *Cyclophorus liricinctus*, Bens., and *C. orbiculatus*, Bens., from Western Australia, both of which are described with "apertura superne angulata," the latter besides "subcanaliculata," belong to our genus. *Cyclophorus whitei*, Braz., of Fitzroy Island, might also be a *Lagochilus*, but possibly as well a *Ditropis*, as Brazier contends. The genus may yet be discovered on the Melanesian islands; *Cyclophorus fornicatus*, Pfr., from the New Hebrides, I feel inclined to consider a representative of *Lagochilus*.

SCHIZOGLOSSA; A NEW GENUS OF CARNIVOROUS
SNAILS.

By C. HEDLEY, F.L.S.

(Plates IX.-X.)

After describing his ascent of Kakepuku, a hill in the Middle Waikato Basin, 1531 feet high, situated near the junction of the Waipa and Mangawero Rivers, Hochstetter says (New Zealand, English Edition, 1867, p. 317): "The top is said to have formerly been fortified and cultivated; only on the south-west side there is a small tract of forest remaining, which the chief, who is the owner of that ground, had ordered to be spared. This sylvan grove welcomed us to its cooling shade, and was moreover found to be rich in small, but also rare landshells. Besides numerous small species of *Helix*, *Realia turriculata*, Pfr., and *Daudebardia novoseelandica*, Pfr., are found here frequently."

From specimens there collected Pfeiffer described [Malak. Blatt., Vol. viii., 1861 (1862), p. 146] *Daudebardia novoseelandica*,* remarking that he had no information of this animal, the shell of which was larger than that of any known *Daudebardia*. Translations (Manual of the New Zealand Mollusca, 1880, p. 12, &c.) and reprints (Mon. Hel. Viv. v. p. 10, &c.) of Pfeiffer's original diagnosis constitute the remainder of the literature relating to this species. No animals seem to have reached the hands of any naturalist, and no figures of the shell have been published. Prof. Hutton described (Trans. N.Z. Inst. Vol. xiv. p. 152) the exterior and the dentition of a snail deprived of its shell, under the illusion that he was dealing with *D.*

* Dr. von Martens has proposed (Critical List N.Z. Moll. p. v.) to reduce all specific names meaning of or from New Zealand to the common form of *neozelanicus*, but, except to correct an evident misprint or obvious error in spelling, it is undesirable to swerve from fixity of nomenclature.

novoseelandica, the shell but not the animal of which he knew. Complete specimens from the same source proved later (Op. cit. Vol. xv., p. 140) to be a species of *Testacella*.

Mr. Brazier, having recently received from Mr. R. Murdoch, of Wanganui, N.Z., specimens of this mollusc collected by that gentleman near Stratford, a township inland from Mt. Egmont, has, most liberally, placed these treasures at my disposal for dissection and description. These animals had, I understand, been carefully drowned in water before being placed in alcohol, and probably present a tolerable resemblance to the living snails. Their external appearance is quite suggestive of the European carnivores *Daudebardia* and *Testacella*; the rudimentary shell quaintly perched on the creature's tail, the auriform shape of that shell and the aculeate teeth of the radula all combine to present a strong, but I am persuaded a superficial and misleading, likeness to their antipodean representatives. Closer examination detects differences in every detail. Comparing the pulmonary orifices: that of *Schizoglossa* is seen, as depicted in my sketch, located in the usual antero-lateral margin of the mantle. To contrast with this, I have copied on my plate fig. 9, pl. v. of Moquin-Tandon's "Histoire Naturelle des Mollusques terrestres et fluviatiles de France," showing the totally different and remarkable position of the same orifice (*f*) in *Testacella*. I am unacquainted with any illustration of the foramen of *Daudebardia*, but suppose it to be similarly placed, because Fischer says of it (Journ. de Conch. v. 1856, p. 16), "Behind there opens obliquely the respiratory pouch, which is rather large and extends opposite the point of the foot." The grooves that run outwards and downwards from the shell along the body in the European genera are wanting in *Schizoglossa*. The shells of the three genera under discussion are quite dissimilar, the New Zealand shell standing alone as to its remarkable little pit, excavated for the reception of the shell-muscle; a feature more resembling the ligament-pit of some bivalves than an ordinary columella muscle-scar.

Contracted in alcohol, *S. novoseelandica* is in length 20 mm., in height and breadth 9 mm. Behind the shell, situated upon

the hinder half of the body, the tail slightly projects ; it is flat, without a trace of a mucous gland, and bluntly pointed. The margin of the foot is produced into a slight flange. A pair of grooves running along the median line from the mantle to the muzzle define a row of small tubercles. Right and left, between this median line and the foot edge, there may be traced two indistinct grooves proceeding from the mantle to the lips. Posterior to these the surface is divided into tubercles by small irregular grooves meandering outwards and downwards. Mantle margin simple, unlobed, protruding around the circumference of the shell. Sole without a defined median area. Colour reddish-brown, splashed with black, darkest above ; mantle and sole ashy-yellow. The animal in motion probably resembles *Paryphanta busbyi* as portrayed P.L.S.N.S.W. (2), ii. pl. xx. fig. 6.

Shell rudimentary, auriform, thin, opaque, oval, increasing irregularly. Colour, without, glossy chestnut shaded to greenish-yellow at the margin, spire tinged with pink ; within, nacreous, gleaming white and purple, columella white. Whorls 2 ; first $1\frac{1}{2}$ embryonic, succeeding half adult, embryonic shell $\frac{1}{4}$ of total length, regular, well defined, commencing smooth, afterwards spirally grooved ; adult most rapidly increasing, finger-nail shaped, descending much at the suture, coarsely irregularly transversely wrinkled and faintly spirally grooved. Growth margin sharp yet firm, exhibiting no trace of an epidermal fringe. Columella stout, below terminating in a minute double tubercle, above broadening upon the embryonic whorl and excavated for the reception of the columella muscle. Length, 10 ; breadth, 7 ; height, 2 mm.

Jaw none.

Radula strap-shaped, 12 mm. long by 3 broad. Formula, 61 rows of 24 : 0 : 24. The central tooth is wanting, and probably many others are missing with it. Here and there in the rachidian cleft (which suggested the generic name) appears a minute, rudimentary and unsymmetrical denticle. From this the four innermost teeth, of a starved and functionless appearance, increase rapidly in size ; the remaining teeth are in bulk nearly equal. The crest of the radula being crushed down by the cover glass, the

teeth of my illustration are seen, those to the right pressed down on their right side and those to the left on their left. Viewed perpendicularly, the teeth appear straighter and narrower, presenting much resemblance to those figured and described for *Rhytida lampra*. The pharynx is enormous, occupying almost the whole length of the visceral cavity and nearly equalling in size the remainder of the viscera. The small stomach overlies it and leads to a short intestine which after passing close to the heart reaches the anus at the mantle margin. From the posterior end of the pharynx a muscle proceeds to the shell-muscle. A long contorted foot-gland runs the length of the floor of the visceral cavity, originating beneath the mouth and terminating in a knob within the tail.

The genital apparatus is of the simplest description. The penis-sac is more reduced than in any mollusc with which I am acquainted, appearing to be represented by a slight bulbous swelling near the orifice, a vas deferens arising therefrom, and a short muscle attaches this swelling to the nearest point of the body wall. I found no spermatheca. A complete egg in the oviduct of one specimen dissected proved the maturity of the animal, and the agreement of three specimens examined attested the uniformity of this remarkable system. Mr. Murdoch found the eggs to be laid in the month of August; he states that "The eggs were found principally under a good thickness of decaying fern leaves, and were in little heaps of from six to as many as fourteen." These eggs are white, hard-shelled, oval, 4 mm. major axis, 3 mm. minor axis, coarsely granular without, smooth within. The embryo in one I opened was in an early stage of development and had not yet acquired any recognisable molluscan features.

Summary.—On the evidence of the naked shell, (*D.*) *novoseelandica*, Pfr., was referred to *Daudebardia*, otherwise exclusively a Palearctic genus. At the first glance the soft parts appear to confirm this determination. Closer scrutiny, however, strengthens the suspicion* aroused by the supposed exceptional distribution.

*Kobelt (Jahrb. Deut. Mal. Gesell. vii. p. 26) and Fischer (Man. de Conch. p. 256) both catalogue this species as *Daudebardia (?) novoseelandica*.

Compared feature by feature with the European carnivores, radical structural differences are detected. Like *Thylacinus* and *Canis* or *Notoryctes* and *Chrysochloris*, this seems an instance where the same mode of life has moulded dissimilar organisms to the same external form. Having divorced *novoseelandica* from *Daudebardia*, a new genus is necessary for its reception, which may thus be provisionally outlined.

Family TESTACELLIDÆ.

SCHIZOGLOSSA, gen.nov.

Shell worn on the tail, incapable of containing the body, and reduced to the function of a shield to the lungs and heart, rudimentary, paucispiral, nacreous within, columella excavated into a pit for the reception of the shell-muscle. Animal lacking rachidian teeth.

Type and only known species *S. novoseelandica*, Pfeiffer.

Schizoglossa appears to me referable to that section of the *Testacellidæ* embracing its compatriots, *Rhytula*, *Elea* and *Paryphanta*, with which the lack of rachidian teeth and the simplicity of the genitalia allies it. Of these perhaps *Paryphanta* stands the closest.

EXPLANATION OF PLATES.

PLATE IX.

- Fig. 1.—Spirit specimen of *Schizoglossa novoseelandica*, Pfr., seen from above. Magnified.
- Fig. 2.—Ditto, seen from the right side, showing respiratory orifice. Magnified.
- Fig. 3.—Posterior portion of shell of ditto, seen from beneath, showing muscle-scar and tubercles on the columella. Magnified.
- Fig. 4.—Genital system of ditto. Magnified.
- Fig. 5.—Tail of *Testacella haliotidea*, Draparnaud, copied from the "Histoire Naturelle des Mollusques terrestres et fluviatiles de France," Pl. v., fig. 9, to show position of respiratory orifice (*f*) for comparison with fig. 2.

PLATE X.

- Fig. 6.—Alimentary canal of *S. novoseelandica*, showing, *a*, mouth; *b*, pharynx; *c*, retractor muscles of the latter; *d*, salivary glands; *f*, stomach; *h*, hepatic ducts; *g*, intestine. Magnified.
- Fig. 7.—Eviscerated cavity of body of ditto, showing foot-gland left undisturbed. Magnified.
- Fig. 8.—Egg of ditto. Magnified.
- Fig. 9.—Detail sketch of anterior portion of the genitalia of ditto, attached to a scrap of the body wall; on the left the right tentacle enters. Magnified.
- Fig. 10.—Diagram of visceral hump of ditto, shell and roof of lung removed, showing, *a*, heart; *b*, shell-muscle; *c*, kidney; *d*, position of anus; *e*, free visceral coil withdrawn from the initial shell whorl. Magnified.
- Fig. 11.—Inner half row of teeth from the radula of ditto. Much magnified.

NOTE ON *GASTRODIA SESAMOIDES* (R. BR.)

BY THE REV. W. WOOLLS, PH.D., F.L.S.

I noticed in the early part of November last year, and also about the same time in the present year, several plants of this leafless orchid growing at the roots of a blue-gum tree (*Eucalyptus globulus*, Labill.) in Mr. Lester's garden at Burwood. Although the gum-tree may be from ten to fifteen years old, no one ever noticed before November of last year any orchids growing at its roots, and yet it is highly probable that some of the bulbs of *G. sesamoides* accompanied the young tree at its introduction into the garden. One of the plants which I measured was over two feet in height, with a raceme of dull white flowers several inches long, and a fusiform fleshy root of more than six inches. R. Brown regarded this orchid as parasitical, and Baron Mueller expresses a similar opinion (see "System of Victorian Plants," Vol. I. p. 403), or at all events that it is "epirhizal, like *Epipogon Gmelini* in England." When I wrote last year to the late Mr. R. D. Fitzgerald, F.L.S., on the strange appearance of *G. sesamoides* in Burwood, he replied, "I have found that orchid at the Fox Gully near Lane Cove, the North Shore, Mittagong, and other places, but I do not think it is a common species anywhere. As *Eucalyptus globulus* is not one of our Eucalypts, I cannot understand how the orchid could have been transplanted from the bush and made its appearance in the garden. If the Eucalypt had been a wild gum-tree, the fact of this orchid being found in such a place would have gone to show that it is a parasite. I have never found any great proof that *Dipodium*, *Galeola*, and *Gastrodia* are parasitical, though supposed to be so." So far as the last is concerned, the tuberous roots do not appear parasitical, nor as deriving any nourishment from the trees at whose roots they grow,

nor do they seem to be in any way connected with another plant. From a careful examination of several plants, I found the roots striking down perpendicularly and perfectly independent of the gum-tree, although from their close proximity to the butt of the tree, it might be supposed that they were in some degree sustained by it. All that can be said on the subject is that the natural habitat of *G. sesamoides* is the roots of gum-trees, just as Mr. Fitzgerald's *Pterostylis Baptistii* delights in proximity to those of tea-tree (*Melaleuca*). *G. sesamoides* has nothing striking in its appearance, but the species is worthy of study from the fact that its flowers differ so much in structure from those of the orchids common near Sydney, the sepals and petals being united in a five-lobed tube, and the enclosed labellum remarkable for its undulate margin and raised lines confluent near the apex. The genus is common to Queensland, N. S. Wales, Victoria, Tasmania, New Zealand, and the Oriental Archipelago. *G. Cunninghami* (Hook.) is very nearly allied to *G. sesamoides*, and differs principally in the colour of its flowers, the size of its roots (which used to be eaten by the New Zealanders), and its frequent occurrence in deep-shaded woods. They are probably varieties of the same species.

OOLOGICAL NOTES.

BY ALFRED J. NORTH, F.L.S., ASSISTANT IN ORNITHOLOGY,
AUSTRALIAN MUSEUM.

I. Notes on the Nesting-place and Eggs of *Halcyon sordidus*,
Gould.

HALCYON SORDIDUS, the Mangrove Kingfisher.

Tchoon gun gun, Aborigines of Hinchinbrook Island.

This fine species of *Halcyon*, exceeding in size all other Australian members of the genus, inhabits the mangrove-lined mouths of the rivers and creeks of Northern and North-eastern Australia, being recorded at intervals along the coast-line and contiguous islands in favourable situations, from Port Darwin in the Northern Territory, to the neighbourhood of Fraser's Island and Wide Bay in South-eastern Queensland, and its range also extends to the Aru Islands and those of the Louisiade Group. It never ventures far inland, but is restricted in its habitat to those estuarine areas and salt-water creeks and marshes of the coast which are clothed with a dense growth of mangroves; in these secure haunts it obtains its food, which consists principally of small fish and crustaceans.

Mr. J. A. Boyd, of the Herbert River, Queensland, who has contributed largely towards a knowledge of the nidification of many birds in that district, informs me that it is not an uncommon species on the Herbert and Seymour Rivers, especially during the winter months. Recently Mr. Boyd has been successful in finding the hitherto unrecorded nesting-place of this species, the eggs of which he has kindly forwarded to me for description, together with the following interesting notes relative to the taking of them.

“ While on a trip to Hinchinbrook Island, I was camped in the beginning of October, 1892, on a ridge, which, intersecting the forest of mangrove, ran down to a salt-water creek about two miles from the sea. On several consecutive days I had noticed a Kingfisher (*H. sordidus*) settle on the limb of a tree that had fallen into the stream, and stay there some little time picking and pluming herself. As she always came from and returned in the same direction, I concluded that she was breeding, and on the 6th inst. I traced her to a Termite nest in a Blood-wood tree [*Eucalyptus corymbosa*] about thirty feet from the ground and leaning somewhat over the water. The tree was two feet and a-half at the base, and the ant nest not a large one, projecting only about twenty inches from the limb on which it was placed. I sent up a blackfellow, and he brought down three eggs, two of which were slightly incubated, and reported there was no made nest, the eggs being simply laid on the bare substance of the ant-heap at the end of the burrow. I did not notice the male bird near the nest, but heard him calling from a mangrove island about two hundred yards away. I saw another pair nearer the coast, but though I searched on several occasions, failed to discover their breeding-place.”

The above set of eggs of *H. sordidus*, which are exhibited here to-night, are pure white and nearly round in form, one specimen (A) being slightly compressed towards one end, the surface of the shell being very smooth and nearly lustreless, and partaking less of that glossy pearly-whiteness, characteristic of the known eggs of all the other members of the Australian *Alcedinidæ*. Length, (A) 1.23 × 1.03 inch; (B) 1.2 × 1.03 inch; (C) 1.22 × 1.05 inch.*

* After the above had been sent to press, Mr. Boyd, who was in Sydney, informed me that on the 26th of December he visited the nest of *H. sordidus* again in company with a black boy, who, on climbing the tree, reported that “two fellow egg sit down.” These eggs were quite fresh, and were evidently laid by the same bird that had been robbed in October, although the burrow in the Termite nest had been roughly broken into with a tomahawk. On this occasion one bird was flushed from the nest, the other was on a tree close at hand. The eggs are similar to those previously taken, and measure as follows :—(A) 1.24 × 1.03 inch; (B) 1.27 × 1.03 inch.

II. Notes on the Nesting-place and Eggs of *Cyanoramphus rayneri*, G. R. Gray.

CYANORAMPHUS RAYNERI, the Norfolk Island Red-fronted Parrakeet.

Platycercus rayneri, G. R. Gray, Ibis, 1862, p. 228.

This Parrakeet is somewhat similar to the Red-fronted Parrakeet, *C. novæ-zealandiæ*, of New Zealand, a species which is subject to considerable variation in colour and size, of which it appears to be an insular form differing only from *C. novæ-zealandiæ* in the extent of the red band on the forehead, its larger measurements, and having a more robust bill. Sir Walter Buller, who has examined the types of several of these insular forms of *C. novæ-zealandiæ* in the British Museum, and which have been described by various authors as distinct species, while admitting and pointing out their variation in colours and size in his second edition of the Birds of New Zealand,* follows in the footsteps of Dr. Finsch in his well-known work on the *Psittaci*†, and includes the following under the synonymy of *C. novæ-zealandiæ*: *C. erythrotis*, Wagl., from Macquarie Island, *C. aucklandicus*, Bonap., from the Auckland Islands, *C. rayneri*, G. R. Gray, from Norfolk Island, and *C. cooki*, G. R. Gray, from New Zealand, Sir W. Buller separating and retaining only a smaller race of *C. novæ-zealandiæ* described by himself in the Transactions of the New Zealand Institute, Vol. vii. p. 220, 1874, under the name of *Platycercus rowleyi*.

Count Salvadori, however, in the recently issued "British Museum Catalogue," keeps all these forms separate and distinct,‡ with the exception of *C. rayneri*, of which he writes, "there is no doubt whatever as to *P. rayneri*, Gray, being the same as *C. cooki*," and has furthermore distinguished the specimens obtained

* Buller, Birds of New Zealand, 2nd Edit., p. 145 (1888).

† Finsch, Die Papag., Vol. ii. p. 273 (1868).

‡ Vol. xx. Catalogue of the Psittaci, by T. Salvadori, 1891.

by Macgillivray at Lord Howe Island during the voyage of H.M.S. "Herald" in 1853, under the name of *C. subflavescens*.

Dr. P. Herbert Metcalfe, the Resident Medical Officer on Norfolk Island, has kindly forwarded me for description two eggs of *C. rayneri*, taken from the hollow spout of a tree on the 12th of October, 1892. One egg (A) is oval in form and is equal in size at both ends; the other is a broad oval tapering somewhat to one end; they are pure white except where nest-stained, the surface of the shell being very smooth and lustreless. Length (A) 1.12 × 0.9 inch; (B) 1.08 × 0.87 inch. Last season another nest of the same species was obtained containing four eggs; they were, however, in a very advanced stage of incubation, the young birds being fully formed and nearly ready to emerge from the shell. I regret that Dr. Metcalfe did not secure the parent-birds with the eggs, but this species is well known to him, he having had five of them in confinement for several years.

In describing these eggs I provisionally retain the name of *C. rayneri*, so as to distinguish the locality they were taken from. If *C. rayneri* of Norfolk Island is the same as *C. cooki* of New Zealand, as stated by Count Salvadori, I should not be surprised to find, upon the examination of a large series of skins of the Red-fronted Parrakeet of Norfolk Island, that it is only an occasional and by no means constant variety of *C. novae-zealandiae*, not meriting even sub-specific distinction.

MODIFICATIONS OF THE *BILLETTA* OR *GNALEALING*
WOMERAH.

BY R. ETHERIDGE, JUNR.

(PALÆONTOLOGIST TO THE AUSTRALIAN MUSEUM, AND GEOLOGICAL
SURVEY OF N. S. WALES).

(Plate XI.)

The comparative study of the weapons and implements of our Aborigines reveals to the student, more and more, how intimately connected are the questions of form and local distribution; and by none is this better exemplified than the Womerahs.

We have seen how the "Lath-shaped" Womerah, for the want of a more correct name, is distributed (and perhaps confined?) in the Cape York Peninsula*; and the "Sword-like" Womerah in the Port Darwin District.† I am now able to extend the range of this weapon, thanks to information supplied by Mr. Harry Stockdale, to the Port Essington District, where it is called by the Aborigines *Orrok-orrok*.

I now purpose bringing under your notice some notes on the *Billetta* Womerah, as it is termed by the Port Essington natives, or *Gnalealing* by the Kimberley blacks, derived from examples in the Macleay Museum, to which I was obligingly given access by the Curator, Mr. G. Masters, thus showing the use of this womerah to have existed from Port Darwin to Derby and King's Sound.

In addition to general shape, the *Billetta* is chiefly distinguished by the emarginated handle at the proximal end for the reception

* Proc. Linn. Soc. N. S. Wales, 1892, vi. (2), Pt. 4, p. 699.

† Proc. Linn. Soc. N. S. Wales, 1892, vii. (2), Pt. 1, p. 170.

of the hand of the spearsman. It is a narrow, rigid, lath-like womerah, seldom exceeding three-quarters of an inch in thickness, either plain, simply coloured, or ornamented with a coloured design, and made of hard or soft wood, more usually the former. The proximal end, as before stated, is cut out for the reception of the hand, but the grasp, like that of so many other Aboriginal weapons, is much too small with comfort, for the fingers of an ordinary white. The spear when shipped lay along the flat face of the womerah, as in the *Orrok-orrok*, and not along the edge as in the "lath-shaped" weapon.

From Port Darwin there are two specimens. One is $3' 3'' \times 2'' \times \frac{1}{2}''$, made of soft wood, and is wholly stained with red ochre, although otherwise unornamented. The grasp is lashed round with native twine, and affords room for two fingers. The peg at the distal end is dog-tooth shaped, of a light coloured hard wood, and is lashed on with string and secured by gum-cement.

The second example from Port Darwin (Pl. XI. fig. 1) is $3' 3\frac{1}{2}'' \times 2'' \times \frac{1}{2}''$, and is precisely similar to the last, but highly ornate on one face of the blade only, which is again stained red. The design is a serpentine band in yellow, margined by white pipeclay dots. The string lashing at the grasp is also covered with white pipeclay, but a second lashing at the distal end is yellow. The gum-cement holding the peg in place is covered with pipeclay also. This specimen was collected by Mr. Spalding, now Taxidermist to the Queensland Museum.

The third *Billetta*, from Derby, is rough, and much shorter than the others, measuring $2' 7'' \times 2'' \times \frac{3}{4}''$. It also is of soft wood, quite unornamented or even stained, and the grasp is bound with sinews and cord and secured with gum-cement in the usual way. The peg resembles that of the preceding womerachs. It was collected by Mr. W. W. Froggatt.

The fourth and last example is from King's Sound, and quite similar to the last, except that it is a little shorter, but at the same time a trifle wider.

The *Billetta* has been figured certainly four times, but without any details, and once with an entirely erroneous locality. The

first undoubted illustration is that by the late Governor Eyre, who in his "Journals of Expeditions of Discovery into Central Australia, &c.,"* figures a *Billetta* simply with the remark, "Throwing-stick of north coast, 3 feet 1 inch." It is, however, differently ornamented to either of those in the Macleay Museum, having two zones at the proximal end, one bearing a cross and the other consisting of two double curved lines, placed back to back, diverging from one another, rather like the letter *x*. At the distal end, just in front of the peg, is a longer zone, longitudinally lined. But previous to this the late Admiral P. P. King figured† a womerah from Hanover Bay, which is apparently the present one, although the illustration *might* pass for the *Orrok-orrok*. No description is given. We next come to the late R. B. Smyth's figure.‡ This represents a plain and unornamented weapon similar to Pl. XI. fig. 2, but having a much wider double emargination for the grip. Smyth merely says "throwing-stick in common use amongst the natives of the north-west coast."

The illustration§ given by Dr. E. H. Knight is a very rough one, and ascribes the *Billetta* to South Australia, as also the *Orrok-orrok*, an assumption which is quite erroneous. This figure in no way affords any indication of colouring or ornamental design. Lastly, the *Billetta* is given by the late Edward Hardman as *Gnalealing* amongst his illustrations of Kimberley weapons,|| and states that it closely resembles the *Gurreik* of the Yarra Tribe in Victoria, but on appealing to Smyth's work as the best authority on such a question as this, one is surprised to find that there is no more resemblance between the Yarra weapon,¶ spelt *Gur-reek*, by Smyth, and that from Kimberley, than one would expect in a purely generic sense; specifically speaking, they bear no relation at all to one another.

* Svo. London, 1845, ii. pl. 6, f. 7.

† Survey of the Intertropical Coasts of Australia, &c., 1827, ii. 1st pl., f. 4.

‡ Aborigines of Victoria, 1878, i. p. 338, f. 147.

§ Study of the Savage Weapons at the Centennial Exhibition, Philadelphia, 1876. *Smithsonian Report*, 1879, p. 276, f. 117.

|| Proc. R. Irish Acad., 1888, i. (3), Pt. 1, p. 66, t. 2, f. 15, 15'.

¶ Aborigines of Victoria, 1878, i., p. 309, f. 88-93.

The distribution of these north coast Womerahs, therefore, so far as we now know them, is as follows:—

1. Lath-shaped,* mounted with *Melo*.

Cape York; Agate Creek, Gilbert River; Cape Grenville; Herbert River; Batavia River, Gulf of Carpentaria.

2. *Orrok-orrok*, or Sword Womerah.

Port Essington; Port Darwin.

3. *Billetta* or *Gnalealing*.

Port Darwin; Derby; King's Sound.

I am much indebted to Mr. C. Hedley for the accompanying drawings of the *Billetta*.

EXPLANATION OF THE FIGURES.

Fig. 1.—*Billetta* from Port Darwin showing ornamented side. The groundwork is red; the serpentine band yellow, margined with white dots. On the handle the right lines are yellow, and the dots white as before. The lashing round the double emargination white; that at the distal end in front of the peg yellow. The gum cement is also white.

Fig. 2.—*Billetta* from King's Sound, quite unornamented or stained.

The figures are greatly reduced.

* The native name of this is much needed.

DESCRIPTION OF A NEW TREE-FROG FROM NEW
SOUTH WALES.

BY G. A. BOULENGER.

(Communicated by J. J. Fletcher.)

HYLA CHLORIS.

Tongue subcircular, slightly nicked and free behind. Vomerine teeth in two small groups between the choanæ. Head broader than long; snout rounded, shorter than the diameter of the orbit; canthus rostralis obtuse; loreal region very oblique, slightly concave; nostril nearer the tip of the snout than to the eye; inter-orbital space broader than the upper eyelid; tympanum very distinct, three-fifths the diameter of the eye. Three outer fingers extensively webbed, the membrane reaching the disks of the second and fourth; no distinct rudiment of pollex; toes nearly entirely webbed; disks of fingers as large as the tympanum; subarticular tubercles moderate. Tibio-tarsal articulation reaching the tip of the snout. Upper parts finely granulate; belly and lower surface of thighs coarsely granulate; a strong fold across the chest. Green above; upper arm and throat yellow; sides of thighs purple; beneath uniform white. Male with an external gular vocal sac. From snout to vent 63 millim.

A single specimen, from Dunoon, Richmond River, collected by Mr. R. Helms, was submitted to me by Mr. J. J. Fletcher. It is closely allied to *H. gracilentæ*, Peters, but differs in the larger size, the larger eye, the obtuse canthus rostralis and oblique loreal region, the very distinct tympanum, the skin of which is free from granulations, and the absence of a white streak along the limbs and round the upper surface of the head. This frog was referred to *H. gracilentæ* by Mr. Fletcher (P.L.S.N.S.W. (2), vi. 1891, p. 263).

NOTES AND EXHIBITS.

Mr. North exhibited the eggs of *Halcyon sordidus* and *Cyanoramphus rayneri*, referred to in his paper.

Mr. Deane exhibited herbarium specimens of the ironbark and box groups of the genus *Eucalyptus*; also some specimens of timber of *E. leucoxydon* and *E. paniculata*, which, though placed close together, according to the anthereal system of classification, are so widely different in the timber they produce. Also a living specimen of a lizard (*Mococa* sp.), with a bifurcated tail.

Mr. Froggatt exhibited a spray of *Acacia undulifolia*, collected at Rylestone by Mr. R. T. Baker, the young seed pods of which were aborted into small pointed galls from the attacks of hymenopterous insects; also numerous minute chalcids bred therefrom. Also twigs of *Eucalyptus longifolia*, from Homebush, covered with a scale (*Eriococcus* sp.), together with a moth, the larva of which destroys the coccus and forms its cocoons out of the dried scales; and a small Coccinella (*Rhizobius?* sp.), the larva of which also preys on the coccus.

Mr. Palmer showed specimens of galls upon *Acacia decurrens*: also upon a Eucalypt specimens of the same species of scale-insect (*Eriococcus*) as that exhibited by Mr. Froggatt; and a number of fossils from Mt. Wellington, Tasmania.

Mr. Maiden exhibited flowering specimens of *Grevillea Barklyana*, F.v.M., from Jervis Bay, a plant new for New South Wales, hitherto recorded only from Gippsland. Also a fine specimen of a New Zealand composite popularly known as the 'Vegetable Sheep' (*Raoulia mammillaris*, Hook. f.), 41 inches in circumference, from the Alps of the Nelson district of New Zealand, at an elevation of 7000 feet. Also an essential oil from the flowers of *Cananga odorata*, the basis of the perfume Ilang-Ilang, from Samoa.

Mr. Hedley exhibited specimens of the peculiar mollusc treated of in his paper.

Mr. Trebeck exhibited a leaf-insect (*Phyllium* sp.) from Fiji.

Mr. Mitchell exhibited the fossils referred to in two notes, recently communicated to the Society, among which were specimens of the genera *Pecopteris*, *Alethopteris*, *Odontopteris*, *Teniopteris* and *Sphenopteris* from the Wianamatta Beds at Glenlee. Also *Glossopteris* and *Næggerathiopsis* from Bellambi. He also exhibited the specimen of *Glossopteris* showing supposed sori; and an Entomostrakon, near *Estheria ovata*, Jones (?), from Wianamatta Beds at Glenlee.

Mr. Rainbow exhibited specimens of an undescribed spider belonging to the genus *Arcyina* (fam. *Epäiride*) from Manly.

WEDNESDAY, DECEMBER 28TH, 1892.

Mr. Henry Deane, M.A., Vice-President, in the Chair.

Mr. Arnold U. Henn, 5 Paling's Buildings, Sydney, and the Right Hon. Lord Walsingham, M.A., F.R.S., Merton Hall, Thetford, England, were elected Members of the Society.

The Chairman made the following announcements:—

- (i.) That a Special General Meeting of Members would be held on Thursday, December 29th, at 4 p.m., in the Board Room, Public Library (by permission of the Librarian), when the New Rules passed at the Special General Meeting of 21st instant would be brought forward for confirmation, so that they may come into force from January 1st next.
- (ii.) That, subject to the confirmation of the Rules referred to, there would be a recess during the months of January and February, 1893; and that the Annual Meeting, as well as the next Ordinary Monthly Meeting, would be held on March 29th (the last Wednesday in the month), 1893.
- (iii.) That, from the plates and proof sheets laid on the table that evening, it would be seen that steady progress was being made with the Macleay Memorial Volume, so that he thought there was justification for the hope that it would be almost, perhaps quite, ready by the date of the Annual Meeting.

DONATIONS.

“Zoological Society of London—Proceedings, 1892.” Part 3 :
 “Abstract,” November 1st, 1892. *From the Society.*

“Royal Microscopical Society — Journal, 1892.” Part 5 :
 “Charter, Bye-laws, and List of Fellows, 1892.” *From the Society.*

“Morphological Laboratory, Cambridge—Studies.” Vol. v.
 Part 2 (1892). *From the Balfour Library, Cambridge.*

“Gesellschaft für Erdkunde zu Berlin—Zeitschrift.” Band
 xxvii. No. 3 (1892): “Verhandlungen.” Band xix. Nos. 6-8
 (1892). *From the Society.*

“Journal of Conchology.” Vol. vii. No. 3 (July, 1892). *From
 the Conchological Society of Great Britain and Ireland.*

“Zoologischer Anzeiger.” xv. Jahrg. Nos. 403-405 (October
 and November, 1892). *From the Editor.*

“Perak Government Gazette.”—Vol. v. Nos. 35-37 (October-
 November, 1892). *From the Government Secretary.*

“Société Belge de Microscopie—Bulletin.” Tome xviii. No. 10
 (1891-92). *From the Society.*

South Australia—“Report on Country in the Neighbourhood
 of Lake Eyre.” By H. Y. L. Brown, Government Geologist.
From the Author.

“Société d'Horticulture du Doubs, Besançon — Bulletin.”
 Nouvelle Série, No. 22 (October, 1892). *From the Society.*

“Geological Society of London—Quarterly Journal.” Vol.
 xlvi. No. 192 (November, 1892): “List of Members, &c., 1892.”
From the Society.

“American Naturalist.” Vol. xxvi. No. 311 (November, 1892).
From the Editors.

“American Geographical Society—Bulletin.” Vol. xxiv. No. 3 (September, 1892). *From the Society.*

“Smithsonian Institution—United States National Museum—Proceedings.” Vol. xv. Nos. 911-915, pp.405-480 (1892). *From the Museum.*

“Victorian Naturalist” Vol. ix. No. 8 (December, 1892). *From the Field Naturalists’ Club of Victoria.*

“Museo di Zoologia ed Anatomia comparata della R. Università di Torino—Bollettino.” Vol. vii. Nos. 127-132 (July-October, 1892). *From the Museum.*

“Société Impériale des Naturalistes de Moscou—Bulletin.” Année 1892, No. 2. *From the Society.*

“Société Géologique de Belgique—Annales.” Tome xix. 3^{me} Livraison (1891-92). *From the Society.*

“Agricultural Gazette of N.S.W.” Vol. iii. Part 11 (November, 1892). *From the Director of Agriculture.*

Pamphlet entitled—“Lejeuneæ Madagascarienses.” By W. H. Pearson (1892). *From the Author.*

“Royal Dublin Society—Transactions.”—Vol. iv. (2nd Series), Nos. 9-13 (1891): “Proceedings” Vol. vii. Parts 3-4 (1892). *From the Society.*

“Archives Néerlandaises des Sciences Exactes et Naturelles.” Tome xxvi. 3^{me} Livraison (1892). *From the Society.*

“Fortegnelse over de af det Kongelige Danske Videnskabernes Selskab i tidsrummet 1742-1891, udgivne Videnskabelige Arbejder (1892).” *From the Society.*

“Marine Biological Association of the United Kingdom—Journal.” New Series, Vol. ii. No. 4 (November, 1892). *From the Association.*

“Australasian Journal of Pharmacy.” Vol. vii. No. 84 (December, 1892). *From the Editor.*

Bentham's "Flora Hongkongensis: a Description of the Flowering Plants and Ferns of the Island of Hongkong" (1861). *From the Director, Royal Gardens, Kew.*

"Indian Museum—List of Batrachia." By W. L. Slater, M.A., F.Z.S. (1892). *From the Trustees.*

"Royal Society of Edinburgh—Transactions." Vol. xxxvi. Parts 2-3 (1890-91): "Proceedings." Vol. xviii. (1890-91). *From the Society.*

"Archiv für Naturgeschichte, 1889." ii. Band, 3 Heft ; 1892, i. Band, 3 Heft. *From the Editor.*

PAPERS READ.

OBSERVATIONS ON THE MYOLOGY OF *PALINURUS*
EDWARDSII, HUTTON.*

BY PROFESSOR T. JEFFERY PARKER, D.Sc., F.R.S., AND JOSEPHINE
GORDON RICH.

(FROM THE BIOLOGICAL LABORATORY OF THE UNIVERSITY OF
OTAGO.)

(*Communicated by Professor Haswell.*)

ON *PARMACOCHLEA FISCHERI*, SMITH.*

BY C. HEDLEY, F.L.S.

ON THE GEOGRAPHICAL RELATIONS OF THE
FLORAS OF NORFOLK AND LORD HOWE ISLANDS.*

BY PROFESSOR RALPH TATE, F.L.S., F.G.S.

* These papers will be published in the Macleay Memorial Volume.

REVISION OF THE AUSTRALIAN *AMARYGMIDES*.

BY THE REV. T. BLACKBURN, B.A., CORR. MEM.

PART. I.

THE GENUS *CHALCOPTERUS*.

In respect of number both of species and specimens this sub-family of the *Tenebrionidae* occupies a very prominent place in the Australian fauna. The great beauty and brilliant colouring of many of its types together with their large size render it likely to prove most attractive to the collector and student. And yet there is probably scarcely a group of genera in the whole of the Australian *Coleoptera* in which the proportion of named species is smaller. This is probably attributable to two causes; the one that on account of the plentiful occurrence and bright colours of many *Amarygmides* the sub-family was well to the front among the *Coleoptera* taken home to Europe by the earlier collectors and described in the brief fashion in which most of the earlier authors "knocked off" our Australian insects—often in five to ten words—so that now the student in approaching it is confronted with a formidable array of names, which are mere names and which could be reliably connected with the insects they belong to only in those cases where the original types are still extant, and by means of an exploration of all the principal museums of Europe. The other cause of the scanty work that has been done on the *Amarygmides* in later times is no doubt the fact that these insects are extremely variable in respect of colours and extremely closely allied *inter se*, so that nothing short of a very careful study of a very large collection of specimens would seem likely to lead to any satisfactory results.

In attempting, then, a systematic work on this sub-family, it appears to me inevitable to accept the certainty that the first memoir of the kind must be very imperfect and must be offered as assuredly fated to much subsequent correction, inasmuch as there are many names connected with descriptions by which it is *impossible* to identify the insects on which they were founded. Nevertheless, if the Australian *Amarygmides* are ever to be worked out satisfactorily, the first step, it appears to me, must be the issue of an imperfect memoir of the kind I have just indicated, and it is for this reason that I have thought I might make a serviceable contribution to the knowledge of our Australian fauna by gathering together as large a collection of *Amarygmides* as I could attain with the help of many obliging correspondents, and offering to the Linnean Society the present memoir, which will, I hope, enable the student without much difficulty to identify at least – (a) all the hitherto named species that have been recognisably described in memoirs scattered through many scientific publications, (b) certain species of which I have been permitted to inspect authentic types through the courtesy of Mr. Masters, Curator of the Macleay Museum, and (c) a considerable number of species to which I give new names.

It will be seen from the foregoing remarks that I confidently anticipate much eventual correction of my work, inasmuch as I have been compelled absolutely to disregard some of the earlier descriptions (especially some of those by Boisduval and Hope), and it is of course to be expected that sooner or later someone will, by examination of such types of the species of those authors as have not perished, identify with them some of the species to which I give new names. But the work cannot be done without accepting that risk; and as the readiness of my correspondents to lend or give me specimens has brought into my hands a collection of the sub-family larger probably than any other extant, and I have before me all the literature that has been published on the subject, my opportunities are probably exceptionally favourable.

I may say before passing on to a review of the work that has hitherto been done in the sub-family and the statement of my

estimate of its value in detail, that I have proceeded upon the line of regarding the re-naming of an insect that has been already described and named as much less mischievous than the assignment to a species, by a mistaken identification, of a name that really belongs to a different insect. The former error is easily corrected and will lead to nothing worse than a somewhat cumbersome synonymy; the latter is far-reaching, because it is liable to extend indefinitely into the descriptions of *other* species which the author may happen to compare with that which he has erroneously supposed to be the rightful bearer of the name he uses. In this memoir, therefore, I have not assigned an insect to a previously existing name without feeling something like *certainty* that the identification is correct,—in some instances I have passed over in silence specimens before me because I have thought it *probable*, but far short of certain, that a given name belongs to them, and I have treated as new all species that seem distinctly more likely than not (judging by published descriptions together with such inspection of types as has been possible) to be distinct from those previously named. In the tabulation of the characters of *Chalcopteri*, I have enclosed in brackets all the names concerning which I feel any doubt in connecting them with the insect on which I suppose them to have been founded.

It will be remembered that at the time when M. Lacordaire published the "Genera des Coléoptères" and made the *Amarygmides* his 45th tribe of *Tenebrionidae*, 22 names of Australian species attributable to the tribe had been published, all of which M. Lacordaire placed in the genus *Amarygmus*. The "tribe" is distinguished from other *Tenebrionidae* by the following characters in combination:—sides of the head reflexed into an ear-like process above the base of the antennæ, intermediate coxæ provided with trochantins, tarsi hairy beneath, metasternum elongate, prosternum very short in front of the coxæ, anterior femora unarmed. In this tribe (which is found in Asia, Africa, Australia, America and Polynesia) the genus *Amarygmus* was founded by M. Dalman in 1824 on an insect which its author called *Amarygmus speciosus*, whose habitat he did not know and which I believe has

not since been identified. M. Lacordaire distinguishes *Amarygmus* from the other genera of the tribe by the following characters in combination :—eyes partly hidden under the prothorax, intercoxal process of the hind body short and triangular. Two years after the issue of M. Lacordaire's work on the tribe, M. Blessig, in an admirable memoir published by the Russian Entomological Society, pointed out that some at least (he thought probably *all*) of the Australian species attributed to *Amarygmus* differed from some at least of the species occurring in Java, &c., by their mandibles being widely and evenly truncate at the apex (instead of bifid), and he proposed for these species with the mandibles widely truncate the new name *Chalcopterus*, at the same time describing four Victorian species as new and appertaining to his new genus. Since that time no author (except myself) has attributed any more species to *Chalcopterus*; but as *Amarygmi* there have been published, in various periodicals, 21 new species by Mr. Pascoe, 11 by Sir W. Macleay, 1 by Haag-Rutenberg, and by myself 3, together with 4 *Chalcopteri*. In 1870 Mr. Pascoe published (Ann. Nat. Hist. p. 106) a diagnosis of a new genus (*Eurypera*) near *Amarygmus*: the diagnosis, however, is utterly insufficient (as defective as anything Boisduval ever did), stating that the new genus differs from *Amarygmus*, only by its "shorter and more convex body." Until something further is forthcoming regarding this genus I decline to recognise it and shall treat it as non-existent. As I have seen no species resembling *Amarygmus* which agrees with Mr. Pascoe's description of his type of *Eurypera*, I have no means of supplementing his diagnosis.

As I have already remarked (P.L.S.N.S.W, 1888, p. 1434), among the Australian species attributed to *Amarygmus* there are some whose mandibles are bifid at the apex. Whether these are really congeneric with *Amarygmus speciosus*, Dalm., or not is at present incapable of determination, I believe. Indeed, unless I am mistaken, the form of the mandibles in *A. speciosus* itself is uncertain, and it is quite possible that it may be an Australian species with truncate mandibles, in which case M. Blessig's name

Chalcopterus would be a synonym of *Amarygmus*, and a new name would be required for the *Amarygmi* (so-called) with bifid mandibles. Nevertheless, until further evidence is forthcoming, if M. Blessig's separation from *Amarygmus* of those species which differ in the form of their mandibles from *A. speciosus* is to be accepted (and I think it ought to be), M. Blessig's claim of Dalman's name for the species with bifid mandibles seems decisive, and therefore those species of the old genus *Amarygmus* which have mandibles widely and evenly truncate at the apex ought to be relegated to *Chalcopterus*.

. For me, therefore, the Australian *Amarygmides* hitherto named all belong to two genera, distinguished thus:—

- A. Apex of mandibles bifid *Amarygmus*.
 A.A. Apex of mandibles widely and evenly truncate *Chalcopterus*.

I am surprised that all the authors subsequent to M. Blessig have disregarded the form of the mandibles (Sir W. Macleay, however, implies, P.L.S.N.S.W. 1887, p. 550, that he had not seen M. Blessig's memoir), especially as Mr. Pascoe (Ann. Nat. Hist. 1869) actually mentions Blessig's remarks on it; for even if it were to be inferred that they regarded the character as too trivial to be treated as generic, it certainly cannot be questioned that it is most valuable for subdividing an aggregate of insects in which sharply defined differences are none too plentiful, and there are few specimens in which the mandibles are so hidden that there is the least difficulty in discerning their form. In the *Chalcopteri* the exposed surface of the mandibles (supposing them to be in contact with each other in repose) is evenly convex in the apical portion, the apex itself being quite straightly truncate, while in *Amarygmus* the surface is traversed from base to apex by a deep sharply defined sulcus, the impression of which at the apex interrupts the continuousness of its truncation.

Turning to the species named up to the present time, we are encountered by the principal difficulty in dealing with the revision of the *Amarygmides*. The number of names that have been used is 67. Of these I am able to say confidently that 11 have

mandibles bifid at the apex, viz. *convexus*, Pasc., *exilis*, Pasc., *foveolatus*, Macl., *striatus*, Macl., *torridus*, Pasc., *tyrrhenus*, Pasc., *variolaris*, Pasc., *tardus*, Blackb., *uniformis*, Blackb., *diaperioides*, Blackb., and (although my identification of this is possibly open to doubt) *pivicornis*, Hope. This leaves 56 which probably appertain to *Chalcopterus* so far as I have been able to ascertain. Of these 56 there are 10 which I feel confident that I have not seen, viz., *convexusculus*, Macl., *cupido*, Pasc., *cupricollis*, Hope, *ellipsoides*, Pasc., *indigaceus*, Pasc., *minutus*, Pasc., *pusillus*, Pasc., *semisus*, Pasc., *sulcipennis*, Hope, *tarsalis*, Pasc. Of the following 7 I have examples of whose identification I feel considerable doubt; but I am confident that if my identification of them is not correct I have not seen the species, viz., *cupreus*, Fab., *grandis*, Macl., *maurulus*, Pasc., *obtusus*, Pasc., *obsoletus*, Macl., *vinosus*, Pasc., *semiticus*, Pasc. Of the remaining 38 species 9 are, I have little doubt, synonyms, viz., *caelestis*, Pasc., and *lavicollis*, Blessig = *cyanipennis*, Hope; *venereus*, Gmel. = *cupreus*, Fab.; *purpureus*, Germ. = *anthracinus*, Hope; *rugosus*, Germ. = *sulcipennis*, Hope; *Howitti*, Pasc., and *affinis*, Blessig = *cupripennis*, Hope; *ruyipes*, Macl. = *nigritarsis*, Pasc.; *triangularis*, Haag-Rut. = *semiticus*, Pasc. The following six I am obliged to disregard as being described in such fashion that it is impossible to form any opinion concerning them, viz., *resplendens*, Boisd., *puncticollis*, Hope, *smaragdulus*, Fab., *tristis*, Fab., *velutinus*, Macl., *viridicollis*, Macl. The following two identifications may be regarded as *probable*, viz., *bicolor*, Fab., and *columbinus*, Boisd., with *cupripennis*, Hope, and *cyanipennis*, Hope, in which case Hope's names will become synonyms. Thus there are 22 names that I regard as representing good species known to me and belonging to *Chalcopterus*, 17 (among which are probably a few that do not belong to *Chalcopterus*) that I have identified doubtfully or not at all, but all of which are likely to be good species, and 17 that are either mere names of practically undescribed insects or else, probably, synonyms.

It will be well to remark that in identifying Hope's, Germar's, and Blessig's species, I have possessed the advantage of a personal

knowledge of the fauna of the localities in which the types were collected. Even with this assistance I have not been able to identify all the species of the former two of those authors.

Beginning with Germar,—*fervens* is unmistakable, as it is mainly characterised by its undersurface being brilliantly iridescent (a very rare character in *Chalcopterus*), and a species presenting this character occurs somewhat commonly all over S. Australia, and agrees very well with the description of *fervens* in all respects. Germar describes *purpureus* as having its elytra "*tenuiter striato-punctatis*," its puncturation less fine than that of *fervens*, and its upper surface (except the head) entirely variegated with metallic colours; these are fairly definite characters, and as there is a species (and only one) known to me (it is common all over S. Australia) found in the habitat of Germar's insects presenting these characters I feel no doubt about this identification. Germar describes *fastuosus* as distinguished by the unusual characters of the seriate puncturation of the elytra being somewhat obsolete and the puncturation of the prothorax stronger than in its allies and crowded near the lateral margins, characters that are combined in one, and one only, of the species before me that occur (and it, too, occurs commonly) in the locality where Germar's species were collected. The above three species also agree in size, &c., with the other characters as stated by Germar under the names mentioned. The other of Germar's names (*rugosus*) its author assigns to a species which he describes as having the prothorax black, the elytra "*rugosely striate*," and the interstices transversely rugulose; I have seen no *Amarygmid* to which this description would apply, unless it be a remarkable form in my collection that I am disposed to regard as a monstrosity and to refer to *C. polychromus*, Pasc., with which it seems absolutely identical in every respect, except that the elytra are sculptured in a fashion quite unlike that of any other *Amarygmid* that I have seen. I have met with another example with this same peculiarity present in a much feebler degree. Unless it be the case that the descriptions of *Amarygmus rugosus*, Germ., (and *A. sulcipennis*, Hope, which Germar thought likely to be the

same species), are founded on the above-mentioned insect, I am convinced that I have not seen it.

Passing to Mr. Hope's species, they are six in number (besides *sulcipennis* already referred to). Of these *cupripennis* is, I think, quite unmistakable, the commonest of all the *Amarygmids* in Southern Australia agreeing well with Mr. Hope's brief description. *C. anthracinus* is no doubt a variety, as I have not seen any S. Australian *Amarygmid* which is habitually of uniform black colour; I have, however, met rarely with black examples of *C. purpureus*, Germ., (as well as of several other species), and as Mr. Hope says that the elytra are striate in *C. anthracinum*, I believe it to be this black var. of *purpureus*; the name, however, is so inappropriate to an insect of which 99 out of every hundred specimens are brilliant with metallic colours that it would be a matter of regret if the identification were established finally and Hope's name had to take precedence. The identity of *C. picicornis* could hardly be determined on the description alone, which would fit a good many species, but as I have seen only one occurring near Adelaide that it agrees with, I think that one is probably the true *picicornis*; it has bifid mandibles and therefore must not be referred to *Chalcopterus*. *C. longipennis* I have discussed below in re-describing the insect to which I believe the name to refer. As regards *C. cyanipennis*, a species widely distributed (but I believe not common) in Southern Australia fits the description very well, and I regard its identification as quite satisfactory. *C. cupricollis* is from an island off the north coast of Australia, and I have seen nothing that fits the description. Regarding *C. puncticollis* I am quite at a loss, as I know nothing (apart from the insects already referred to) that agrees with the description; the only suggestion I can make is that it may be a variety of *purpureus*, Germ., in which case Hope's name would take precedence.

M. Blessig's species are all well described and, I think, quite recognisable; *C. iridicolor* is a very well marked insect; *C. variabilis* may possibly be identical with one of Boisduval's species; *C. affinis*, I think there is hardly a doubt, is a variety

of *C. cupripennis*, Hope, to which M. Blessig says it is "extremely close" (I have specimens from Melbourne agreeing with the description of *affinis* which are certainly vars. of *cupripennis*); *C. levicollis* I have no doubt is identical with *cyanipennis*, Hope, from which M. Blessig says he can only distinguish it by its being, according to Hope's measurement, a less slender insect.

As regards the species described by Fabricius, it is unfortunate that we do not know their exact habitats. In the case of one of them (*tristis*), it seems doubtful whether the habitat is in Australia. The types of the others are said to have been in Sir Joseph Banks' collection, from which it may be inferred that they were collected by Captain Cook's expedition. The descriptions are too brief in most cases for certain identification, *amethystinus* (owing to its remarkable colouring) being alone capable of confident recognition; *Erotylus cupreus* is very likely to be identical with a large *Chalcopterus* from N. Queensland that Mr. French has sent me, and it is probable that *Cnodulon bicolor* is the same species as *Chalcopterus (Cnodulon) cupripennis*, Hope. The other species of Fabricius (*Helops smaragdulus*) I cannot recognise in any *Amarygmid* that I have seen.

Fortunately M. Boisduval described only two species. The description of one of them (*Amarygmus columbinus*), consisting of exactly ten words, reads much as if it were founded on the same insect as *Chalcopterus (Cnodulon) cyanipennis*, Hope; that of the other (*A. resplendens*) consists of thirteen words, and does not suggest any particular species to my mind; though reasoning from *probability* (of locality, &c.) would perhaps indicate *vinosus*, Pasc., as likely to be the subject of the description, and I do not know that there is anything among Boisduval's thirteen words altogether irreconcilable with that supposition; but unless—and until—the types can be examined, Boisduval's *Amarygmides* ought to be treated as non-existent.

The two descriptions by Mr. W. S. Macleay in "King's Survey" are not recognisable.

In respect of the species published since 1861—by Mr. Pascoe, Sir William Macleay, and myself—the difficulties are not so great

as those concerning the earlier descriptions. Here Mr. Masters has come to my help with great kindness and has lent me specimens which he knows to be identical with many of those on which descriptions were founded.

In this first instalment of the present memoir I offer to the Society descriptions of a number of new species of *Chalcopterus*. In the second and concluding instalment I hope to supply a tabular statement of the distinctive characters of these new species and of most of the species previously described, together with a revision of the much less numerous species of *Amarygmus*.

CHALCOPTERUS CLYPEALIS, sp. nov.

♂ Sat ovalis; sat convexus; minus nitidus; niger, elytris obscure viridibus haud versicoloribus, epipleuris purpureomicantibus; capite sat fortiter punctulato fronte media lævi, clypei parte ante canthos oculares postice fortiter emarginata; oculis quam antennarum articuli basalis longitudine multo magis remotis; sulcis ocularibus nullis; antennis corporis dimidio parum brevioribus, apicem versus sat incrassatis, articulo 3^o quam 1^{us} 2^{us}que conjuncti sat longiori quam 4^{us} 5^{us}que conjuncti parum breviori, articulis 8-10 quam latioribus haud duplo longioribus; prothorace quam longiori (et postice quam antice) vix duplo latiori, modice convexo, antice bisinuatim leviter emarginato, a basi anterius sat æqualiter sat arcuatim angustato, sparsim obsolete vix subtiliter punctulato, basi arcuatim bisinuatim, angulis anticis obtusis; elytris subtiliter seriatim punctulatis (seriebus postice vix obsolescentibus, latera versus paullo magis fortiter impressis), interstitiis planis quam series (seriebus lateralibus exceptis) parum minus fortiter punctulatis; prosterno haud sulcato; metasterno nitido subtiliter punctulato, episternis opacis sparsim subtilissime vel vix manifeste punctulatis; abdomine nitido minus subtiliter punctulato et sat fortiter longitudinaliter rugato; femoribus anticis antice subtiliter sat sparsim punctulatis, tarsi subtus breviter nigro-setosis. [Long. 5 $\frac{1}{3}$, lat. 2 $\frac{1}{3}$ lines.

This species is extremely like some varieties of *C. cupripennis*, Hope, and may possibly prove to be itself a variety of that insect. It differs, however, from all the examples I have seen that I can refer to *cupripennis* in two characters that seem to be important, viz., the structure of the head and the sculpture of the elytra. In *cupripennis* (and in most *Chalcopteri*) the forehead is divided from the clypeus by a fine suture which passes (arched slightly hindward) immediately in front of the antennal tubers, in front of which stands the clypeus appearing from its convexity to be a little tumid; in *clypeatus*, however, the space immediately in front of the clypeal suture is a flat continuation of the plane of the clypeus, which space is strongly arched forward in front, and in front of it the clypeus becomes suddenly tumid with its hinder side deeply concave where the flattened space mentioned above cuts into it. As regards the sculpture of the elytra, I have not seen among the examples I refer to *cupripennis* any in which the punctures of the longitudinal series and those of the interstices are so nearly alike as they are in this insect, especially near the suture where the punctures of the series are scarcely distinct from those of the interstices; whereas in *cupripennis* (although the seriate and interstitial punctures are undoubtedly less distinct from each other than in the majority of *Chalcopteri*) even the series nearest the suture is perfectly apparent to a casual glance.

The shape of this species is different from that of most of its congeners, though agreeing with that of *C. cupripennis* and several others. If it be looked at from the side it will be seen that the highest point in the curve which forms the upper outline is exceptionally near to the base of the elytra, so that the posterior declivity is very gradual indeed, and begins far in front of the middle. The puncturation of the prothorax is very faintly impressed and not close, but it is not particularly fine as compared with that of some *Chalcopteri*.

S. Australia; near Adelaide.

C. SIMIUS, sp. nov.

Late ovalis, fortiter convexus; minus nitidus; niger, elytris rubro-cupreis; capite (hoc haud canaliculato) oculis antennis

(harum articulo 3^o manifeste longiori) prothoraceque fere ut *C. cupripennis*, Hope; elytrorum quam *C. cupripennis* seriebus minus fortiter punctulatis, interstitiis magis fortiter punctulatis; cetera ut *C. cupripennis*.

[Long. 6, lat. 3 $\frac{3}{8}$ lines.

Very like *C. cupripennis* in many respects, but differing much in shape, being very wide with strongly rounded sides and very convex. Viewed from the side the outline curve of the elytra is very strong, so that the elytra seem to be strongly gibbous behind the base (as in *C. semiticus*, Pasc.). There is very little difference between the seriate punctures of the elytra and those of the interstices, so that the former are very inconspicuous. This species may be at once separated from *C. semiticus*, *inter alia*, by its widely separated eyes and much more strongly punctured elytral interstices.

N. Queensland.

C. CUPRIPENNIS, Hope.

Sat late ovalis; sat nitidus; niger, elytris cupreo-eneis; capite minus crebre subtiliter (spatio inter oculos levigato excepto) punctulato, in medio longitudinaliter plus minusve perspicue canaliculato; oculis quam antennarum articuli basalis longitudine multo magis inter se remotis; sulcis ocularibus nullis; antennis apicem versus manifeste incrassatis, quam corporis dimidium paullo (σ) vel sat multo (φ) brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti paullo longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam praeedentes paullo brevioribus; prothorace quam longiori fere duplo (postice quam antice tribus partibus) latiori, leviter minus crebre nec subtilissime punctulato, antice sat fortiter bisinuato, a basi antrorsum arcuatim angustato, basi media sat late sublobata, angulis anticis obtusis posticis (superne visis) subacutis; elytris sat subtiliter seriatim punctulatis, interstitiis planis, sat crebre subtiliter leviter (φ) vel minus leviter (σ) punctulatis; prosterno medio plus minusve distincte carinato; metasterno in medio sat crebre sat

subtiliter, latera versus minus crebre, in episternis (his subopacis) subtilissime minus perspicue, punctulato; abdomine minus sparsim minus subtiliter punctulato et sat fortiter rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali quam ceteri conjuncti parum breviori.

[Long. $5-6\frac{1}{2}$, lat. $3-3\frac{1}{2}$ lines.

The head is very nitid, and is impressed with a fine more or less distinct line down the middle, for some distance on either side of which the surface is lævigata; the rest of the head is finely but very distinctly punctured, the punctures tending to become stronger and less close from the front of the clypeus hindward. The space between the eyes is about $\frac{2}{3}$ of a line wide. The puncturation of the prothorax is faintly impressed and therefore not at all conspicuous, but is not so *fine* as in many species in which it is more conspicuous. The surface of the prothorax is not less nitid than that of the elytra. The seriate punctures of the elytra are finer than in most *Chalcopteri*, being in fact so little larger than the punctures of the interstices (especially in the male) as to appear somewhat *indistinct*. They are generally slightly more closely placed in the series in the ♀ than in the ♂. In (say) the middle part of the 4th series from the suture there are in a length equal to the width of an interstice about four punctures in the male and about (or scarcely) five in the female. The interstices are absolutely flat throughout. The antennæ scarcely differ sexually, but the general form being distinctly more elongate in the female, the antennæ in that sex are shorter in comparison of the total length. I do not know any species of *Chalcopterus* in which the eyes are more widely separated.

The above is a description of the ordinary form of *cupripennis*, which occurs abundantly all over Southern Australia. It is an exceedingly variable species however in respect of the colour of the elytra, special colouring appearing to predominate in certain localities. Examples from the interior of S. Australia (Port Augusta, &c.) usually have blue elytra with purplish reflections,

but I can find no other difference. From various localities in Victoria and S. Australia I have seen examples with dark green elytra which are somewhat less nitid (I take this to be *affinis*, Blessig). From Western Australia I have a specimen with the elytra bright green and very nitid; as this form is a trifle more elongate and less convex (the summit of the outline curve of the elytra viewed from the side being scarcely in front of the middle) it is possible that it represents a distinct species. Examples from the Victorian Alps are of the typical form. Queensland specimens have elytra inclining to *reddish*-copper colour, but do not seem to differ otherwise. *Amarygmus Howitti*, Pasc., seems to be the typical form. Specimens from the Fraser Range (taken by the Elder Exploring Expedition) differ from the type only in having their elytra of a purplish tone.

C. VERSICOLOR, sp. nov.

Ovalis; subelongatus; nitidus; niger, capite prothoraceque viridi aureo purpureoque (elytris aureo purpureoque) micantibus; capite crebre sat fortiter punctulato (parte media inter antennis levi excepta), oculis quam antennarum articuli basalis longitudine paullo magis remotis; sulcis ocularibus nullis; antennis corporis dimidio sat brevioribus sat robustis, articulo 3^o quam 1^{us} 2^{us}que conjuncti paullo longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes paullo brevioribus; fronte æquali: prothorace quam longiori plus quam tribus partibus (postice quam antice ut 5 ad 3) latiori, sat crebre sat profunde (nihilominus sat subtiliter) punctulato, antice sat profunde emarginato, a basi antrosum arcuatim angustato, basi leviter bisinuata, angulis anticis distinctis subprominulis posticis obtusis; elytris æqualiter sat subtiliter seriatim punctulatis, interstitiis planis crebre distincte punctulatis: prosterno late concavo (parte concava in medio plus minusve elevata); metasterno episternisque nitidis subfortiter nec crebre punctulatis, illo oblique strigato; abdomine sat fortiter punctulato et longi-

tudinaliter strigato; femoribus anticis antice sparsim minus perspicue punctulatis; tarsis subtus nigro-setosis.

[Long. $5\frac{1}{5}$ - $6\frac{1}{2}$, lat. $2\frac{1}{5}$ - $3\frac{1}{2}$ lines.

The extension of the metallic colouring to the head (which seems constant) is an unusual character. The combination of eyes widely separated (not much less widely than in *C. cupripennis*) and the prothorax with its front margin not less than $\frac{3}{5}$ as wide as the base places this species among a group of very limited number. In that group the metallic head, non-striate elytra, comparatively large size, will distinguish the present species. The sculpture of the prosternum seems variable—indeed I find it an unsatisfactory character in most of the *Chalcopteri*: in this species the prosternum is widely concave down the middle (at any rate in the front part), but the middle of this sulcus is more or less convex, so that a kind of keel runs along it which in some examples is little noticeable and in others almost fills up the concavity. The sculpture of the elytra is almost exactly as in *C. cupripennis*. The elytral outline viewed from the side is an even gentle curve with its summit at (or almost behind) the middle.

S. Australia; basin of Lake Eyre.

C. TINCTUS, sp.nov.

Ovalis; nitidus; convexus; niger, prothorace elytrisque versicoloribus, cyaneo- et purpureo-micantibus; capite (parte media inter antennis levi excepta) crebre sat fortiter punctulato; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis; sulcis ocularibus nullis; antennis quam corporis dimidium vix (σ) vel sat manifeste (ρ) brevioribus, 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 8-11 quam præcedentes manifeste brevioribus; prothorace quam longiori (et postice quam antice) fere duplo latiori, sat crebre sat profunde nihilominus sat subtiliter) punctulato, antice sat fortiter bisinuato, a basi antrorsum arcuatim angustato, basi media sat late sublobata, angulis anticis obtusis posticis fere rectis; elytris subtiliter

(latera versus paullo minus subtiliter) seriatim punctulatis, interstitiis planis sparsim (σ) vel minus sparsim (φ) distincte punctulatis; prosterno medio sulcato; metasterno in medio et in episternis sat crebre, in parte intermedia sparsim, punctulato; abdomine crebre punctulato et rugato; femoribus anticis antice perspicue sat crebre punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali ceteris conjunctis longitudine aequali. [Long. $5\frac{1}{2}$, lat. $3\text{-}4\frac{1}{2}$ lines.

This species bears considerable general resemblance to *C. polychromus*, Pasc., but is of more robust build, with the eyes much less widely separated from each other, the seriate punctures of the elytra clearly traceable quite to the base, &c. Compared with *C. cupripennis*, the interval between the eyes is only about half as wide, the antennæ are more slender and filiform, the prothorax is a little less transverse, the sculpture of the elytra is not much different, the legs (and especially the tarsi) are much more elongate, and the colour of the prothorax and elytra in all the examples I have seen is bright purple changing in certain lights to cyaneous. The outline curve of the elytra viewed from the side is rather strong, with its summit at about the middle of its length. There are about four punctures (in the elytral series exclusive of the nearest two to the suture) in a length equal to the width of an interstice.

S. Australia.

C. DIFFICILIS, sp. nov.

Ovalis; subelongatus; nitidus; niger, elytris viridi-aureo- et purpureo-versicoloribus; capite aqualiter distincte punctulato; oculis quam antennarum articuli basalis longitudine paullo magis inter se remotis; sulcis ocularibus fere nullis; antennis (φ ?) quam corporis dimidium multo brevioribus, apicem versus paullo incrassatis, articulo 3^o quam 1^{us} 2^{us} que conjuncti haud longiori quam 4^{us} 5^{us} que conjuncti parum breviori, articulis 8-10 quam præcedentes vix brevioribus; prothorace quam longiori (et postice quam antice) fere duplo

latiori, sat crebre minus subtiliter nec profunde punctulato, antice bisinuato, a basi antrorsum (superne viso) arcuatim angustato, basi media sublobata, angulis anticis obtusis posticis (superne visis) subacutis; elytris subtiliter (fere ut *C. cupripennis*) seriatim punctulatis, interstitiis planis (quam *cupripennis* magis) subtiliter sparsius punctulatis; prosterno medio carinato; metasterno et episternis sparsim subtilissime punctulatis, illo ad latera oblique rugato; abdomine fere ut metasternum punctulato et distincte rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus nigrosetosis, posticorum articulo basali ceteris conjunctis multo brevioribus. [Long. $5\frac{1}{2}$, lat. $2\frac{4}{5}$ lines.

This is a somewhat difficult species to place in my tabulation, owing to its having slight (but only slight) indications of ocular sulci and elytral interstices punctured somewhat less strongly than in the allies of *cupripennis*, but decidedly more strongly than in *letus*, so that it appears somewhat intermediate; the sides of its prothorax, moreover, viewed from above, are less strongly arcuate than in most species in which the form of the prothorax is what I have called "normal," so that it tends a little towards the group with their prothorax trapezoidal. In colouring and puncturation of the prothorax and elytral series it resembles a very bright specimen of *C. cupripennis* but its head is evenly punctured, its prothorax more narrowed in front, its eyes more approximate, its antennæ shorter, its elytral interstices more finely punctured, and the basal joint of its hind tarsi much shorter. It also resembles *fervens*, Germ., but differs from that species *inter alia* by its black head, prothorax and undersurface, its more approximate eyes, much shorter antennæ, and the much shorter basal joint of its hind tarsi. The outline curve of its elytra (viewed from the side) is moderately strong, with its summit a little in front of the middle. It is not at all like *C. rugosipennis*, Macl., next to which the exigencies of tabulation require it to be placed.

S. Australia; McDonnell Ranges; sent by C. French, Esq.

C. LÆTUS, sp.nov.

Ovalis; subelongatus; nitidissimus; niger, capite obscure cupreo prothorace minus nitido cyaneo, elytris splendide viridi-aureo et purpureo-iridescentibus; capite crebre æqualiter punctulato; oculis subapproximatis quam antennarum articuli basalis longitudine fere minus inter se remotis; sulcis ocularibus nullis; antennis quam corporis dimidium sat brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti sat breviori, articulis 8-10 quam præcedentes parum brevioribus; prothorace quam longiori (et postice quam antice) fere duplo latiori, sparsim obsolete vix manifeste punctulato, antice sat fortiter bisinuato, a basi antrorsum (superne viso) æqualiter arcuatim angustato, basi bisinuata, angulis anticis obtusis; elytris sat subtiliter fere ut *C. cupripennis* sed multo minus crebre) seriatim punctulatis, seriebus suturam versus et postice magis subtilibus, interstitiis planis sparsim subtilissime vix perspicue punctulatis; prosterno medio concavo; metasterno subtilissime punctulato et oblique leviter rugato, episternis minus nitidis obsolete punctulatis; abdomine sparsim sat subtiliter punctulato et longitudinaliter rugato; femoribus anticis sparsim subtilissime punctulatis; tarsis subtus nigrosetosis, posticorum articulo basali ceteris conjunctis (unguiculis exceptis) sat æquali. [Long. 6, lat. 3½ lines.

A somewhat longer and less robust species than *C. cupripennis*, with its elytral outline (viewed from the side) moderately arched, the summit of the arch rather behind the middle. The elytral series of punctures are exceptionally conspicuous owing to their individual punctures not being crowded together, and the interstices being so finely punctulate as to appear lævigata unless under a very strong lens. The elytra of this species are among the most nitid and brilliantly iridescent in the genus.

Two examples in my collection, said to be from N. S. Wales, must certainly, I think, be attributed to this species; their

elytral interstices are a trifle more strongly punctulate, but I can find no other distinction whatever.

S. W. Australia.

C. JUVENIS, sp.nov.

♂ (?). Elongato-ovalis ; sat convexus ; nitidus ; niger, prothorace elytrisque cyaneis purpureo-micantibus ; capite sat fortiter sat æqualiter punctulato, vertice breviter longitudinaliter sulcato (sulci fundo lævi) ; oculis quam antennarum articuli basalis longitudine paullo magis remotis ; sulcis ocularibus nullis ; antennis corporis dimidio parum brevioribus, apicem versus parum incrassatis, articulo 3^o quam 1^{us} 2^{us}que conjuncti manifeste longiori quam 4^{us} 5^{us}que conjuncti sat breviori, articulis 8-10 quam præcedentes paullo brevioribus parum latoribus ; prothorace quam longiori (et postice quam antice) tribus partibus latiori, minus sparsim minus subtiliter punctulato, cetera ut *C. clypealis* ; elytris seriatim (suturam versus subtilius, latera versus magis fortiter, apicem versus vix minus fortiter) punctulatis, interstitiis planis sparsim subtilissime punctulatis ; prosterno haud sulcato ; metasterno fere lævi, episternis sparsim subtilissime punctulatis ; abdomine sparsim subtiliter punctulato et longitudinaliter rugato ; pedibus ut *C. clypealis*. [Long. 5, lat. 2½ lines.

Compared with *C. cupripennis*, Hope, this species is narrower and more parallel, its antennæ less thickened towards the apex, and having the third joint proportionally a little shorter, the prothorax less transverse, more strongly punctured and brightly coloured, the elytral seriate punctures a little stronger and not quite so closely placed (appearing very much more distinct owing to the interstices being almost kevigate), the eyes not quite so remote, no kevigate space between the eyes on the front part of the forehead, the vertex (in the typical example) with a short distinct kevigate sulcus, &c.

S. Australia ; Morgan.

C. CARUS, sp.nov.

♀ (?). Elongato-ovalis; nitidus; niger, prothorace elytrisque læte cyaneis, purpureo-micantibus; capite minus crebre subfortiter punctulato; oculis quam antennarum articuli basalis longitudine magis inter se remotis; sulcis ocularibus nullis; antennis apicem versus manifeste incrassatis, quam corporis dimidium sat brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes paullo brevioribus; prothorace quam longiori (et postice quam antice) vix duabus partibus latiori, sparsim obsolete punctulato, antice sat fortiter bisinuato, a basi antrorsum sat arcuatim angustato, basi media sat late sublobata, angulis anticis distinctis vix subacutis posticis obtusis: elytris sat subtiliter seriatim punctulatis, interstitiis planis vix perspicue punctulatis; prosterno medio sulcato; metasterno (episternis inclusis) sparsim subtilissime punctulato; abdomine rugato et sat subtiliter punctulato; femoribus anticis antice sparsim sat subtiliter punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali quam ceteri conjuncti fere longiori.

[Long. 4½, lat. 2½ lines.

This species is difficult to place under the system I have adopted in tabulating the *Chalcopteri*, as the width of its prothorax in front is just about $\frac{2}{3}$ of the width at the base. Such difficulties are inevitable in any tabulation of a large number of closely allied forms. I have decided to place this species among those with the prothorax less narrowed anteriorly. If it were placed among those with the prothorax anteriorly *more* narrowed it would stand beside *C. modestus*, which has eyes much less distant from each other and the punctures of the lateral series on the elytra much larger.

Compared with *C. cupripennis* the present insect has eyes a little less widely separated, prothorax less transverse, seriate punctures of elytra not much different, interstices much less punctured (all but impunctate), basal joint of hind tarsi more

elongate, &c., &c. The colour of the head and prothorax in the typical example is a uniform bright blue in some lights, changing to purplish from certain points of view.

W. Australia; Eucla district.

C. SPARSUS, sp.nov.

♂. Sat late ovalis, postice sat acuminatus; sat convexus; sat nitidus; niger elytris roseo-cupreis (exemplorum nonnullorum certo adspectu viridi-micantibus); capite æqualiter crebre subfortiter punctulato; oculis inter se sat approximatis; sulcis ocularibus nullis; antennis corporis dimidio parum brevioribus, apicem versus vix incrassatis, articulo 3^o quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti multo breviori, articulis 8-10 quam præcedentes parum brevioribus; prothorace quam longiori (et postice quam antice) duplo latiori, modice convexo, antice leviter bisinuatim emarginato, a basi antrorsum sat æqualiter sat arcuatim angustato, sat opaco, vix perspicue punctulato, basi media anguste sublobata, angulis anticis obtusis; elytris subtiliter (fere ut *C. cupripennis*) seriatim punctulatis (serierum lateralium puncturis paullo magis fortiter impressis), interstitiis planis sparsim subtilissime punctulatis; prosterno medio sulcato; metasterno sat nitido sublævi, episternis minus nitidis vix distincte punctulatis; abdomine vix manifeste punctulato obscure longitudinaliter strigato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus breviter nigro-setosis. [Long. 5½-6½, lat. 3-3½ lines.

Resembles *C. cupripennis* in colouring—also in shape, but having the elytra even more strongly convex longitudinally (*i.e.*, as viewed from the side). The seriate punctures of the elytra are not in reality much stronger than in *cupripennis*, but the absence of distinct puncturation on the interstices makes them appear infinitely more distinct than they do in *cupripennis*, where they are much obscured by the conspicuousness of the puncturation of the interstices. The eyes are very much less separated than those of *cupripennis*.

N. Territory of S. Australia.

C. MODESTUS, sp.nov.

♀ (?). Sat late ovalis; minus nitidus; niger, vix picescens, elytris purpureis, cyaneo-micantibus; capite crebre sat æqualiter minus subtiliter punctulato, oculis quam antennarum articuli basalis longitudine fere minus inter se remotis; sulcis ocularibus nullis; antennis corporis dimidio vix longioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes vix brevioribus; prothorace quam longiori (et postice quam antice) duplo latiori, sat opaco, obsolete vix crebre punctulato, antice bisinuato, a basi antrorsum (superne viso) æqualiter arcuatim angustato, basi bisinuata, angulis anticis obtusis; elytris fortiter seriatim punctulatis, puncturis in seriebus minus crebre positis a serierum lateralium parte mediana antrorsum retrorsum et suturam versus gradatim magis subtilibus, interstitiis planis leviter vix perspicue nec crebre punctulatis; prosterno medio leviter concavo; metasterno medio subtiliter, episternis vix perspicue, punctulatis; abdomine vix perspicue punctulato leviter longitudinaliter rugato; femoribus anticis sparsim subtilissime punctulatis; tarsis subtus nigro-setosis, posteriorum articulo basali ceteris conjunctis (unguiculis exceptis) fere longiori.

[Long. 3 $\frac{1}{2}$, lat. 2 $\frac{1}{2}$ lines.

A very distinct species. The punctures in the middle of the lateral series (where two each in adjoining series form the corners of a square) are much larger than any on the elytra of *C. cupripennis*, but they are gradually smaller in all directions, so that the punctures near the base, the apex, and the suture are about the same size as those of *cupripennis*, and as they become smaller they are more closely placed. The space between the eyes is very much narrower than in *C. cupripennis*.

N. Queensland; also Thursday Island; sent by C. French, Esq.

C. VIGILANS, sp.nov.

Ovalis, subelongatus; minus nitidus; niger, exempli typici prothorace cyaneo-micanti elytris violaceo-purpureis (his ad

latera viridi-micantibus); capite sat crebre sat æqualiter distincte punctulato; oculis magnis approximatis quam antennarum articuli 2ⁱ longitudine haud magis inter se remotis; sulcis ocularibus nullis; antennis (exempli typici) carentibus, articulis basalibus 2 exceptis; prothorace quam longiori (et postice quam antice) vix duplo latiori, leviter subtiliter punctulato, antice sat fortiter bisinuato, a basi antrorsum æqualiter arcuatim angustato, basi bisinuata, angulis anticis obtusis; elytris subtiliter (quam *C. cupripennis* paullo magis subtiliter) sat crebre seriatim punctulatis, seriebus apicem versus obsolescentibus, interstitiis sparsim subtilissime vix perspicue punctulatis; prosterno (exempli typici) leviter canaliculato; metasterno (episternis inclusis) fere lævi; abdomine leviter longitudinaliter rugato vix perspicue punctulato; femoribus anticis sparsim subtilissime punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali ceteris conjunctis (unguiculis exceptis) sat æquali.

[Long. 6, lat. 3 lines.

This insect is distinguished from nearly all its congeners by the distance between its eyes being not greater than the length of the 2nd joint of its antennæ. Viewed from the side the outline of the elytra is a moderately strong curve, the summit of which is about at the middle. Compared with *C. cupripennis*, Hope, this species is narrower, more elongate, and of less robust appearance, with the punctures of the prothorax much finer, the seriate punctures of the elytra a little finer, and those of the elytral interstices scarcely discernible except under a very strong lens.

N. Territory of S. Australia.

C. BELLUS, sp.nov.

♂ (?). Ovalis; sat convexus; minus nitidus; niger, elytris cæruleis, prothorace vix cæruleo-micanti; capite obsolete sparsim (clypeo verticeque magis crebre minus obsolete) punctulato; oculis quam antennarum articuli basalis longitudine vix magis remotis; sulcis ocularibus nullis; antennis robustis corporis dimidio longitudine sat æqualibus, apicem

versus sat incrassatis, articulo 3° quam 1^{us} 2^{us}que conjuncti sat longiori quam 4^{us} 5^{us}que conjuncti parum breviori, articulis 8-10 quam præcedentes (3° excepto) nullo modo brevioribus; prothorace quam longiori (et postice quam antice) duabus partibus latiori, obsolete (latera versus vix manifeste) sat crebre punctulato, antice fere truncato, cetera ut *C. clypealis*; elytris seriatim sat æqualiter sat fortiter (postice magis subtiliter) punctulatis, interstitiis planis sparsim vix manifeste punctulatis; prosterno haud sulcato; corpore subtus toto lævigato, abdomine haud strigoso; femoribus sublævigatis, tibiis sparsim punctulatis; tarsis subtus nigro-setosis. [Long. 6, lat. 3 lines.

The prothorax is comparatively small (its width is to the elytra as 5 to 8); its width only exceeding the length by about $\frac{2}{3}$ of the latter furnishes a good distinction from many species. The punctures of the elytral series are much larger than those of *cupripennis*, and scarcely so large as those in the juxta-sutural series in *punctipennis*, Mael.; they are rather closely placed in the series. The interstices (as in the preceding 3 species) are absolutely flat throughout. This species bears considerable resemblance to the insect which I take to be *C. celestis*, Pasc., but differs by its bluish-green and by no means impunctate prothorax, its much stouter antennæ, eyes much less approximate, and not bordered within by sulci, &c. An example from Thursday Island has elytra more purplish in colour.

N. Queensland; also Thursday Island.

C. BREVIPES, sp. nov.

Sat cylindricus; sat nitidus; niger, prothorace plus minus aureo-micanti, elytris læte versicoloribus (coloribus aureis purpureis viridibusque ornatis); capite crebre sat æqualiter (postice paullo sparsius) subfortiter punctulato; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis; sulcis ocularibus fere nullis; antennis corporis dimidio sat (♂) vel multo (♀) brevioribus, articulo 3° quam 1^{us} 2^{us}que conjuncti manifeste longiori quam 4^{us} 5^{us}que

conjuncti multo breviori, articulis 8-10 quam præcedentes paullo (♂) vel multo (♀) brevioribus; prothorace quam longiori duabus partibus (postice quam antice fere duplo) latiori, distincte inæqualiter (subacervatim) punctulato, antice leviter emarginato, lateribus (superne visis) a basi antrorsum rotundatim convergentibus, basi media sat anguste sublobata, angulis anticis obtusis; elytris æqualiter sat subtiliter (quam *cupripennis*, Hope, paullo minus subtiliter) seriatim punctulatis, interstitiis planis subtilius suberebre punctulatis; prosterno minus fortiter carinato; metasterno distincte punctulato et sat fortiter oblique rugato, episternis subopacis leviter indistincte punctulatis; femoribus anticis antice sparsim subtiliter punctulatis; tarsi subtus nigrosetosis, posticorum articulo basali quam 4^{us} parum longiori; abdomine sat crebre punctulato et longitudinaliter rugato.

[Long. 9, lat. 4 $\frac{2}{5}$ lines.

The puncturation of the elytra is much like that of *C. cupripennis*, but the seriate punctures are more distinct owing to there being a greater disparity between them and the punctures of the interstices. The eyes are considerably more approximate than in *cupripennis*. The shortness of the hind tarsi (and especially of their basal joint) is a conspicuous character.

Victoria; sent by C. French, Esq.

C. PLACIDUS, sp.nov.

Late ovalis; sat nitidus; supra viridis vel purpureus vel aureus, vel his coloribus intermixtis micans, corpore subtus antennis palpis pedibusque nigris; capite antice crebre postice sparsius punctulato, oculis quam antennarum articuli basalis longitudine vix minus inter se remotis, intus vix manifeste sulco marginatis; antennis quam corporis dimidium sat brevioribus, articulo 3^o quam 1^{us} 2^{us} que conjuncti sat longiori quam 4^{us} 5^{us} que conjuncti sat breviori, articulis 8-11 quam præcedentes sat brevioribus; prothorace sat convexo, quam longiori (et postice quam antice) duabus partibus latiori, distincte inæqualiter punctulato, lateribus a basi antrorsum (superne

visis) convergentibus, margine antico bisinuatum emarginato, angulis anticis obtusis parum productis posticis (superne visis) subrectis; elytris quam prothorax duabus partibus latioribus, modice convexis, seriatim punctulatis (seriebus antice obliterated), puncturis in seriebus crebris subtilibus, interstitiis distincte minus crebre punctulatis; prosterno medio concavo; metasterno toto (episternis inclusis) et abdomine subfortiter minus sparsim punctulatis; hoc longitudinaliter strigoso; femoribus anticis sat crebre sat fortiter punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali quam ceteri conjuncti haud breviori.

[Long. 8, lat. 5 lines.

A very distinct species on account of its wide form, the comparatively strong puncturation of its metasternum and femora, &c. The eyes are not really margined with a sulcus, but the space separating them (which is much narrower than in *C. cupripennis*, *fervens*, &c.) being slightly raised above the level of the margin of the eye causes a deceptive appearance of a very narrow sulcus. Viewed from the side, the curve of the outline of the elytra is strong and is very manifestly at its highest decidedly in front of the middle. The seriate punctures of the elytra are finer, and the interstitial stronger, than in *cupripennis*, so that the series are less distinct than in that species; near the front they are quite obliterated.

W. Australia; seems to be widely distributed.

C. FROGGATTI, sp.nov.

C. placido affinis; antennarum articulo 3° minus elongato; prothorace magis fortiter transverso, quam longiori fere duplo latiori, lateribus a basi ultra medium leviter hinc ad apicem sat fortiter convergentibus; elytris prothoracem latitudine minus antecedentibus; prosterno medio carinato; abdomine magis crebre punctulato; tarsorum posticorum articulo basali quam ceteri conjuncti paullo breviori.

[Long. 7, lat. 4 lines.

Besides the differences specified above, this species differs from all the examples known to me of *C. placidus* in colour, the prothorax being black with a faint coppery tone, and the elytra of a uniform reddish-copper colour with the suture greenish in certain lights, whereas in all the specimens of *C. placidus* I have seen the whole upper surface is blue or green, changing from certain points of view to purple or golden. The form of the prothorax is very like that of *C. fastuosus*, Germ., (but with the crowded lateral puncturation wanting). The prothorax being much less rapidly narrowed forward than that of *C. placidus* appears conspicuously more massive.

N. S. Wales; taken near Maitland by Mr. Froggatt and generously presented to me.

C. PURPUREUS, Germ.

C. versicolori valde affinis; differt forma angustiori, capite haud (vel vix) metallico-micanti, prothorace magis nitido, elytris perspicue (nec profunde) striatis, interstitiis leviter convexis. [Long. $4\frac{1}{2}$ - $6\frac{1}{2}$, lat. $2\frac{1}{3}$ - $3\frac{1}{3}$ lines.

The species forming the group to which this and *C. versicolor* belong are extremely closely allied *inter se*, and it is possible that they ought to be considered local races of a single type. The differences, however, such as they are, seem to be constant. I found *C. versicolor* plentifully (though I was able to take only a short series) on young shoots of *Eucalyptus* in the far North (basin of Lake Eyre), and all the specimens of it that I have examined seem to be quite identical, being oval in form, with the prothorax a little less nitid than the elytra, the head of a bright green colour, and the elytra, when carefully examined, not in the least striate, although the closeness of the seriate punctures in the rows makes them seem to a casual glance finely striate, with the interstices perfectly flat. *C. purpureus* is widely distributed and not uncommon in the southern part of S. Australia. It is a distinctly narrower and more elongate species with the head black or faintly tinged with copper colour, the prothorax very nitid and the elytra distinctly though finely striate, with their

interstices widely and gently convex. I suspect that *C. purpureus* is the insect from Port Lincoln that Mr. Pascoe refers to (Ann. Nat. Hist. 1870, p. 105) as a variety of *C. suturalis*, sibi, as I have frequently taken, at Port Lincoln, *C. purpureus* (coloured, as Mr. Pascoe describes the so-called var. of *suturalis*), but never anything more like *C. suturalis*. This (*C. suturalis*) is another species belonging to the same group, and was described by Mr. Pascoe on an example from Western Australia. Through the courtesy of G. Masters, Esq., of Sydney, I have been able to examine a specimen which he tells me was named *suturalis* by Mr. Pascoe, and which agrees well with the description. It is very close to *C. purpureus* in respect of all characters except the sculpture of the elytra (I attach no importance to the colour of the suture alluded to by Mr. Pascoe, as I find it to vary in *C. purpureus*), but its elytra are very deeply striate, with the interstices strongly elevated, evidently narrower than the interstices of *C. purpureus* and scarcely visibly punctured. It appears to me quite possible that *C. anthracinus*, described by Mr. Hope (Proc. Ent. Soc. 1842, p. 79) in a few words, quite insufficient for confident identification, may be a black var. of *C. purpureus* (I have seen a single black specimen of that insect), but I have no means of settling the point, and the application of the name *anthracinus* to an insect brilliantly shining with golden purple and green colours, because it was first named on a very rare black variety, seems so unnatural as almost to justify a change of name even if my suspicion should prove to be well founded.

C. VIVIDUS, sp. nov.

♀ (?). Elongato-ovalis ; sat nitidus ; niger, prothorace elytrisq̄ue versicoloribus, purpureo- cyaneo- viridi- et aureo-micantibus ; capite crebre subfortiter punctulato, parte mediana lævi ; oculis quam antennarum articuli basalis longitudine magis inter se remotis ; sulcis ocularibus nullis ; antennis apicem versus manifeste incrassatis, quam corporis dimidium sat brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti parum longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis

8-10 quam præcedentes paullo brevioribus ; prothorace quam longiori (et postice quam antice) fere duabus partibus latiori, minus crebre minus subtiliter punctulato, antice fortiter bisinuato, a basi antrorsum leviter arcuatim angustato, basi media sat late sublobata, angulis anticis distinctis subacutis posticis obtusis ; elytris sat subtiliter seriatim punctulatis, interstitiis planis distincte minus crebre punctulatis ; prosterno planato ; metasterno in medio subtilissime, ad latera et in episternis minus subtiliter sparsim punctulato ; abdomine subfortiter punctulato et rugato ; femoribus anticis antice sparsim minus subtiliter punctulatis ; tarsis subtus fulvo-setosis, posticorum articulo basali quam ceteri conjuncti parum breviori. [Long. 5, lat. $2\frac{2}{3}$ lines.

Bears a general superficial resemblance to *C. variabilis*, Blessig, but differs from it and from others allied to it by the very different shape of the prothorax, which in this species is distinctly less wide, at the base, than once and two-thirds the width of the front, and has its front margin very strongly bisinuate, with the front angles distinctly prominent and subacute, almost as in *C. micans*. It is distinguished from most of its congeners by the lateral carinæ of its prothorax being (not arched downwards but) almost straight as viewed from the side. Compared with *C. cupripennis* the interval between the eyes is about one-third narrower, the head and prothorax are decidedly more strongly punctulate, the punctures both of the series and the interstices are stronger, the episterna are distinctly punctulate, the prothorax of quite different form, &c., &c. The outline curve of the elytra is moderately strong with its summit about the middle of the length.

N. Queensland ; sent by Mr. French.

C. INTERMEDIUS, sp.nov.

Elongato-ovalis ; sat nitidus ; niger, elytris cupreis (certo adspectu viridi-micantibus) ; capite sat crebre sat fortiter punctulato, in medio anguste lævi ; oculis quam antennarum articuli basalis longitudine vix minus inter se remotis ;

sulcis ocularibus nullis; antennis apicem versus leviter incrassatis, quam corporis dimidium paullo brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti paullo longiori, quam 4^{us} 5^{us}que conjuncti sat breviori, articulis 8-10 quam præcedentes vix brevioribus; prothorace quam longiori quatuor partibus (postice quam antice fere tribus partibus) latiori, crebre minus subtiliter punctulato, antice fortiter sinuatim emarginato, a basi antrorsum leviter arcuatim angustato, basi media sat late sublobata angulis anticis distinctis subacutis posticis fere rectis; elytris subtiliter seriatim punctulatis (puncturis in seriebus minus crebre positis), interstitiis planis crebrius distincte punctulatis; prosterno medio carinato; metasterno (episternis inclusis) subtiliter punctulato; abdomine subtilius punctulato et distincte rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali quam ceteri vix breviori. [Long. 5, lat. 2 $\frac{3}{4}$ lines.

Belongs to a small group of species remarkable for their prothorax being wider in front than is usual in the genus, with the front angles prominent and well developed. Among the species of that group the present insect is distinguished by the following characters in combination:—prothorax having its lateral carinæ (viewed from the side) nearly straight, interval between the eyes little more than half as wide as in *C. cupripennis*, elytra not striate, their interstices quite flat and very distinctly punctured, the punctures in the elytral series not very closely placed (distinctly less closely than in *C. cupripennis*). The outline curve of the elytra is as in *C. vividus*: the seriate punctures of the elytra are much finer than in that species.

Victoria; sent by Mr. French.

C. CONFLUENS, sp. nov.

Ovalis; nitidus; niger; supra versicolor viridi-aureo-pureo-et cyaneo-micans; capite crebre fortiter punctulato; oculis quam antennarum articuli basalis longitudine magis inter se remotis; sulcis ocularibus nullis; antennis apicem

versus sat incrassatis, quam corporis dimidium multo brevioribus, articulo 3° quam 1^{us} 2^{us}que conjuncti parum longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes parum brevioribus; prothorace quam longiori duplo (postice quam antice fere duplo) latiori, fortiter (in medio sparsius, latera versus fere confluentem) punctulato, apice sat fortiter siuatiem emarginato, postice leviter antice fortiter arcuatiem angustato, basi media sat late sublobata, angulis anticis obtuse subproductis posticis fere rectis; elytris sat subtiliter seriatiem punctulatis, interstitiis planis quam series nullo modo minus fortiter punctulatis; prosterno medio carinato ad latera ruguloso; corpore subtus sat fortiter vix crebre punctulato, abdomine rugato; femoribus anticis antice subtilius sat crebre punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali quam ceteri conjuncti parum breviori.

[Long. 5-6½, lat. 3-3½ lines.

The coarse puncturation of the prothorax rugulose crowded on the sides distinguishes this species from all its congeners known to me except *fastuosus*, Germ. The seriate punctures of the elytra are somewhat finer than in *cupripennis*, and are quite indistinguishable from the punctures of the interstices except by their seriate arrangement. The interval between the eyes is about a quarter narrower than in *cupripennis*. The outline curve of the elytra, viewed from the side, is strong, with its summit slightly in front of the middle.

W. Australia.

C. MICANS, sp.nov.

♀ (?). Ovalis; sat nitidus; niger, prothorace elytrisque versicoloribus purpureo-cyaneo-viridi-et aureo-micantibus; capite crebre sat fortiter punctulato, antice in medio anguste levi; oculis quam antennarum articuli basalis longitudine magis inter se remotis; sulcis ocularibus nullis; antennis apicem versus manifeste incrassatis, quam corporis dimidium sat brevioribus, articulo 3° quam 1^{us} 2^{us}que conjuncti sat

longiori quam 4^{us} 5^{us}que conjuncti parum breviori, articulis 8-10 quam præcedentes sat brevioribus; prothorace quam longiori (et postice quam antice) fere tribus partibus latiori, crebre sat æqualiter minus subtiliter punctulato, antice sat fortiter sinuatim emarginato, lateribus (superne visis) fere recte a basi ad apicem convergentibus, basi retrorsum sat fortiter sinuatim producta, angulis anticis productis sat acutis posticis acutis (apice summo truncato); elytris sat subtiliter seriatim punctulatis, interstitiis planis sat crebre (quam series vix minus fortiter) punctulatis; prosterno medio sulcato; metasterni parte media sparsim subtiliter, lateribus episternisque magis fortiter, punctulatis; abdomine crebre minus subtiliter punctulato obscure rugato; femoribus anticis antice sparsius minus subtiliter punctulatis; tarsis subtus nigro setosis, posticorum articulo basali quam apicales 2 conjuncti paullo longiori. [Long. 6, lat. 3 lines.

Resembles *C. palmerstoni* and *C. eyrensis* in the straightness of the sides of its prothorax, but differs from both in the deep emargination and sharp angles of the front of the prothorax. The seriate punctures are so little larger than those of the interstices that the series are quite indistinct. If this species be compared with *C. cupripennis*, Hope, the following differences among others are noticeable: the space between the eyes is very evidently narrower, the punctures of the head, of the prothorax, and of the elytral interstices are very distinctly stronger, the seriate punctures of the elytra are a little less strong, the prothorax is quite differently shaped, and the outline curve of the elytra (viewed from the side) is at its summit not in front of the middle. The lateral carina of the prothorax is really straight in this species, but is not in the preceding two or in *eyrensis*.

W. Australia; Yilgarn; sent by C. French, Esq.

C. EYRENSIS, sp. nov.

Elongato-ovalis; sat nitidus; niger, prothorace elytrisque ut *C. micantis* tinctis; capite crebre sat fortiter sat æqualiter punctulato; oculis quam antennarum articuli basalis longi

tudine multo magis inter se remotis ; sulcis ocularibus nullis ; antennis apicem versus vix incrassatis, quam corporis dimidium vix (σ) vel multo (σ) brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti multo longiori quam 4^{us} 5^{us}que conjuncti manifeste breviori, articulis 8-10 quam præcedentes manifeste brevioribus ; prothorace quam longiori (et postice quam antice) fere duplo latiori, sparsius sat subtiliter punctulato, antice sinuatim subtruncato, lateribus (superne visis) fere recte a basi ad apicem convergentibus, basi retrorsum sat fortiter sinuatim producta, angulis anticis obtusis posticis acutis (apice summo truncato) ; elytris sat subtiliter seriatim punctulatis, interstitiis minus planis (præsertim maris) sat crebre (quam series sat subtilius) punctulatis ; prosterno medio carinato ; metasterno ut *C. micantis* ; abdomine sparsim obscure punctulato et rugato ; femoribus anticis antice ut *C. micantis* ; tarsis subtus nigro-setosis, posticorum articulo basali quam ceteri conjuncti parum breviori. [Long. 6-6½, lat. 2½-3 lines.

Resembles the preceding in the peculiar shape of its prothorax, but is very differently punctured. Compared with *C. cupripennis*, the space between the eyes is scarcely narrower, and has no defined lævigata portion ; the shape of the prothorax is entirely different, the puncturation of the elytra is very similar, the interstices of the elytra are more or less convex in some examples (? males), and the outline curve of the elytra (viewed from the side) is at its summit much further from the base.

S. Australia ; basin of Lake Eyre.

C. PALMERSTONI, sp. nov.

σ (?). Sat anguste ovalis ; sat nitidus ; niger, elytris cæruleis certo adspectu purpureo- vel viridi-micantibus ; capite vix perspicue (clypeo paullo magis distincte) punctulato ; oculis quam antennarum articuli basalis longitudine vix minus inter se remotis ; sulcis ocularibus nullis ; antennis corporis dimidio longitudine sat æqualibus, articulo 3^o quam 1^{us} 2^{us} que conjuncti sat longiori quam 4^u 5^{us}que conjuncti parum

breviori, articulis 8-10 nullo modo incrassatis quam præcedentes haud brevioribus; prothorace quam longiori (et postice quam antice) fere tribus partibus latiori, subobsolete sat crebre vix subtiliter punctulato (exempli typici utrinque ante basin sulco obliquo impresso), antice leviter sinuatim emarginato, lateribus (superne viso) fere rectis a basi antrorsum convergentibus, angulis anticis obtusis posticis (superne visis) acutis; elytris minus subtiliter seriatim punctulatis, interstitiis planis obsoletissime vix perspicue punctulatis; prosterno medio concavo; corpore subtus fere lævi, abdomine leviter rugato; tarsis subtus nigro-setosis, posticorum articulo basali quam ceteri conjuncti parum breviori. [Long. $5\frac{1}{2}$, lat. $2\frac{3}{4}$ lines.

The prothorax small and with its sides (viewed from above) almost straight in their whole length, distinguishes this species from all but a very small number of its congeners. The remarkable obliquely placed furrow on either side of the prothorax a little in front of the base is very likely to be merely accidental in the typical specimen. The eyes (in the typical specimen) are too much drawn back into the prothorax for the space dividing them to be measured, but I can see that it is just about half as wide as in *C. cupripennis*, Hope. The seriate punctures of the elytra are not much different from those in the middle part of the discal series in *cupripennis*; but their size does not vary noticeably in the series towards the suture or lateral margins, and this, together with the interstices being scarcely punctured, makes the seriate punctures appear to a casual glance very much stronger than in that species. The outline curve of the elytra (viewed from the side) is very strong, its summit being almost *behind* the middle of its length.

N. Territory of S. Australia; near Palmerston.

C. PERLONGUS, sp. nov.

♂ (?). Elongato-oblongus; nitidus; niger, elytris versicoloribus æneo-viridi et violaceo-micantibus; capite crebre sat fortiter punctulato, in medio anguste lævi; oculis quam antennarum

articuli basalis longitudine paullo magis inter se remotis; sulcis ocularibus nullis; antennis apicem versus vix incrassatis, quam corporis dimidium parum brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti sat breviori, articulis 8-10 elongatis quam precedentiibus vix brevioribus; prothorace quam longiori (et postice quam antice) dimidio latiori, crebre sat fortiter punctulato, antice truncato, a basi antrorsum (vix arcuatim) angustato, basi retrorsum arcuatim vix sinuatim producta, angulis anticis obtusis posticis subacutis; elytris subtiliter sat seriatim punctulatis, interstitiis planis subtiliter subcrebre punctulatis; prosterno medio sulcato; metasterno sparsim, episternis magis crebre, punctulatis; abdomine sparsim distincte punctulato, obscure rugato; femoribus anticis antice sparsim sat subtiliter punctulatis; tarsis subtus nigrosetosis, posteriorum articulo basali quam apicales 2 conjuncti paullo longiori. [Long. $7\frac{1}{2}$, lat. $3\frac{1}{2}$ lines.

This is a very elongate species resembling *C. cylindricus* in outline, but being less convex it does not appear so cylindrical. It is an extremely isolated type, the evenly distributed strong puncturation of its prothorax and the well-defined puncturation (scarcely at all obscured by wrinkles) of the underside being characters almost as unusual as the peculiarly elongate form. The interval between the eyes is about a third narrower than in *C. cupripennis*, and the elytral puncturation (both of the series and the interstices) is almost as in that species.

S. Australia; McDonnell Ranges; sent by C. French, Esq.

C. OBSCURUS, sp. nov.

Ovalis, subelongatus; minus nitidus; niger, elytris obscure cyaneis, vix purpureo-tinctis; capite opaco equaliter sat crebre subtilius punctulato; oculis quam antennarum articuli basalis longitudine vix minus inter se remotis; sulcis ocularibus nullis; antennis (♀ ?) quam corporis dimidium sat brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis

8-10 quam præcedentes paullo brevioribus nullo modo incrassatis; prothorace opaco, quam longiori fere tribus partibus (postice quam antice fere duplo) latiori, haud punctulato, antice sat fortiter bisinuato, a basi (superne viso) antrorsum arcuatim angustato, basi media sat late sublobata, angulis anticis obtusis; elytris minus fortiter (quam *C. cupripennis* sat magis fortiter, suturam versus sat subtiliter) seriatim punctulatis, interstitiis planis sparsim subtiliter punctulatis; prosterno medio sat profunde sulcato; metasterno in medio subtiliter ad latera sat crasse punctulato, episternis obsolete punctulatis; abdomine sat crebre punctulato obscure rugato; femoribus anticis antice sparsim subtiliter punctulatis: tarsi subtus fulvo-setosis, posticorum articulo basali quam apicalis vix longiori.

[Long. $6\frac{3}{4}$, lat. $3\frac{3}{4}$ lines.

A very distinct species distinguished by its opaque dark blue-black appearance in combination with the perfectly flat evidently punctulate interstices of its elytra and the short basal joint of its hind tarsi. It bears a certain resemblance to *C. celestis*, Pasc., but is larger and more obscure, without ocular sulci, &c. *C. celestis*, moreover, has the basal joint of its hind tarsi much longer. The outline curve of the elytra, viewed from the side, is moderately strong, with its summit about the middle. The space between the eyes is scarcely more than half as wide as in *cupripennis*, but is evidently wider than in *vigilans*, *major*, &c. I have an example from Port Darwin and another from N. Queensland, which probably represent distinct species, as they present appreciable differences in the seriate puncturation of the elytra; but as they are unique specimens it is safer at present to treat them as local forms of this insect. The colour of the elytra in both is a uniform dark green.

N. W. Australia; Kimberley district.

C. NEGLECTUS, sp.nov.

Oblongo-ovalis; sat nitidus: niger, elytris cyaneis, certo aspectu violaceo-micantibus; capite sat crebre (postice

minus crebre) sat fortiter punctulato; oculis quam antenarum articuli basalis longitudine multo minus inter se remotis; sulcis ocularibus nullis; antennis quam corporis dimidium paullo brevioribus, apicem versus haud incrassatis, articulo 3° quam 1^{us} 2^{us}que conjuncti sat longiori quam 4^{us} 5^{us}que conjuncti parum breviori, articulis 8-10 quam præcedentes haud brevioribus; prothorace quam longiori (et postice quam antice) vix tribus partibus latiori, haud punctulato, antice sinuatim vix emarginato, a basi antrorsum arcuatim angustato, basi media sat late subtruncata, angulis anticis obtusis posticis (superne visis) subacutis; elytris seriatim minus subtiliter punctulatis, interstitiis planis sat crebre minus subtiliter punctulatis; prosterno medio planato; metasterno in medio subfortiter sat crebre punctulato, latera versus oblique rugato, in episternis vix manifeste punctulato; abdomine distincte nec fortiter punctulato et leviter rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus fulvo-setosis, posticorum articulo basali quam ceteri conjuncti paullo breviori. [Long. 8, lat. 4½ lines.

Not very near to any other described species; among the species devoid of ocular sulci and having the tarsal vestiture fulvous, it may be distinguished by the following characters in combination: eyes exceptionally approximate, prothorax impunctulate. The outline curve of the elytra (viewed from the side) is moderately strong, with its summit somewhat in front of the middle. The seriate punctures of the elytra are a trifle stronger than in *cupripennis*, Hope (considerably stronger near the lateral margins), and the interstices are evidently less finely punctulate. Compared with *C. obscurus* the eyes are more approximate, the 3rd joint of the antennæ is considerably longer, the elytral sculpture is evidently stronger, the prothorax is impunctulate, &c., &c.

An example, belonging to Mr. French, from the same locality as the type, specifically identical I think, is larger (long. 9½ lines) with the eyes a trifle more approximate, the colour more greenish and the elytral sculpture a little coarser. It is quite possibly a distinct species, but I do not find any character that seems

satisfactory for giving it a name, at any rate without being sure that the differences are constant.

Queensland ; Darling Downs ; sent by Mr. French.

C. MINOR, sp.nov.

Ovalis ; sat nitidus ; niger, elytris cyaneis certo adpectu viridi- vel purpureo-micantibus ; capite subtiliter inæqualiter punctulato ; oculis quam antennarum articuli basalis longitudine paullo minus inter se remotis ; sulcis ocularibus nullis ; antennis quam corporis dimidium vix longioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti paullo longiori quam 4^{us} 5^{us}que conjuncti parum breviori, articulis 8-10 quam præcedentes vix brevioribus haud incrassatis ; prothorace quam longiori duabus (postice quam antice tribus) partibus latiori, sparsim obsolete (vix manifeste) punctulato, antice subtruncato vix emarginato, a basi (superne viso) antrorsum arcuatim angustato, basi media sat late sublobata, angulis anticis obtusis ; elytris subtiliter vix crebre seriatim punctulatis, interstitiis sub lente vix manifeste punctulatis ; prosterno medio plus minusve manifeste sulcato ; metasterno medio subtiliter, lateribus episternisque vix perspicue, punctulatis ; abdomine sparsim obsolete punctulato, obsolete rugato ; femoribus anticis antice subtiliter minus crebre punctulatis ; tarsis subtus fulvo-setosis, posticorum articulo basali quam apicales 2 conjuncti sublongiori.

[Long. 5-6, lat. 3-3½ lines.

The interval between the eyes is about half as wide as in *C. cupripennis*, Hope. The seriate punctures of the elytra are very similar to those of *cupripennis*, but the interstices being lævigata, or very nearly so, the seriate punctures are very much more conspicuous. The absolute flatness of the interstices on the elytra distinguishes this species from those which are its nearest allies structurally.

W. Australia.

C. MAJOR, sp.nov.

♂ (?). Elongato-ovalis; sat robustus; minus nitidus; niger, capite prothoraceque plus minusve cyaneo tinctis, elytris læte cyaneis certo adspectu purpureo- et viridi-micantibus; capite subtilissime sat æqualiter punctulato; oculis quam antennarum articuli 2ⁱ longitudine haud multo magis inter se remotis; sulcis ocularibus nullis; antennis apicem versus haud incrassatis quam corporis dimidium vix brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti sat longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-11 quam præcedentes sat brevioribus; prothorace sat opaco, quam longiori fere duabus partibus (postice quam antice fere duplo) latiori, subtiliter minus perspicue punctulato, antice bisinuato, a basi (superne viso) antrorsum sat rotundatim angustato, basi bisinuata, angulis anticis obtusis; elytris æqualiter sat subtiliter (quam *C. cupripennis* paullo minus subtiliter) seriatim punctulatis, interstitiis leviter convexis haud vel vix manifeste punctulatis; prosterno medio antice carinato; metasterno medio perspicue, ad latera et in episternis vix manifeste, punctulato; abdomine indistincte punctulato, perspicue rugato; femoribus anticis antice minus sparsim minus subtiliter punctulatis; tarsis subtus fulvo-setosis, posticorum articulo basali quam ceteri conjuncti manifeste breviori quam apicalis sat longiori. [Long. $9\frac{1}{2}$, lat. 5 lines.

The only very large *Chalcopterus* known to me having in combination, eyes not bordered by a sulcus, prothorax evidently narrower at the middle than at the base, and tarsi with fulvous cilia. The evident convexity of the interstices makes the elytra appear substriate, somewhat as *C. longipennis*, Hope.

N. Queensland; sent by C. French, Esq.

C. MERCURIUS, sp.nov.

Elongato-ovalis; sat nitidus; niger, elytris læte cyaneis, certo adspectu purpureo- aureo- et viridi-micantibus; capite leviter (inter oculos obsolete) punctulato; oculis quam antennarum articuli basalis longitudine minus inter se

remotis; sulcis ocularibus nullis; antennis (δ ?) quam corporis dimidium longioribus, articulo 3° quam 1^{us} 2^{us}que conjuncti multo longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes sat brevioribus haud incrassatis; prothorace opaco quam longiori fere tribus partibus (postice quam antice duplo) latiori, vix manifeste punctulato, antice subtruncato (vix emarginato), a basi (superne viso) antrorsum arcuatim angustato, basi media sat late sublobata, angulis anticis obtusis; elytris sat æqualiter striatis, striis sat fortiter sat æqualiter punctulatis, interstitiis convexis vix manifeste punctulatis; prosterno medio sulcato; metasterno medio subtiliter, episternis vix perspicue, punctulatis; abdomine vix manifeste punctulato longitudinaliter sat fortiter rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus fulvo-setosis, posticorum articulo basali quam apicales 2 conjuncti parum breviori.

[Long. 7, lat. 3½ lines.

Among the species devoid of ocular sulci with the prothorax much narrowed in front, and at its widest at the base (but not trapezoidal) and with the tarsi fulvous beneath, this insect is recognised by the following characters in combination: size moderate, front of prothorax scarcely emarginate, elytra striate, head almost devoid of puncturation. The interval between the eyes is about half as wide as in *cupripennis*. The outline curve of the elytra (viewed from the side) is not at all strong, and its summit is about at the middle.

N. Queensland; sent by C. French, Esq.

C. MIMUS, sp. nov.

Oblongo-ovalis; sat nitidus; niger, prothorace obscure cyanescenti, elytris læte cyaneis (certo adspectu) purpurascens; oculis quam antennarum articuli basalis longitudine vix magis remotis; prothorace crebrius punctulato, lateribus (superne visis) a basi antrorsum arcuatim sat æqualiter convergentibus, angulis posticis (superne visis) sat obtusis; elytris minus cylindricis, serierum puncturis paullo minoribus

et minus æqualibus (suturam lateraque versus magis subtilioribus), interstitiis paullo minus planis sat crebre punctulatis; cetera ut *C. cylindrici*. [Long. 6, lat. 3 lines.

Near *C. cylindricus* in many respects, but very differently coloured, with the eyes less remote, the prothorax and elytral interstices much more closely [though not much less faintly (prothorax) or finely (interstices)] punctured, the punctures in the discal series scarcely so large (at least seven in the length of a line), and distinctly smaller in the series near the suture and lateral margins. The shape also is distinctly less cylindric; this is especially notable if the insects be looked at from the side, when the upper outline of *cylindricus* appears as a nearly straight line from the base of the elytra to considerably beyond the middle, the corresponding outline in *minus* being a curve; in *minus*, moreover, the prothorax viewed from above is at its widest more exactly at the base, while in *cylindricus* it seems almost to dilate (or at any rate not to narrow) immediately in front of the base. *C. minus* also resembles *C. tyrrenus*, Pasc., but that species is more cylindric (almost as much so as *cylindricus*), with the prothorax wider in front, the elytra striate, the eyes a little more remote, &c.

W. Australia; Yilgarn; sent by Mr. French.

C. SIMILIS, sp. nov.

C. longipennis, Hope, valde affinis, sed corpore subtus haud vel vix iridescenti, tarsi brevioribus fulvo-ciliatis, posticorum articulo basali quam apicalis vix longiori.

[Long. 8, lat. $3\frac{3}{4}$ lines.

This species is perplexingly like *C. longipennis*, Hope. I have before me two examples (both from the neighbourhood of King George's Sound) which are probably male and female, since they differ from each other by characters similar to those which distinguish the sexes of *longipennis*, and which also differ from each other in the underside of one being quite black while the corresponding surface of the other is faintly tinged with coppery colour. They both differ from *longipennis* in their tarsi being shorter and

clothed with (not black but) fulvous setæ, and also in the basal joint of the hind tarsi being of nearly the same length as the apical joint, while the corresponding joint in *longipennis* is a trifle longer than the 3rd and 4th joints together. The bisinuation of the front of the prothorax in this species is very feeble and renders its place in the tabulation a little doubtful.

W. Australia.

C. CYLINDRICUS, sp.nov.

Sat cylindricus ; nitidus ; niger, elytris splendide versicoloribus (coloribus aureis purpureis viridibusque, his plus minusve longitudinaliter dispositis, ornatis) ; capite prothoraceque minus nitidis ; illo sat æqualiter sat crebre minus subtiliter punctulato ; oculis quam antennarum articuli basalis longitudine magis remotis ; sulcis ocularibus nullis ; antennis corporis dimidio sat brevioribus, sat robustis, articulo 3° quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti sat breviori, articulis 8-10 quam præcedentes vix brevioribus ; prothorace quam longiori postice quam antice paullo magis quam dimidia parte latiori, leviter sat crebre (latera versus magis obsolete) punctulato, antice subtruncato, lateribus (superne visis) mox ante basin antrorsum fere divergentibus hinc ad apicem arcuatim convergentibus, basi bisinuata, angulis posticis (superne visis) subacutis ; elytris seriatim fortiter sat æqualiter (postice magis subtiliter) punctulatis, interstitiis sat planis sparsim subtilissime punctulatis ; prosterno acute carinato ; corpore subtus subtilissime (abdominis lateribus obscure subrugulosis) punctulatis ; pedibus subtiliter minus sparsim punctulatis ; tarsis subtus fulvo-setosis. [Long. 7, lat. 3 lines.

Totally different from all the preceding in shape, but resembling in that respect *C. logiusculus*, from which, however, it differs *inter alia* by its non-striate elytra. The puncturation of its prothorax closely resembles that of *C. cupripennis*, Hope ; the seriate punctures of the elytra resemble those in the intermediate rows on the elytra of *C. punctipennis*, MacL., in which species, however, the punctures become feebler towards the suture and

coarser towards the lateral margins, whereas in the present insect they are uniform or nearly so. There are about six punctures in the length of a line in the discal series, and the intervals between puncture and puncture are about equal to (slightly more or less than) the diameter of the individual punctures. The eyes are fully as wide apart as in *C. cupripennis*. This is an exceptionally beautiful species.

N. Queensland ; sent to me by Mr. French ; also N. S. Wales, near Wilcannia.

C. BOVILLI, sp.nov.

♂ (?). Elongatus ; subcylindricus ; sat nitidus ; niger ; capite sat crebre sat æqualiter minus subtiliter punctulato ; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis ; sulcis ocularibus nullis ; antennis apicem versus leviter incrassatis, quam corporis dimidium longioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti sat longiori quam 4^{us} 5^{us}que conjuncti vix breviori, articulis 8-10 quam præcedentes haud brevioribus ; prothorace quam longiori vix dimidio (postice quam antice fere duabus partibus) latiori, distincte crebre leviter punctulato, antice subsinuatim truncato, a basi antrorsum sat arcuatim angustato, basi retrorsum arcuatim vix sinuatim producta, angulis omnibus distinctis obtusis ; elytris sat subtiliter seriatim punctulatis, interstitiis fere planis sparsim subtilissime punctulatis ; prosterno medio leviter carinato ; corpore subtus fere lævi, abdomine obscure rugato ; femoribus anticis antice sparsim minus subtiliter punctulatis ; tarsi subtus fulvo-setosis, posteriorum articulo basali quam apicales 2 sublongiori.

[Long. $5\frac{1}{2}$, lat. $2\frac{1}{2}$ lines.

Like the preceding, the width of the front of the prothorax as compared with the base in this species seems to make it somewhat intermediate between the two groups that I have distinguished in the tabulation by the prothorax being more or less narrowed forward. If placed among those with the prothorax more narrowed it would fall beside *C. minor*, from which *inter*

alia its much narrower and more slender form will easily distinguish it.

Compared with *C. cupripennis* the interval between the eyes is nearly a half narrower, prothorax of totally different form, seriate punctures of elytra a little less closely placed, interstices all but impunctulate, general form quite different, &c., &c.

N. Territory of S. Australia.

C. COLOSSUS, sp.nov.

♀ (?). Oblongus; parallelus; sat nitidus; niger, elytris viridibus purpureo- (præsertim in sutura) et aureo- micantibus; capite crebre subtilius subrugulose punctulato; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis; sulcis ocularibus nullis; antennis quam corporis dimidium sat brevioribus, articulo 3° quam 1^{us} 2^{us}que conjuncti sat longiori quam 4^{us} 5^{us}que conjuncti sat breviori articulis 8-10 quam præcedentes multo brevioribus vix incrassatis; prothorace quam longiori quatuor partibus (postice quam antice duplo) latiori, subtiliter sat crebre æqualiter punctulato, antice modice emarginato, lateribus postice fere parallelis, basi trisinuata, angulis anticis obtusis posticis (superne visis) sat rectis; elytris subtiliter seriatim punctulatis, interstitiis subconvexis sat crebre distincte punctulatis; prosterno medio carinato; metasterno in medio subfortiter punctulato, latera versus fortiter oblique rugato, in episternis subtilius punctulato; abdomine sat crebre subfortiter punctulato et fortiter rugato; femoribus anticis antice subtilius sat distincte punctulatis; tarsis subtus fulvo-setosis, posticorum articulo basali quam apicales 2 conjuncti paullo breviori. [Long. 10½, lat. 5 lines.

This remarkably fine large species is closely allied to *C. longulus*, from which it differs (apart from colour) in its considerably more closely punctured head, in the much greater transversity and different puncturation of its prothorax, and in the distinct though gentle convexity of its elytral interstices, which is even more pronounced near the apex than in front.

S. Australia; Basin of Lake Eyre; also N.S. Wales, near Wilcannia.

C. IMPERIALIS, sp.nov.

C. colosso affinis; differt capite inter oculos paullo minus crebre punctulato et (exempli typici) inter oculos utrinque longitudinaliter carinato, antennis apicem versus magis incrassatis (articulis 8-10 quam præcedentes haud multo brevioribus), elytrorum puncturis seriatis multo majoribus et interstitiis nullo modo convexis fortiter punctulatis, metasterno minus fortiter magis sparsim sculpturato, et (ab exemplis visis) coloribus multo magis splendidis,—sc. viridi aureo purpureo cyaneoque-longitudinaliter vittatim positus (fere ut *C. superbi*, Blackb.). [Long. 10, lat. 5½ lines.

This species is near *C. colossus*, Blackb. The style of colouring is so entirely different that it may probably be relied on as a character. The difference in the antennæ may be unreliable, as I am not sure of the sex of either species. The carina on either side of the interval between the eyes is probably constant. The antero-internal corner of the eyes is much rounded off, so that the interval between the eyes looks much less parallel than in *C. colossus* (the head is almost exactly like that of *C. carinaticeps* except in not having distinct ocular sulci). The punctures in the elytral series are considerably stronger than in *C. variabilis*, Blessig (they are scarcely less strong than in *C. punctipennis*, Macl.), whereas in *C. colossus* the corresponding punctures are very little less fine and close than in *C. cupripennis*, Hope. The interstices on the elytra are more strongly punctured than in almost any other *Chalcopterus*, very little less so than in *C. rugosipennis*, Macl., while in *C. colossus* the punctures of the interstices are exceptionally fine.

Queensland; Darling Downs; sent by Mr. French.

C. LONGULUS, sp.nov.

Elongatus; sat parallelus; sat nitidus; niger, elytris versicoloribus purpureis latera versus viridi- et cyaneo-micantibus; capite subtiliter sat crebre punctulato, vertice medio lævigato;

oculis quam antennarum articuli basalis longitudine fere magis inter se remotis; sulcis ocularibus nullis; antennis (♀ ?) quam corporis dimidium sat brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti sat longiori quam 4^{us} 5^{us}que conjuncti multo breviori, articulis 8-10 quam præcedentes multo brevioribus vix incrassatis; prothorace subopaco quam longiori (et postice quam antice) duabus partibus latiori, subtiliter inæqualiter punctulato, antice sat fortiter emarginato, lateribus postice fere parallelo, basi trisinuata, angulis anticis obtusis posticis (superne visis) sat rectis; elytris subtiliter seriatim punctulatis, interstitiis sat crebre distincte punctulatis; prosterno medio carinato; metasterno in medio subtilius latera versus sat rugulose, in episternis distincte, punctulato; abdomine crebrius sat fortiter punctulato et rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus fulvo-setosis, posticorum articulo basali quam apicales 2 conjuncti vix breviori. [Long. 8, lat 4 lines.

A large robust species bearing much general resemblance to *C. similis*, Blackb., but differing from it by its larger size and by the sides of the prothorax (viewed from above) being parallel or nearly so in their hinder half and then roundly narrowed to the front. If the prothorax be viewed from the side, the lateral carina appears in *C. similis* as a curve evenly arched downward from base to apex, while the same in *C. longulus* is seen to be strongly sinuate in its front half. The interval between the eyes is something more than half as wide as in *C. cupripennis*. The seriate punctures on the elytra and the punctures of the interstices scarcely differ from the same in *C. cupripennis*. The interstices being slightly convex near the front, the elytra have some appearance of striation, as in *C. longipennis*, Hope, and *similis*, Blackb.

W. Australia.

C. LONGIPENNIS, Hope.

Oblongus; sat nitidus; niger, et supra et subtus iridescens, viridi-cyaneo-aureo- et purpureo-versicolor; capite æqualiter crebre distincte punctulato; oculis quam antennarum articuli basalis longitudine fere minus inter se remotis;

sulcis ocularibus nullis; antennis quam corporis dimidium paullo (♂) vel multo (♀) brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti manifeste longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes vix (♂) vel manifeste (♀) brevioribus; prothorace quam longiori (et postice quam antice) tribus partibus latiori, sat crebre distincte (maris quam feminae minus distincte) punctulato, antice leviter sinuatim emarginato, a basi antrorsum (superne viso) arcuatim (antice quam postice magis fortiter) angustato, basi media sublobata, angulis anticis obtusis; elytris subtiliter (fere ut *C. cupripennis*, maris quam feminae paullo magis subtiliter) seriatim punctulatis, interstitiis leviter subconvexis sat subtiliter (maris quam feminae paullo magis subtiliter) punctulatis; prosterno medio antice carinato; metasterno sat distincte punctulato et oblique rugato, episternis minus nitidis obsolete punctulatis; abdomine distincte punctulato et longitudinaliter rugato; femoribus anticis subtilius sat sparsim punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali ceteris conjunctis sat breviori.

[Long. $7\frac{1}{2}$ -8, lat. $3\frac{1}{2}$ - $3\frac{3}{4}$ lines.

Hope's description of *C. longipennis* is too brief for certain identification on its merits, but as the author expressly states that Adelaide is the habitat of the species, mentions $7\frac{1}{2}$ lines as the length, and specifies the shape as oblong, as there is nothing in the description distinctly inconsistent with my identification, and as, moreover, this insect is not rare near Adelaide, and is the only oblong species of large size that I know of occurring near Adelaide, I have little hesitation in applying the name, though I take the precaution of carefully describing the species to which I apply it. The principal discrepancy is in respect of colour, as Hope says that the prothorax is "black," and the underside "black and nitid." I have not seen an example of this insect in which both prothorax and underside are not iridescent, but in dark specimens (especially if they have become a little greasy) the iridescence of the prothorax is not very brilliant, and it seems

possible that the addition of "and nitid" to the "black" in describing the underside may be a reference to the iridescence as in describing other species (e.g. *cyanipennis*), in which the underside only differs in colour in the absence of iridescence Mr. Hope calls the underside simply "black." "Elytra punctulate-striate," moreover, presents a slight difficulty; but here again the insect I have described presents some excuse for the phrase, for although when carefully examined it is seen that the elytra are not genuinely striate, yet the interstices being distinctly not quite flat, and the punctures in the series close, there is certainly some superficial appearance of striation in contrast with the absolute want of it in *cupripennis* and numerous others of the genus. Compared with *C. cupripennis* the species differs *inter alia* as follows: the eyes are much less widely separated, the head is evenly punctured (without a lævigata space between the eyes), the prothorax is more strongly punctured and much less transverse, the interstices of the elytra are less flat and less strongly punctured so that the seriate punctures appear more distinct, the general form is larger and more elongate, and the underside is iridescent. The last-named character furnishes a distinction from nearly all the other *Chalcopteri* known to me. The elytral outline (viewed from the side) is a very gentle curve, with its summit about the middle of the length. From *C. fervens*, Germ., this species differs *inter alia* by its much more elongate and parallel form, and its prothorax (not evenly narrowed in a regular curve from the base but) narrowing only slightly from the base to the middle, and then much more strongly forward.

S. Australia; widely distributed.

C. IRIDIVENTRIS, sp.nov.

Ovalis; subelongatus; sat nitidus; niger, et supra et subtus iridescens (exemplo typico subtus magis læte quam supra), viridi-cyaneo-aureo-et purpureo-versicolor; capite sat æqualiter sat crebre punctulato; oculis quam antennarum articuli basalis longitudine fere minus inter se remotis; sulcis ocularibus nullis: antennis quam corporis dimidium

brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti sat breviori, articulis 8-10 quam præcedentes haud brevioribus; prothorace quam longiori (et postice quam antice) tribus partibus latiori, subtiliter minus sparsim minus perspicue punctulato, antice leviter sinuatim emarginato, a basi antrorsum (superne viso) æqualiter arcuatim angustato, basi anguste sublobata, angulis anticis paullo prominulis; elytris subtiliter (quam *C. cupripennis* paullo magis subtiliter) seriatim punctulatis, puncturis in seriebus crebre positis, interstitiis planis vix manifeste punctulatis; prosterno medio leviter concavo; metasterno medio subtilissime ad latera vix perspicue punctulato, episternis minus subtiliter punctulatis; abdomine distincte punctulato et longitudinaliter rugato; femoribus anticis sparsim subtiliter punctulatis; tarsis subtus nigro-setosis, posteriorum articulo basali ceteris conjunctis (unguiculis exceptis) sat æquali. [Long. 5½, lat. 2¼ lines.

Differs from nearly all its congeners in having the whole under-surface (especially the ventral segments) brilliantly iridescent. In build closely resembling *C. letus* but differing *inter alia* in its prothorax a little less transverse (not more than once and three-quarters as wide as long), the seriate punctures of its elytra considerably finer and closer (four or five in the middle part of the intermediate rows on a length equal to the width of an interstice), the interstices even less visibly punctulate, and the upper surface less nitid. Compared with *fervens*, Germ., (which also has the undersurface iridescent) this insect is a much less robust and more elongate species, with longer legs, hind tarsi much longer, puncturation finer throughout, &c.

S. Australia; near Port Lincoln.

C. SETOSUS, sp.nov.

♂ (?). Elongato-ovalis; subnitidus; niger, supra viridis vix aureo-micans; capite crebre sat subtiliter punctulato; oculis quam antennarum articuli basalis longitudine haud multo minus inter se remotis; antennis quam corporis dimidium

paullo longioribus, articulis apicalibus quam præcedentes haud brevioribus; prothorace sat perspicue punctulato antice sat fortiter bisinuato, hoc (exempli typici) utrinque ad basin oblique impresso; elytris sat fortiter (quam *C. cupripennis* multo magis grosse) seriatim punctulatis, interstitiis planis sparsim subtiliter punctulatis et puncturis majoribus sparsissimis (his setas subtiles fulvas erectas ferentibus) instructis, epipleuris setis erectis sat crebre vestitis; metasterni episternis perspicue punctulatis; abdomine crebre minus subtiliter punctulato, minus perspicue rugato; cetera ut *C. majoris*. [Long. 8, lat. $4\frac{1}{3}$ lines.

The elongate fine setæ sparingly sprinkled over the elytra and quite thickly clothing the epipleuræ, render this a most distinct species. The interval between the eyes is about half as wide as in *C. cupripennis*. The outline curve of the elytra (viewed from the side) is moderately arched and its summit is slightly in front of the middle.

Victoria; sent by Mr. Best, of Melbourne.

C. SEMISERIATUS, sp. nov.

♀ (?). Sat late oblongus; sat nitidus; niger, elytris cupreo-purpureis, certo situ viridi-micantibus; capite antice crebre subtilius postice magis fortiter minus crebre punctulato; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis; sulcis ocularibus sat bene determinatis sat elongatis; antennis quam corporis dimidium sat brevioribus, apicem versus vix incrassatis, articulo 3^o quam 1^{us} 2^{us}que conjuncti paullo longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes paullo brevioribus; prothorace quam longiori (et postice quam antice) tribus partibus latiori, subtiliter minus crebre punctulato, antice leviter bisinuato-emarginato, a basi antrorsum (leviter arcuatim) angustato, basi media sat anguste sublobata, angulis anticis obtusis posticis (superne visis) leviter subacutis; elytris interrupte sat subtiliter seriatim punctulatis, interstitiis planis distincte sat crebre

punctulatis; prosterno medio sulcato; metasterno in medio sparsim minus subtiliter punctulato, latera versus oblique rugato, in episternis sparsim subtiliter punctulato; abdomine distincte sat sparsim punctulato et rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus obscure piceo-setosis, posticorum articulo basali quam ceteri conjuncti vix breviori. [Long. 8, lat. $4\frac{1}{2}$ lines.

Rather a robust-looking species, distinguished among its allies by the irregularity of the seriate puncturation of its elytra. The middle part of the series near the suture is obliterated, and parts of other series are very obscure. If this species be placed beside *C. cupripennis* it will be seen that the interval between its eyes is not much more than half as wide, that its prothorax is less transverse, less nitid, and more finely but less feebly punctulate, that the seriate punctures of its elytra are much less evenly placed and a trifle less fine, that the interstices are more closely punctulate, and that the general form is more parallel. The outline curve of the elytra (viewed from the side) is moderately strong with its summit at about the middle of its length.

Victoria; sent by C. French, Esq.

C. PLUTUS, sp.nov.

Ovalis; minus elongatus; sat nitidus; niger, supra purpureus, certo adspectu cyaneo-viridi-micans; capite antice crebre (postice minus crebre) subtilius punctulato; oculis quam antennarum articuli basalis longitudine vix minus inter se remotis; sulcis ocularibus profundis sat elongatis; antennis quam corporis dimidium parum brevioribus, apicem versus vix incrassatis, articulo 3^o quam 1^{us} 2^{us}que conjuncti sat longiori quam 3^{us} 4^{us}que conjuncti parum breviori, articulis 8-10 quam præcedentes haud brevioribus; prothorace quam longiori (et postice quam antice) fere tribus partibus latiori, crebre leviter minus subtiliter punctulato, antice bisinuato, a basi antrorsum arcuatim angustato, basi trisinuata, angulis anticis sat obtusis posticis (superne visis) subacutis; elytris sat grosse seriatim punctulatis, plus minusve substriatis,

interstitiis subtiliter minus crebre punctulatis; prosterno medio antice carinato; metasterno fere impunctato; abdomine sparsim subtilissime punctulato et sparsim subtiliter rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus nigro-piceo-setosis, posticorum articulo basali ceteris conjunctis longitudine æquali.

[Long. $5\frac{1}{2}$ - $6\frac{1}{2}$, lat. 3 - $3\frac{1}{2}$ lines.

A general resemblance in colour, size, and elytral striation seems to associate this species superficially with *C. mercurius*, with which it might be supposed identical until carefully examined; it is, however, very widely different from it in reality, being distinguished by the puncturation of its head, the presence of ocular sulci, the much less convexity and much stronger puncturation of its prothorax, the puncturation of its elytral interstices, the obscure vestiture of its tarsi, the much longer basal joint of its hind tarsi, &c., &c. The typical example has the elytra very decidedly striate, with the interstices rather strongly convex; I refer to the same species another example of the habitat of which I am uncertain, which seems to differ from the type only by the less marked striation and less convex interstices of its elytra.

Queensland.

C. MURRAYENSIS, sp. nov.

Elongato-ovalis; sat nitidus; niger, prothorace viridi (cupreo-micanti), elytris versicoloribus viridi-aureo-purpureo- et cyaneo-micantibus; capite sat crebre (inter oculos magis sparsim) distincte punctulato; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis; sulcis ocularibus profundis subfoveiformibus; antennis apicem versus leviter incrassatis, quam corporis dimidium multo brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti parum longiori quam 4^{us} 5^{us}que conjuncti manifeste breviori, articulis 8-10 quam præcedentes haud brevioribus; prothorace quam longiori (et postice quam antice) duplo latiori, sparsim sat subtiliter punctulato (exempli typici in medio anguste

levi), antice modice sinuatim emarginato, a basi antrorsum arcuatim angustato, basi media sat late sublobata, angulis anticis obtusis posticis fere rectis; elytris sat subtiliter seriatim punctulatis, interstitiis subplanis (♀?) vel subconvexis (♂?) subtiliter sat crebre punctulatis; prosterno medio convexo; corpore subtus sparsissime subtilissime punctulato, abdomine sat crebre minus subtiliter rugato; femoribus anticis antice sparsim sat subtiliter punctulatis; tarsis subtus nigro-setosis, posticorum articulo basali quam ceteri conjuncti paullo breviori. [Long. $7\frac{1}{2}$, lat. $3\frac{2}{3}$ lines.

Much like *C. longipennis*, Hope, in general appearance, but differs from it by its eyes being less approximate and being bordered at their anterior corner with deep foveiform sulci, by the prothorax being much more transverse with its sides much more evenly converging from base to apex, by its elytral interstices evidently more strongly punctulate, its undersurface of a uniform shining black colour, &c., &c. Compared with *C. cupripennis*, the interval between the eyes is about a quarter narrower, the prothorax differs chiefly in the front angles being much more sharply defined, and the elytra are very similar, except in being more elongate and less convex, their outline curve viewed from the side being less strongly arched and reaching its summit at about the middle of its length. The whole insect has a much more elongate appearance than *cupripennis*.

S. Australia; Murray Bridge.

C. PUNCTULATUS, sp. nov.

Oblongo-ovalis; sat nitidus; niger, supra versicolor, elytris prothoraceque (hoc obscure) viridi-purpureo- et cyaneotinctis; *C. murrayensi* affinis; differt antennis apicem versus haud incrassatis, articulis 4° 5° que conjunctis quam 3^{us} vix longioribus; prothorace minus nitido, magis crebre (paullo acervatim) punctulato; elytrorum puncturis seriatim paullo majoribus in seriebus minus crebre dispositis, interstitiis nullo modo convexis multo magis fortiter punctulatis.

[Long. $7\frac{1}{2}$, lat. $3\frac{2}{3}$ lines.

This species is no doubt nearly allied to *C. murrayensis*; but, apart from other differences, is easily distinguishable from it by the quite different sculpture of the elytra.

N.S. Wales; taken near Wellington by Mr. Froggatt.

C. MACER, sp.nov.

C. murrayensi affinis; differt forma magis elongata magis parallela; antennarum articulo 3^o quam 4^{us} 5^{us}que conjuncti vix breviori; prothorace magis æqualiter punctulato (exempli typici ante scutellum distincte biimpresso), elytrorum interstitiis subtilissime sparsim punctulatis.

[Long. $7\frac{3}{4}$, lat. $3\frac{1}{4}$ lines.

Though very close to *C. murrayensis*, I feel no doubt this insect is a good species, its much more elongate form and the extremely minute puncturation of its elytral interstices being characters that certainly seem to indicate more than a mere variety. In the typical example the interstices of the elytra are absolutely flat, and the colour is considerably different from that of the type of *murrayensis*, the whole upper surface being of a pure bright green tone, and requiring to be looked at from a particular (oblique) point of view to bring out any purplish and golden tints.

S.A.; Basin of Lake Eyre.

C. OBLONGUS, sp.nov.

Oblongus; sat parallelus; sat nitidus; niger, supra versicolor, prothorace cyaneo-purpureoque tincto, elytris coloribus lætis (sc. viridi, aureo, purpureoque) vittatim ornatis; *C. murrayensi* affinis; differt prothorace minus transverso, magis fortiter et multo magis crebre punctulato, basi haud distincte lobata, angulis posticis (superne visis) subacutis; elytrorum puncturis seriatis minoribus interstitialibus multo majoribus (his cum illis subconfusis), interstitiis nullo modo convexis; corpore subtus magis distincte punctulato.

[Long. $6\frac{1}{2}$, lat. $3\frac{1}{4}$ lines.

This species is rather closely allied to *C. murrayensis*, *macer*, and *punctulatus*, but is smaller and narrower than any of them and differs from them all in the elytral punctures of the series and of the interstices being sufficiently nearly equal in size for them to appear confused together (almost as in *C. fastuosus*, Germ.). This latter character is extremely unusual in the genus. The clearly defined vittæ (running the whole length of the elytra) in which the different colours are arranged, is probably also a more or less constant and fairly reliable character. This is one of the most beautiful species of the genus.

W. Australia; Gnarlbine; sent by Mr. French. There is an example apparently identical in the S. Australian Museum from Innaminka, in the far north of S.A.

C. LEPIDUS, sp.nov.

Elongatus; subcylindricus; sat nitidus; niger, supra versicolor purpureo-viridi-cyaneo-et anreo-micans; capite sat crebre sat fortiter punctulato; oculis quam antennarum articuli basalis longitudine multo magis inter se remotis; sulcis ocularibus sat profundis minus latis sat elongatis; antennis apicem versus parum incrassatis, quam corporis dimidium multo brevioribus; articulo 3^o quam 1^{us} 2^{us}que conjuncti vix longiori quam 4^{us} 5^{us}que conjuncti vix breviori, articulis 8-10 quam præcedentes vix brevioribus; prothorace quam longiori (et postice quam antice) fere tribus partibus latiori, subfortiter minus æqualiter punctulato, antice sinuatim subtruncato, a basi antrorsum arcuatim angustato, basi media sat late sublobata, angulis anticis subacutis posticis fere rectis; elytris subtiliter seriatim punctulatis, interstitiis planis distincte sat crebre punctulatis; prosterno medio planato; metasterno puncturis setiferis sparsis instructo, episternis magis crebre punctulatis; abdomine sparsim punctulato et sat crebre rugato; femoribus anticis antice fere lævibus; tarsis subtus nigro-setosis, posticorum articulo basali ceteris conjunctis longitudine æquali.

[Long. $7\frac{1}{2}$, lat. $3\frac{3}{5}$ lines.

An extremely elongate species somewhat resembling *C. perlongus* and *cylindricus*, but differing from both *inter alia* by the presence of distinct ocular sulci and the greater width of the interval between the eyes. Compared with *C. cupripennis* this species (apart from its entirely different shape) has eyes about the same distance apart, prothorax somewhat less transverse and with front angles evidently more pointed, sculpture of elytra not much different, &c., &c. The outline curve of the elytra (viewed from the side) is not strong and its summit is at, or even a little *behind*, the middle of its length. The arrangement of colours on the elytra of the typical specimen is peculiar, the suture being widely purple except near the base and apex; the elongate spot thus formed is surrounded on all sides by a green ring; the lateral margins are widely green and the rest of the surface is dull greenish-aneous, changing in certain lights to coppery.

Victoria; sent by C. French, Esq.

C. INCONSPICUUS, sp.nov.

Elongato-subovatus; sat nitidus; niger, elytris minus late versicoloribus (sc. obscure viridibus suturam versus aureo-purpureoque micantibus); capite crebre subfortiter sat æqualiter punctulato; oculis quam antennarum articuli basalis longitudine magis remotis; sulcis ocularibus nullis; antennis corporis dimidio sat brevioribus, modice robustis, articulo 3° quam 1^{us} 2^{us}que conjuncti parum longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes (3° excepto) vix brevioribus; prothorace quam longiori (et postice quam antice) tribus partibus latiori, sat crebre sat profunde (nihilominus sat subtiliter) punctulato, antice sat fortiter bisinuato, cetera ut *C. clypealis*: elytris subtiliter æqualiter seriatim punctulatis, interstitiis planis crebre distincte punctulatis; prosterno simplici (sc. nec carinato nec distincte sulcato); metasterno sparsim, episternis (his subnitidis) sat crebre, distincte punctulatis; abdomine sparsim punctulato minus perspicue longitudinaliter

rugato; femoribus anticis antice sparsim subtiliter punctulatis; tarsis subtus nigro-setosis.

[Long. $6\frac{1}{3}$ - $7\frac{1}{3}$, lat. $3\frac{3}{5}$ - $3\frac{4}{5}$ lines.

The form is a little ovate, being slightly at the widest behind the middle of the elytra. Viewed from the side the upper outline of the elytra is a feeble curve, the summit of which is at—almost behind—the middle. The sculpture of the elytra is almost as in *C. cupripennis*, the puncturation of the prothorax being closer and stronger (*i.e.*, deeper and more conspicuous, but scarcely less fine) than in that species. The distance between the eyes is scarcely less than in *C. cupripennis*. Compared with *C. cupripennis* the head in this insect is much more closely and evenly punctulate, the antennal joints quite differently proportioned *inter se*, the prothorax less transverse, the metasternal episterna much more punctulate, &c. The general form is much more elongate and parallel with the outline curve of the elytra (viewed from the side) much feebler, with its summit much further from the base. The interstices of the elytra are absolutely flat.

W. Australia; sent by C. French, Esq.; also by E. Meyrick, Esq.

C. YORKENSIS, sp.nov.

Elongato-ovalis; sat nitidus; supra versicolor, viridi-aureo-purpureo- et cyaneo-micans; capite sat crebre sat fortiter punctulato, in medio spatio parvo impunctulato instructo; oculis quam antennarum articuli basalis longitudine vix magis inter se remotis; sulcis ocularibus sat profundis minus latis sat elongatis; antennis apicem versus modice incrassatis, quam corporis dimidium multo brevioribus, articulo 3^o quam 1^{us} 2^{us}que conjuncti parum longiori quam 4^{us} 5^{us}que conjuncti paullo breviori, articulis 8-10 quam præcedentes parum brevioribus; prothorace quam longiori tribus partibus (postice quam antice dimidio) latiori, distincte sat crebre punctulato, antice sinuatim truncato, a basi antrorsum (leviter arcuatim) angustato, basi media sat late vix lobata,

angulis anticis distinctis sat obtusis posticis (superne visis) fere subacutis; elytris sat subtilius seriatim punctulatis, interstitiis planis distincte sat crebre punctulatis; prosterno medio carinato; metasterno ad latera episternis abdomineque sparsim subtilissime punctulatis, hoc vix perspicue rugato; femoribus anticis antice sparsim subtilissime punctulatis; tarsi subtus nigro-setosis, posticorum articulo basali ceteris conjunctis longitudine æquali. [Long. $5\frac{1}{2}$, lat. $2\frac{1}{5}$ lines.

An ordinary looking species of rather dull aspect, but readily distinguishable from nearly all its congeners by the presence of well-defined ocular sulci in combination with a wide interval between the eyes. Placed beside *C. cupripennis*, Hope, the present insect is seen to be of much narrower and less robust form, with the interval between the eyes scarcely narrower, the prothorax much less transverse, and the seriate punctures of the elytra scarcely different, while the punctures of the interstices are evidently stronger. The outline curve of the elytra, viewed from the side, is moderately strong, and at its summit slightly behind the middle.

W. Australia; York.

C. CARINATICEPS, sp. nov.

♀ (?). Elongatus; subparallelus; sat nitidus; niger, elytris versicoloribus viridi- et purpureo-micantibus; capite prothoraceque subopacis; illo sat crebre subfortiter punctulato; oculis quam antennarum articuli basalis longitudine paullo magis inter se remotis; spatio interoculari utrinque carina brevi instructo; sulcis ocularibus ut *C. yorkensis*; antennis quam corporis pars tertia haud longioribus apicem versus haud incrassatis, articulo 3^o quam 1^{us} 2^{us}que conjuncti parum longiori quam 4^{us} 5^{us}que conjuncti manifeste breviori, articulis 8-11 quam præcedentes sat brevioribus; prothorace quam longiori vix duabus partibus (postice quam antice tribus partibus) latiori, distincte sat crebre punctulato, antice leviter emargiuato, a basi antrorsum (præsertim ante

medium) arcuatim angustato, basi media sat anguste sublobata, angulis anticis obtusis posticis (superne visis) subacutis; elytris sat fortiter (latera versus magis fortiter) seriatim punctulatis, interstitiis planis subtiliter minus crebre punctulatis; prosterno medio antice carinato; metasterno sparsim perspicue punctulato et (episternis exceptis) rugato; abdomine minus sparsim punctulato et crebre rugato; femoribus anticis antice sat crebre minus subtiliter punctulatis; tarsis subtus fulvo-setosis, posticorum articulo basali quam apicales 2 vix longiori. [Long. 8, lat. $4\frac{1}{2}$ lines.

A fine large species, bearing considerable resemblance to *C. longipennis*, Hope, but at once distinguishable by the presence of distinct ocular sulci and of a carina on either side close to the eye, the opaque prothorax, the stronger seriate puncturation of the elytra, the absence of iridescent colouring on the underside, fulvous tarsal vestiture, &c., &c. Placed beside *C. cupripennis* this species is seen to be much larger, with the eyes evidently less (though not *much* less) remote, the seriate punctures of the elytra considerably larger and less closely placed (in most parts three—but here and there only two—punctures on a length equal to the width of an interstice), &c., &c. The eyes are remarkable for having their antero-internal angles completely rounded off. The outline curve of the elytra, viewed from the side, is feeble, with its summit about at the middle of its length.

N. Queensland; sent by C. French, Esq.

C. CATENULATUS, sp. nov.

C. carinaticipiti valde affinis sed capite prothoraceque versicoloribus, elytrorum coloribus viridi et purpureo alternatim vittatim positus, prothorace antice paullo minus angustato; elytris grosse seriatim foveolatis; cetera ut *C. carinaticipitis*.

[Long. 9, lat. $4\frac{1}{2}$ lines.

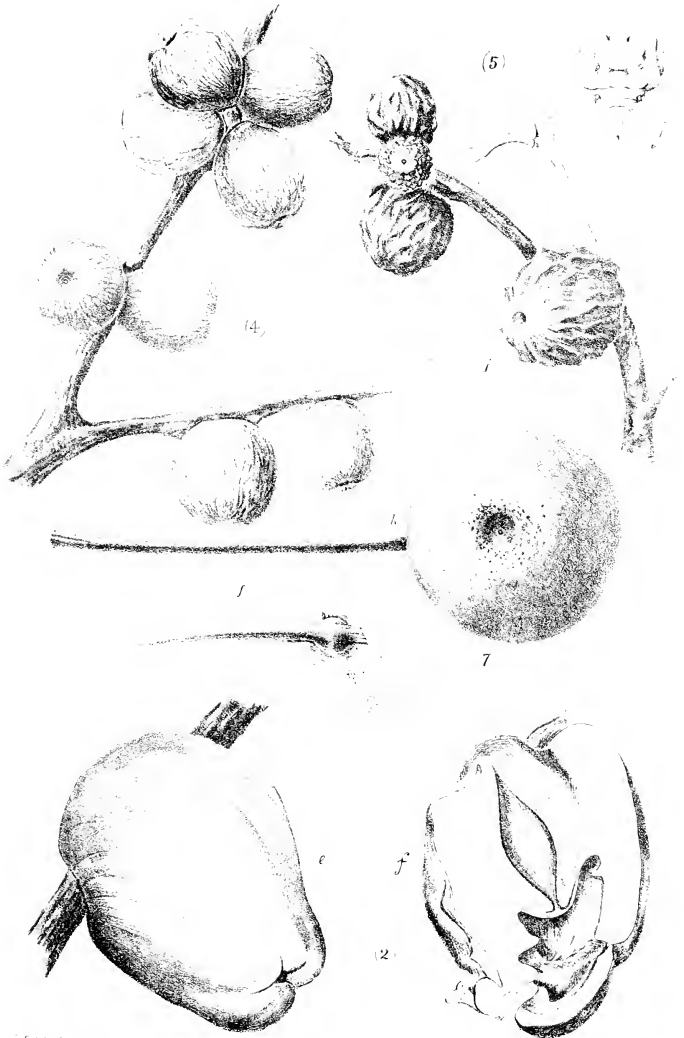
Notwithstanding the close resemblance of this insect to *C. carinaticeps* in nearly all its structural characters (I can find no difference in them except in the less anterior narrowing of the

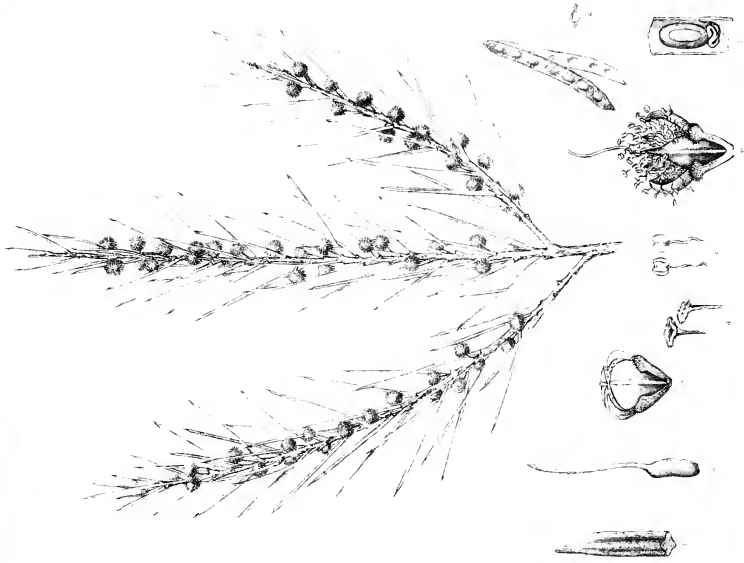
prothorax) it seems impossible to regard it otherwise than as a good species, owing to the entirely different sculpture of the elytra, the seriate punctures of which are large foveæ (larger than in any other *Chalcopterus* that I have seen). The intervals between the series are scarcely wider—and in places even narrower—than the diameter of individual foveæ in the series. I have seen several examples all quite alike.

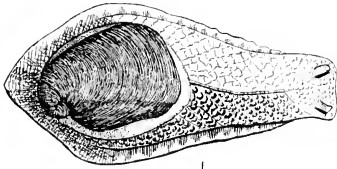
N. Queensland.



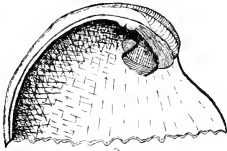








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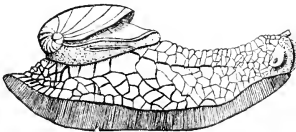
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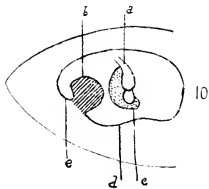
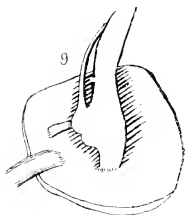
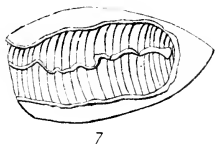
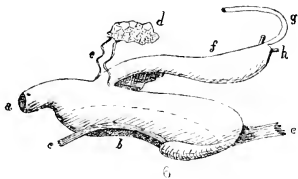
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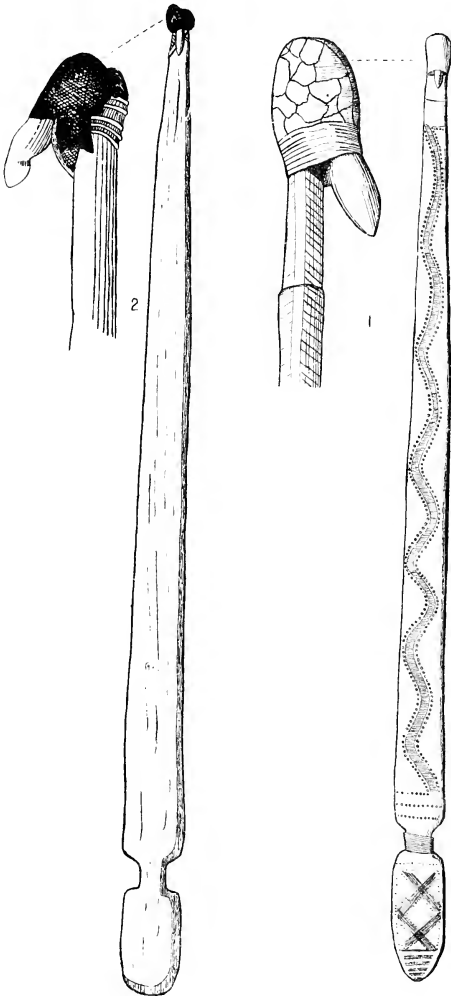


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DESCRIPTIONS OF SOME NEW ARANEIDÆ OF NEW
SOUTH WALES. No. 1.

BY W. J. RAINBOW.

(Plate XII.)

Family THOMISIDÆ.

Genus STEPHANOPIS, Cambr.

STEPHANOPIS ASPERA, sp.nov.

♀. Cephalothorax, 4 mm. long ; abdomen, 7 mm. long.

Cephalothorax nearly as broad as long, somewhat convex : *caput* elevated, sloping forward, terminating in an almost perpendicular eminence, on the extremity of which are several tubercles ; on the back, front and sides also a number of tubercles, all of them bluntish, yellow-brown at the base and dark brown at the apex ; the junction of the cephalic and thoracic segments indicated by strong, deep, lateral clefts, the projections formed by the clefts strongly tuberculated ; at the centre of the cephalothorax a large, strong, coniform tubercle, with several radiating clefts, their margins strongly tuberculated : *clypeus* strongly rugulose and tuberculated ; its surface yellow-brown, the tubercles dark brown.

Eyes eight in number, forming a ring or corona around the upper part of the cephalic eminence ; of these the four seated at the back in a slightly curved series—the curvature being directed downwards towards the sides—the largest of the group, equal, equi-distant, each being separated from its neighbours by a distance sub-equal to its diameter ; front lateral eyes slightly smaller than

those of the hinder row, separated from each other by fully the diameter of two eyes; front central eyes exceedingly minute, seated lower down the cephalic eminence than the laterals, but each central eye situated nearer to the lateral eye than to each other.

Legs strong and moderately long, their relative lengths being 1, 2, 4, 3, but the front pair somewhat the strongest; similar in colour to the cephalothorax, all furnished with tubercles, short hairs, bristles and spines, but the spines on the tibiae and metatarsi of the first and second pairs much the longest and strongest, and directed forwards on the underside.

Palpi moderately long, and strong, similar in colour and armature to the legs, each terminating with a small curved claw.

Falces long and strong, similar in colour to the legs; furnished with short hairs and bristles; and in addition a row of short tooth-like spines on the inner margin of the furrow on the underside of each falx, wherein the fang lies concealed when at rest.

Maxille of a brown colour, moderately long, nearly straight, but converging somewhat towards the labium.

Labium short, broad, but much narrower at the apex than at the base; the apex fringed with a few strong bristly hairs.

Sternum yellowish-brown, large, elliptical in outline, slightly broadest towards its fore extremity, and thickly furnished with short hairs.

Abdomen obovate, slightly overhanging; upper side similar in colour and appearance to the cephalothorax, notched in front, somewhat flattish, though slightly depressed towards the middle; hinder part higher and broader than the fore extremity, and thickly tuberculated, with a few small tubercles and punctures scattered over the surface, and an irregular row of rather large tubercles along the lateral margins; the underside and sides of a lighter colour than the upper surface, and strongly rugulose; spinnerets compactly grouped, small, three-jointed, and furnished with rather strong, bristly hairs.

Hab.—Bungendore.

A single specimen, for which I am indebted to Mr. A. Lea. Representatives of this genus, though by no means common, are found in all the Australian colonies. By the form and arrangement of the legs they are enabled to move forwards, backwards, or in a lateral direction with facility. They capture their prey either by surprise or pursuit, and conceal themselves under loose bark or among the rugulosity of trees. Their extraordinary appearance, which closely resembles bark, doubtless serves to protect them from the raids of enemies.

Family CTENIDÆ*

Genus CYCLOCTENUS, L. Koch.

CYCLOTENUS ABYSSINUS, Urq. ♂.

The female of *C. abyssinus* was described by Mr. A. T. Urquhart in Trans. N.Z. Inst., Vol. xxii., 1889, pp. 237-8, and is figured on Plate XVI. of that volume. That author stated in a concluding paragraph of his paper that "two immature males did not differ essentially in form or colouration from the female examples." Through the kindness of Mr. A. S. Olliff, F.E.S., I have been placed in possession of mature ♂ and ♀ examples, and upon comparing them, with others which I have since received, I find the difference, though not great, is nevertheless sufficient to warrant me in describing the ♂.

I desire to add, further, that from specimens of the female I have examined I find that there is in some examples a slight difference in the colouration of the abdomen. In some the "faint blackish flecks on lateral margins," as described by Mr. Urquhart, are darker than in others, and slightly larger, irregularities which

* In Vol. xxii. Trans. N.Z. Inst. Mr. Urquhart placed this genus, by mistake, in the Family *Lycosidae*, an error which he afterwards corrected in his "Catalogue of the Described Species of New Zealand Araneida," Vol. xxiv. 1892.

should be borne in mind and carefully noted, in order to prevent the creation of synonyms and consequent confusion, more especially as the examples to which I refer are from the same locality as the one described by that author, namely, Jenolan Caves.

Similar irregularities occur in other species. The Rev. O. P. Cambridge, F.Z.S., has drawn attention to a like occurrence,* notably in connection with *Gasteracantha formosa*, the abdominal spines of which in four instances (and which he demonstrated by figures†) were different "in the absolute as well as relative length, strength, and direction." In the course of this interesting paper he remarks:—"This will be found, I think, to be the case also with some other species when collectors will take the trouble to collect a series of examples, instead of being satisfied with a few or even single specimens of those which appear to differ most from each other . . . especially if the spiders come from the same locality."

The difference in specimens of *C. abyssinus*, as I have stated, is slight, or comparatively so; nevertheless, the fact of the occurrence of any difference at all is, I think, sufficient to justify me in recording it, and is, indeed, my only apology for doing so.

♂. Cephalothorax 4 mm. long, 3.5 mm. broad; abdomen 2.5 mm. long, 2 mm. broad.

Cephalothorax rather longer than broad, convex: *caput* elevated and rounded on the sides and upper part; the junction of the *cephalic* and *thoracic* segments indicated by a strong deep cleft of a transverse curved form, the curvature being directed forwards laterally; colour of the cephalothorax yellow-brown, tinged with dark brown or sepia on the margins of the lateral grooves: *clypeus* convex, somewhat quadrate, with a deep longitudinal groove running nearly its entire length; marginal band yellow-brown, dark on the outer margin, rather broad, sinuate, and furnished with a few short yellowish hairs; profile contour of the cephalothorax, like that of the ♀, representing a double arch.

* P.Z.S., Part II., 1879, p. 280.

† P.Z.S., Part II., 1879, Plate XXVI., figs. 11, 11a, 11b, 11c.

Eyes similar in disposition to those of the ♀.

Legs long, slender, and gradually tapering off; yellow-brown in colour with dark annulations; their relative lengths 4, 1, 2, 3, the difference between 4, 1, and 2, however, very slight; furnished with short yellowish and black hairs, and armed like the ♀ with long black spines, similar in number and disposition.

Palpi equal in length to the body, slender, and similar in colour to the legs; the copulatory organs prominent, highly developed and complicated in structure, and armed on their sides with long and strong spines.

Falces yellow-brown, long, strong, broadest towards the middle, and inclined outwards at the lower extremity; furnished with strongish yellow hairs, and a few long coarse black bristles; and in addition a row of short tooth-like spines on the margins of the furrow of each falx, wherein the fang lies concealed when at rest.

Maxillæ long, narrow at the base, broad towards the middle, and slightly pointed at the apex; yellow-brown, furnished with coarse hairs or bristles, and inclined towards the labium.

Labium similar in colour to maxillæ, short, broad, quadrate, slightly concave at apex.

Sternum short, broad, somewhat heart-shaped, pale yellowish, sparsely furnished with yellowish hairs.

Abdomen obovate, slightly overlapping cephalothorax, base somewhat truncated, moderately convex; greyish in colour and thickly covered with coarse hairs and long bristles.

Hab.—Jenolan Caves.

EXPLANATION OF PLATE.

PLATE XII.

Fig. 1.—*Stephanopsis aspera*.

Fig. 2.—Profile view of spider.

PLATE XII. (*continued*).

- Fig. 3.—Caput, front view, showing arrangement of first row of eyes.
Fig. 4.—Caput, back view, showing arrangement of second row of eyes.
Fig. 5.—Falces.
Fig. 6.—*Cycloctenus abyssinus*, Urq. ♂.
Fig. 7.—Maxillary palpus of ♂.
Fig. 8.—*C. abyssinus*, ♀.
Fig. 9.—Showing arrangement of eyes as viewed from the front.
Fig. 10.—Tarsus.
Fig. 11.—Maxillary palpus of ♀.
Fig. 12.—Vulva.

Note—Figs. 9-12 after Urquhart.

DESCRIPTIONS OF AUSTRALIAN MICRO-LEPIDOPTERA.

BY E. MEYRICK, B.A., F.Z.S.

XVI. TINEIDAE.

The investigations which I made for the purpose of this paper have led me to extend the limits of the family *Tineidae* beyond those which I originally contemplated and have elsewhere used, thus including within it the smooth-faced genera previously separated as the *Argyresthiidae*, those with up-turned apex of forewings for which I formed the family *Erechthiidae*, and the rough-headed genera with antennal eyecaps formerly classed as *Lyonetiidae*; the latter term I would now restrict to the smooth-headed genera with antennal eyecaps. The reason for this course is that I find it impossible to maintain an accurate line of demarcation between these groups, the characters not being constantly preserved. They do however constitute natural groups, with structural distinctions which are usually though not invariably maintained, and may be conveniently regarded as subfamilies, if rigidity of definition is not insisted on.

As now defined, the family includes nearly all the rough-headed *Tineina*. The *Micropterygidae* and *Nepticulidae*, which are also rough-headed, differ from it, the former by the primitive neuration of the hindwings, which have eleven or more veins, instead of the normal eight, and the latter (which is probably a direct development of the *Micropterygidae*, with very degraded neuration,) by the eighteen-legged larva. The *Gracilariidae* are normally smooth-headed, but some genera have rough heads; these are distinguishable by the fourteen-legged larvæ, and can also be separated from those genera of *Tineidae* with degraded neuration

(with which alone they can be confused) by a consideration of the total of other characters.

I consider the *Tineidae* to have been developed from an early form of the *Plutellidae*, closely approaching the primitive *Micropterygidae*. The *Lyonetiadae* and *Gracilariadae* I regard as offshoots from some of the more degenerate forms of the *Tineidae*. The family, though less numerous than some others, is still a large one, and seems to be pretty evenly distributed throughout the world.

The following are the characters of the family :—

Head roughly haired, face sometimes smooth. Antennæ variable in length, usually $\frac{3}{4}$ -1, joints often closely set, transverse. Labial palpi usually nearly straight, often with scattered bristles, apex rarely acute. Maxillary palpi often strongly developed, several-jointed, folded, sometimes absent. Forewings with vein 1 furcate or more rarely simple, 2 from or rather near angle, 11 usually from or before middle, upper margin of cell usually more or less obsolete towards base, secondary cell often well-marked, forked parting-vein usually well-defined. Hindwings usually as broad as forewings, sometimes narrower, very rarely broader, varying from subovate to linear; vein 8 free. Larva sixteen-legged or apodal.

The folded several-jointed maxillary palpi are confined to the rough-headed families of the *Tineina*: they are not however by any means constantly present, the tendency to their loss being so strong, that they are not unfrequently present in one of two closely allied genera and absent, or nearly so, in the other. Hence, while their presence is a highly valuable indication of affinity, their absence proves nothing. They are notwithstanding one of the primitive characters of the ancestors of the family. I am however unable at present to see how, on any scheme of descent, all those genera which possess long folded maxillary palpi can have retained them by direct inheritance from the primitive form; and it seems necessary to assume that in some instances they may have reverted from a state of partial (not entire) obsolescence to their originally fully-developed structure.

In some other respects there is great variation. Certain genera have the antennæ of extreme length, thrice as long as the forewings, a character which recurs in no other *Lepidoptera*. The labial palpi never assume the sickle-shaped form so characteristic of the large majority of the smooth-headed *Tineina*; occasionally they are quite absent. The presence or absence of the ocelli seems to be of little or no importance generically. The neuration is sometimes much degraded, but when fully present the normal type has all the veins separate and tolerably parallel in both forewings and hindwings; many genera have a tendency to the approximation of veins 5 and 6 in the hindwings.

The family may be divided into the following groups, as characterised:

- (1) *Adelides*. Antennæ of ♂ thrice forewings; genera 1, 2.
- (2) *Tineides*. Face usually rough; maxillary palpi often developed; neuration usually normal; genera 3-21.
- (3) *Erechthiades*. Face usually rough; maxillary palpi well-developed; neuration normal; apex of forewings bent up at right angles to surface in repose; genera 22-27.
- (4) *Hieroxestides*. Face smooth; maxillary palpi well-developed; antennæ with eyecap; genus 28.
- (5) *Argyresthiades*. Face smooth; maxillary palpi rarely developed; neuration normal; genera 29-40.
- (6) *Bedelliades*. Face smooth; maxillary palpi obsolete; antennæ often with eyecap; neuration degraded; genera 41-47.
- (7) *Opostegides*. Face rough; maxillary palpi well-developed; antennæ with large eyecap; neuration much degraded; genus 48.

The first of these groups, the *Adelides*, is definable as a separate family, if it were thought necessary, but there seems no sufficient reason to separate it from the rest at present.

In the following descriptions I have given characters for all the genera, for the sake of completeness, and tables of species for all the genera; but I have not thought it necessary to redescribe those species which I have already described before, nor to repeat localities then given.

Subjoined is the tabulation of genera.

1. Antennæ in ♂ more than twice forewings...	2.
Antennæ in ♂ less than twice forewings...	3.
2. Eyes in ♂ much enlarged, closely approximated above.....	1. <i>Nemotois</i> .
Eyes in ♂ normal.....	2. <i>Adela</i> .
3. Face more or less rough..	4.
Face smooth.....	27.
4. Maxillary palpi more or less developed....	5.
Maxillary palpi rudimentary or absent....	20.
5. Maxillary palpi long, folded.....	6.
Maxillary palpi moderate or short, not folded.....	18.
6. Forewings with one or more veins absent	7.
Forewings with all veins present.....	13.
7. Antennæ in ♂ with notch above basal joint	24. <i>Comodica</i> .
Antennæ in ♂ without notch.....	8.
8. Antennæ with large eyecap.....	48. <i>Opostega</i> .
Antennæ without eyecap.....	9.
9. Abdomen much dilated; posterior tibiæ smooth above.....	26. <i>Eurytyla</i> .
Abdomen normal; posterior tibiæ rough-haired above.....	10.
10. Hindwings with cell open.....	11.
Hindwings with cell closed.....	12.
11. Hindwings ovate-lanceolate, cilia $1\frac{1}{4}$	23. <i>Chorocosma</i> .
Hindwings narrow-lanceolate or linear, cilia 3-6.....	19. <i>Demobrotis</i> .
12. Forewings with veins 7 and 8 stalked or coincident	25. <i>Ereunetis</i> .
Forewings with veins 7 and 8 separate....	20. <i>Endophthora</i> .
13. Forewings with vein 7 to hindmargin.....	7. <i>Eriocottis</i> .
Forewings with vein 7 to costa.....	14.

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| 14. Hindwings with vein 5 absent..... | 22. <i>Dryadaula</i> . |
| Hindwings with all veins present..... | 15. |
| 15. Forewings with transparent discal impres-
sion, veins 3 and 4 stalked..... | 14. <i>Blabophanes</i> . |
| Forewings without transparent impression,
veins 3 and 4 separate..... | 16. |
| 16. Antennæ almost or quite 1..... | 16. <i>Chrysoryctis</i> . |
| Antennæ not over $\frac{5}{6}$ | 17. |
| 17. Hindwings with cell open..... | 13. <i>Mimoscopa</i> . |
| Hindwings with cell closed..... | 15. <i>Tinea</i> . |
| 18. Labial palpi with second joint tufted in
front..... | 12. <i>Scardia</i> . |
| Labial palpi with second joint not tufted.. | 19. |
| 19. Antennæ in ♂ ciliated..... | 8. <i>Mesopherna</i> . |
| Antennæ in ♂ pubescent..... | 17. <i>Tineola</i> . |
| 20. Hindwings with one or more veins absent | 21. |
| Hindwings with all veins present..... | 24. |
| 21. Antennæ in ♂ bipectinated..... | 22. |
| Antennæ in male not bipectinated..... | 23. |
| 22. Hindwings with cell open between 6 and 7. | 10. <i>Iphierga</i> . |
| Hindwings with cell closed..... | 4. <i>Ctenocompa</i> . |
| 23. Forewings with vein 10 absent..... | 21. <i>Mychonoa</i> . |
| Forewings with vein 10 present..... | 6. <i>Lepidoscia</i> . |
| 24. Antennæ longer than forewings..... | 18. <i>Macraeola</i> . |
| Antennæ shorter than forewings..... | 25. |
| 25. Middle and posterior tarsi conspicuously
elongate..... | 9. <i>Acridotarsa</i> . |
| Middle and posterior tarsi normal..... | 26. |
| 26. Posterior tibiæ smooth-scaled..... | 11. <i>Ardiosteres</i> . |
| Posterior tibiæ rough-haired..... | 5. <i>Xysmatodoma</i> |
| 27. Hindwings with all veins present..... | 28. |
| Hindwings with one or more veins absent | 36. |
| 28. Antennæ $1\frac{1}{2}$ | 29. |
| Antennæ less than 1..... | 30. |

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| 29. Maxillary palpi long, folded..... | 35. <i>Hestiarula</i> . |
| Maxillary palpi rudimentary..... | 40. <i>Amphithera</i> . |
| 30. Maxillary palpi long, folded..... | 31. |
| Maxillary palpi short or absent..... | 32. |
| 31. Hindwings with vein 5 out of 7, 6 to hind-
margin..... | 28. <i>Hieroxestis</i> . |
| Hindwings with vein 7 separate, 6 to costa | 27. <i>Hippiochaetes</i> . |
| 32. Forewings with vein 7 to costa. | 33. |
| Forewings with vein 7 to hindmargin..... | 35. |
| 33. Second joint of labial palpi with dense tuft
of hairs..... | 31. <i>Dascia</i> . |
| Second joint of labial palpi not tufted..... | 34. |
| 34. Terminal joint of palpi as long as second | 29. <i>Timaea</i> . |
| Terminal joint of palpi much shorter than
second..... | 32. <i>Acmosara</i> . |
| 35. Tongue well-developed..... | 30. <i>Thudaca</i> . |
| Tongue absent..... | 3. <i>Sentica</i> . |
| 36. Hindwings with cell closed..... | 37. |
| Hindwings with cell open..... | 42. |
| 37. Maxillary palpi porrected, distinct..... | 36. <i>Touza</i> . |
| Maxillary palpi rudimentary.... | 38. |
| 38. Posterior tibiæ smooth-scaled | 33. <i>Zelleria</i> . |
| Posterior tibiæ with long hairs | 39. |
| 39. Antennæ longer than forewings..... | 40. |
| Antennæ not longer than forewings..... | 41. |
| 40. Antennæ in ♂ ciliated..... | 39. <i>Thereutis</i> . |
| Antennæ in ♂ simple..... | 38. <i>Harpedonistis</i> |
| 41. Anterior tibiæ dilated with scales..... | 34. <i>Macarangela</i> . |
| Anterior tibiæ normal.... | 37. <i>Nematobola</i> . |
| 42. Palpi wholly absent..... | 45. <i>Bucculatrix</i> . |
| Palpi not wholly absent..... | 43. |
| 43. Basal joint of antennæ forming well-marked
eyecap..... | 44. |
| Basal joint of antennæ not forming an eyecap | 46. |

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| 44. Antennæ 1 or over 1..... | 46. <i>Stegommata</i> . |
| Antennæ less than 1..... | 45. |
| 45. Forewings with 4 veins absent..... | 41. <i>Cateristis</i> . |
| Forewings with 5 veins absent..... | 47. <i>Crobylophora</i> . |
| 46. Antennæ 1. | 43. <i>Bedellia</i> . |
| Antennæ less than 1..... | 47. |
| 47. Forewings with cell closed, 5 veins absent | 42. <i>Diplothectis</i> . |
| Forewings with cell open, 6 veins absent... | 44. <i>Arctocoma</i> . |

1. NEMOTOIS, Hb.

Head rough-haired on crown, face smooth; eyes in ♂ enlarged, approximated on crown; ocelli absent; tongue well-developed, base hairy. Antennæ in ♂ about 3, in ♀ $1\frac{1}{2}$ or more, in ♂ filiform, simple, basal joint thick, without pecten. Labial palpi moderate, curved, ascending, shorter in ♀, with long rough projecting hairs in front, terminal joint tolerably pointed. Maxillary palpi absent. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate, 7 to costa, 11 from $\frac{1}{3}$. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; veins 6 and 7 stalked or approximated at base.

A rather small genus, characteristic of the European and Indo-Malayan regions; the three Australian species known to me are very closely allied together. The known larvæ (not Australian) are case-bearers, feeding at first on flowers, afterwards rather indiscriminately. The imagos fly in hot sunshine.

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| 1. Forewings with clear yellow oval spot in disc near base..... | 3. <i>topazias</i> . |
| Forewings without yellow spot..... | 2. |
| 2. Hairs of crown in ♂ black..... | 1. <i>sparsellus</i> . |
| Hairs of crown in ♂ yellow-ochreous mixed with blackish..... | 2. <i>orichalcias</i> . |

1. *Nem. sparsellus*, Walk.

(*Nemotois sparsella*, Walk. 506.)

♂♀. 11 mm. Head in ♂ blackish, in ♀ yellow-ochreous, face brassy-metallic. Palpi whitish, with black hairs. Antennæ

whitish, towards base dark fuscous. Thorax pale metallic golden. Abdomen and legs dark fuscous, base of tarsal joints whitish. Forewings elongate-triangular, costa gently arched, apex obtuse, hindmargin obliquely rounded; bright metallic coppery-golden, with purple reflections; a slender dark purple subcostal streak from base to $\frac{1}{3}$, margined above by a pale metallic golden costal streak; a rather broad dark fuscous-purple median fascia, anterior edge rather irregular, posterior edge straight, crossed throughout by numerous whitish fine partially broken striæ, not quite reaching posterior edge: cilia coppery-golden. Hindwings dark purplish-fuscous; cilia bronzy-fuscous.

Sydney, New South Wales; three specimens in October, on flowers of *Leptospermum*. This may possibly be only a form of *N. orichalcias*; further material is needed to decide. It is distinguished by the wholly black crown of ♂, whitish antennæ, more golden (less purple) colouring, and whitish (not ochreous) striæ of median fascia.

2. *Nem. orichalcias*, n.sp.

(? *Adela laurella*, Newm., Trans. Ent. Soc. Lond. (n.s.) III, 290.)

♂♀. 10-13 mm. Head yellow-ochreous, crown in ♂ mixed with blackish, face brassy-metallic. Palpi whitish-ochreous, with some dark fuscous hairs. Antennæ dark fuscous. Thorax bright metallic coppery. Abdomen and legs dark fuscous, base of tarsal joints ochreous-whitish. Forewings elongate-triangular, costa gently arched, apex obtuse, hindmargin obliquely rounded; bright metallic coppery-golden, with strong bright purple reflections; a thick dark purple subcostal streak from base to $\frac{1}{3}$, margined above by a pale metallic golden costal streak, and beneath by a pale metallic golden oval patch; a rather broad dark fuscous-purple median fascia, anterior edge curved or somewhat sinuate, posterior edge straight, crossed throughout by numerous whitish-ochreous fine partially broken striæ, not quite reaching posterior edge: cilia metallic purplish-coppery. Hindwings dark fuscous, with

purplish or bronzy reflections, thinly scaled towards base; cilia bronzy-fuscous.

Sydney and Bowenfels (3000 feet), New South Wales; Melbourne, Victoria; Launceston and Hobart, Tasmania; Mount Lofty, South Australia; locally plentiful from December to March, frequenting flowers of *Bursaria spinosa*. *Adela laurella*, Newm., may probably be this species, but as the description is insufficient to separate it with certainty from its allies, and the type is not forthcoming, it seems better not to adopt the name on uncertain evidence. *Adela chrysolamprella*, Ros., Ann. Mag. Nat. Hist. 1885, 438, appears to me from the description to be probably a fourth species of the genus, unless described from a bad specimen; it cannot be certainly identified at present.

3. *Nem. topazias*, n.sp.

♂♀. 10-12 mm. Head in ♂ blackish, in ♀ yellow-ochreous, face brassy-metallic. Palpi pale yellow, in ♂ with some blackish hairs. Antennæ dark fuscous. Thorax bright metallic coppery. Abdomen and legs dark fuscous, base of tarsal joints ochreous-whitish. Forewings elongate-triangular, costa gently arched, apex obtuse, hindmargin obliquely rounded; bright deep coppery-purple, with golden-metallic reflections; a pale metallic-golden streak along basal third of costa; a pale clear ochreous-yellow oval or pear-shaped spot near base in middle; a rather broad dark fuscous-purple median fascia, anterior edge curved or somewhat sinuate, posterior edge straight, crossed throughout by numerous whitish-yellowish fine partially broken striæ, not quite reaching posterior edge; cilia deep coppery-purple. Hindwings dark purplish-fuscous, thinly scaled towards base; cilia purplish-fuscous.

Blackheath (3500 feet), New South Wales; Georges Bay, Tasmania; Warrabara and Mount Lofty, South Australia; in October, December, and March, locally plentiful, frequenting flowers of *Acacia*. This species is very similar to the two preceding, but distinguished from both by the clear well-defined yellow (not metallic) subbasal spot, and by the deeper purple (less golden) colouring, especially noticeable in the cilia of fore-

wings; in the blackish crown of ♂ it agrees with *N. sparsellus*, in the yellowish tint of the striæ with *N. orichalcias*. The fact of the three species appearing to frequent different flowers may not indicate much, as it is possible that these are not the food-plants of the larvæ, but are merely frequented by the imagos for their nectar; they may therefore be simply selected as the most attractive blossoms in the localities respectively inhabited by the species.

2. ADELA, Latr.

Head rough-haired, face rather smooth beneath; ocelli absent; tongue developed. Antennæ in ♂ about 3, in ♀ about $1\frac{1}{2}$, filiform, often thickened with scales towards base. Labial palpi rather short, porrected, rough-haired. Maxillary palpi absent. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate, 7 to costa, 8 and 9 rarely stalked, 11 from $\frac{1}{3}$. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; sometimes 5 and 6, or 6 and 7 stalked.

This genus, distinguished from the preceding by the eyes of the ♂ not being abnormally enlarged, is characteristic of the northern hemisphere, where it attains some development; whether the single species alleged to be Australian is really so, appears to me at present very doubtful. Besides the species in question, an insect has been figured by Felder (Reis. Nov. pl. CXXXIX, 1) under the name of *Adela aethiops*, from Australia; it is represented as having blue-black forewings, with three straight parallel blue transverse lines beyond middle, and blackish hindwings; I believe this figure represents a Neuropterous insect which I have seen in Australia; and not a Lepidopteron at all.

4. *Ad. caeruleella*, Walk.

(*Adela caeruleella*, Walk. 502.)

♂. 13-14 mm. Head reddish-ochreous. Forewings elongatè; deep purple, with indigo-blue reflections. Hindwings dark grey.

I have never seen this species in Australia, neither have any of my correspondents; possibly it is from the northern districts, but

at present I am disposed to think that there is some error of locality; two of the three types in the British Museum are said to be from an unknown source, the third from Australia, without more precise indication. The above diagnosis is drawn from these types.

Nemophora sabulosella, Walk. 497, is described as Australian: the small genus *Nemophora*, differing from *Adela* mainly in the possession of long folded maxillary palpi, is otherwise exclusively European, and its occurrence in Australia is very improbable, and has never been confirmed. The species in question (a greyish-ochreous insect with grey hindwings) closely approaches the European *N. panzerella*, if indeed not actually identical with it, and at present I refuse to include it in the Australian fauna without further evidence.

3. SENTICA, Walk.

Head with loose rather rough hairs, face with tolerably appressed scales; ocelli absent; tongue absent. Antennæ under $\frac{1}{2}$, joints elongate, in ♂ dentate, fasciculate-ciliated, basal joint thickened with small tooth of scales, without pecten. Labial palpi rather short, porrected, loosely haired, terminal joint short, somewhat pointed. Maxillary palpi absent. Posterior tibiae with appressed scales. Ovipositor of ♀ very long. Forewings with vein 1 furcate, 7 to hindmargin, 8 absent, 9 and 10 sometimes stalked. Hindwings 1, trapezoidal-ovate, cilia $\frac{1}{4}$; 6 and 7 somewhat approximated.

Only the two following species are known. The genus may probably be a development of *Xysmatodoma*.

- Forewings with white spots..... 6. *oppositella* ♀.
 Forewings with golden spots..... 6. *oppositella* ♂.
 Forewings with orange fasciæ..... 5. *heliozona*.

5. *Sent. heliozona*, n.sp.

♀. 20 mm. Head, palpi, thorax, abdomen, and legs blackish; anal tuft whitish-ochreous beneath. Antennæ pale ochreous-yellowish. Forewings suboblong, costa sinuate, apex obtuse,

hindmargin obliquely rounded; purple-blackish; markings bright orange; a moderate rather irregular fascia at $\frac{1}{4}$; a spot on inner margin at $\frac{2}{3}$; a moderate slightly sinuate fascia from middle of costa to anal angle; a moderate outwards-curved fascia from $\frac{3}{4}$ of costa to middle of hindmargin: cilia deep indigo-blue. Hindwings purple-blackish; a moderate orange fascia near base; a moderate orange fascia from beneath costa at $\frac{1}{3}$ to hindmargin below middle, upper extremity attenuated; cilia deep indigo-blue.

Queensland; one specimen obtained from Mr. C. Diggles.

6. *Sent. oppositella*, Walk.

(*Sentica oppositella*, Walk. 507; *Oecinea Felderi*, Scott, Austr. Lep. 29, pl. IX.; ? *Lampronia discistrigella*, Walk. 487.)

♂. 14 mm. Forewings dark purplish-fuscous; numerous small golden dots towards inner and hindmargin; a golden spot on middle of costa, and another on costa before apex. Hindwings dark fuscous, with a golden discal patch extending to base.

♀. 15-19 mm. Head, palpi, antennæ, thorax, abdomen, and legs black; antennæ ringed with whitish; base of first tarsal joint white; anal tuft ochreous-yellowish. Forewings oblong-triangular, costa moderately arched, apex obtuse, hindmargin rounded, little oblique; black, with slight blue-green reflections; markings snow-white; a narrow fascia near base, not reaching inner margin; a second at $\frac{1}{3}$, somewhat angulated in middle, interrupted below middle; several variable dots below middle of disc; three spots forming a curved series from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin; four others forming a curved submarginal series from $\frac{5}{6}$ of costa to anal angle: cilia indigo-blue, with white dots at apex and anal angle and sometimes above and below middle. Hindwings very dark purplish-bronze, towards anal angle blue-greenish-tinged; three or four variable snow-white dots towards anal angle; cilia indigo-blue.

Sydney, New South Wales; from November to January, common. Larva 16-legged, blackish; head and segments 2-4 yellowish-brown: feeds on lichens, grass, &c., in a portable case;

case large, triangular, swollen about middle, granulated with fragments of lichen, mouth very oblique, apex rather flattened, with two loose flaps on sides a little below apex. The description of the ♂ given above is taken from Scott (loc. cit.); I have bred the ♀ freely, but only bred one ♂, and that escaped, owing to my being unprepared for its great activity and rapidity of flight; I have never met with the species on the wing.

If Walker's description of *discistrigella* is really taken from the ♂ of this species, as seems not unlikely, the specific name would have to be adopted for the species; but I found no type standing under the name in the Museum collection, and think it better to wait until it is discovered, as the description does not fully accord.

4. CTENOCOMPA, n.g.

Head rough-haired; ocelli absent; tongue absent. Antennæ $\frac{1}{2}$, in ♂ bipectinated, basal joint moderate, without pecten. Labial palpi short, thick, obtuse, porrected, with some loose rough hairs. Maxillary palpi absent. Posterior tibiæ with appressed scales. Forewings with vein I furcate, 7 to apex, 8 absent, 11 from before middle. Hindwings 1, triangular-ovate, cilia $\frac{1}{6}$; vein 4 absent, 6 and 7 somewhat approximated.

Presumably also a development of *Xysmatoloma*, and allied to the preceding genus. It is nearly related structurally to the genus *Melusina*, which inhabits the European Alps, but differs in the absence of a vein in both forewings and hindwings. Only the one species is known.

7. *Cten. baliodes*, n.sp.

♂. 18 mm. Head, palpi, thorax, abdomen, and legs blackish, clothed with grey hairs. Antennæ blackish, pectinations 3, reduced to dentations towards apex. Forewings suboblong, costa gently arched, apex rounded, hindmargin obliquely rounded; dark fuscous, strewn with numerous small paler or whitish-tinged spots throughout; several irregular white spots towards base; a larger transverse white spot from costa before middle, reaching half across wing; beneath this a triangular white spot, below

which are two white dots on middle of inner margin; four small white spots on apical half of costa; one or two whitish spots towards anal angle: cilia snow-white, base blackish-fuscous. Hindwings dark fuscous; cilia as in forewings.

Duaringa, Queensland; one specimen received from Mr. G. Barnard.

5. XYSMATODOMA, Z.

Head shortly rough-haired; ocelli present; tongue absent. Antennæ from under $\frac{1}{2}$ to $\frac{3}{4}$, in ♂ flatly subdentate or almost filiform, ciliated (1-2), basal joint with pecten. Labial palpi moderate or short, subascending or porrected, second joint with loose or rough projecting scales beneath or rarely tufted in front, terminal joint shorter than second, tolerably pointed. Maxillary palpi rudimentary or absent. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate, rarely 2 and 3 stalked, 7 and 8 stalked or coincident, 7 when present running to apex or hindmargin, 8 and 9 sometimes stalked, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{1}{6}$ - $\frac{1}{2}$; veins 4 and 5 sometimes stalked, 6 and 7 somewhat approximated at base.

Hitherto only known as containing two European species, this genus reaches a considerable degree of development in Australia, and may be regarded as the type of one main group of the family. The European genus *Talaeporia* only differs from it in the apterous ♀, and as that sex is unknown in some of the following species, it is conceivable that representatives of *Talaeporia* may hereafter be found among them. In *Xysmatodoma* the ♀ is usually somewhat smaller than the ♂, but always fully winged. The larvæ are all case-bearers, and feed either on lichens or indiscriminately on various plants.

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|---|-----------------------|
| 1. Palpi with second joint tufted in front..... | 11. <i>manrella</i> . |
| Palpi with second joint not tufted..... | 2. |
| 2. Head ochreous-yellow..... | 3. |
| Head not yellow..... | 7. |
| 3. Forewings with yellow markings..... | 4. |
| Forewings with white markings..... | 5. |

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4. Hindwings yellow.....	28. <i>carlotta</i> .
Hindwings dark fuscous.....	29. <i>chrysopetala</i> .
5. Forewings with white marginal spots.....	36. <i>chrysuva</i> .
Forewings with transverse fasciæ.....	6.
6. Forewings with fasciæ only.....	35. <i>melanarthra</i> .
Forewings with spots and fasciæ.....	8. <i>glabella</i> .
7. Hindwings white.....	26. <i>apochroa</i> .
Hindwings not white.....	8.
8. Abdomen yellowish.....	34. <i>trifasciana</i> .
Abdomen not yellowish.....	9.
9. Forewings with ground colour white, without strigulæ.....	10.
Forewings with ground colour not white, or if white, with darker strigulæ.....	13.
10. Forewings with posterior fascia furcate at anal angle.....	31. <i>basiferana</i> .
Forewings with posterior fascia not furcate beneath.....	11.
11. Forewings with posterior fascia confluent with submarginal streak beneath.....	33. <i>characota</i> .
Forewings with posterior fascia not confluent with submarginal streak.....	12.
12. Forewings with markings slender, sharply defined.....	32. <i>cataphracta</i> .
Forewings with markings moderately broad, irregular.....	30. <i>hamalitha</i> .
13. Forewings pale brownish-ochreous.....	27. <i>pelochroa</i> .
Forewings not brownish-ochreous.....	14.
14. Hindwings distinctly strigulated with darker.....	16. <i>saxosa</i> .
Hindwings not strigulated.....	15.
15. Hindwings dark fuscous.....	16.
Hindwings not dark fuscous.....	22.
16. Forewings with clear white spots.....	17.
Forewings without white spots.....	18.

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| 17. Forewings with eleven spots..... | 9. <i>Franzenfeldi</i> . |
| Forewings with spots numerous, indefinite | 10. <i>stellaris</i> . |
| 18. Forewings with dark fasciae more or less
defined | 19. |
| Forewings without indication of fasciae.... | 21. |
| 19. Forewings with vein 7 absent, 8 and 9
stalked or from point..... | 23. <i>phaulodes</i> . |
| Forewings with veins 7 and 8 stalked, 9
separate | 20. |
| 20. Size above 21 mm..... .. | 17. <i>adelopis</i> . |
| Size below 16 mm..... | 22. <i>reticulata</i> . |
| 21. Size large..... | 18. <i>Guildingi</i> . |
| Size very small..... .. | 24. <i>pygmaea</i> . |
| 22. Head light brownish-ochreous..... | 19. <i>charitodes</i> . |
| Head not ochreous. | 23. |
| 23. Forewings with vein 7 absent. | 24. |
| Forewings with vein 7 present | |
| 24. Forewings without darker markings..... | 25. <i>nephelodes</i> . |
| Forewings with darker markings..... | 25. |
| 25. Head grey | 20. <i>crepuscularis</i> . |
| Head white..... .. | 26. |
| 26. Forewings with dark linear mark from
costa at $\frac{3}{4}$ | 12. <i>zonarcha</i> . |
| Forewings without dark linear mark from
costa at $\frac{3}{4}$ | 15. <i>protorna</i> . |
| 27. Forewings with distinct whitish antemedian
fascia | 21. <i>heliochaeres</i> . |
| Forewings without whitish fascia..... | 28. |
| 28. Forewings much dilated ; size 28 mm..... | 13. <i>euryptera</i> . |
| Forewings not dilated ; size 17 mm..... .. | 14. <i>lasiocola</i> . |

8. *Xysm. glabrella*, Walk.*(Senticia glabrella, Walk. 508.)*

♂. 17 mm. Head light yellowish. Thorax blackish. Forewings elongate, blackish ; markings white ; a rather narrow fascia

at $\frac{1}{3}$; a spot on costa beyond middle, and a smaller one at $\frac{2}{3}$; a small spot on inner margin at $\frac{3}{4}$; a narrow fascia from $\frac{1}{5}$ of costa to anal angle; a small mark at apex, and one or two dots on hindmargin below it. Hindwings dark fuscous.

Sydney, New South Wales; I have described the type in the British Museum, which is the only specimen I have seen; I have not been able to examine it accurately for structure, but have little doubt of its position, though it might be a *Lepidoscia*.

9. *Xysm. Frauenfeldi*, Scott.

(*Oecobia Frauenfeldi*, Scott, Austr. Lep. 27, pl. ix)

♀. 18 mm. Forewings elongate, purplish-black; about eleven white spots irregularly scattered throughout. Hindwings dark fuscous.

Sydney, New South Wales. Larva blackish, head and segments 2-4 testaceous spotted with brown; feeds on *Eucalyptus*; case cylindrical, formed of silk covered with small twigs placed longitudinally. I have not seen this species; a single specimen was bred by Scott, and the above account is taken from him.

10. *Xysm. stellaris*, n.sp.

♀. 20 mm. Head, palpi, antennæ, thorax, abdomen, and legs dark fuscous. Forewings elongate, costa gently arched, apex rounded, hindmargin obliquely rounded; $\bar{7}$ absent; dark fuscous; numerous small scattered well-defined white spots, on anterior half partially coalescing to form transverse marks or incomplete slender fasciæ; a more conspicuous transverse white spot on middle of inner margin: cilia fuscous, basal half dark fuscous. Hindwings dark fuscous; cilia as in forewings.

Melbourne, Victoria; one specimen received from Mr. G. H. Raynor. The number of spots is much greater than in the preceding species, especially in the posterior half of wing.

11. *Xysm. maurella*, Walk.

(*Tinea maurella*, Walk. 483).

♀. 24-26 mm. Head, palpi, antennæ, thorax, abdomen, and legs dark fuscous; palpi with scales of second joint forming a

dense projecting tuft in front; antennæ under $\frac{1}{2}$; legs obscurely ringed with whitish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin obliquely rounded; 7 absent; dark fuscous, mixed with blackish scales, tending to form transverse strigulae: cilia dark fuscous, mixed with blackish, terminal half spotted with whitish-ochreous (imperfect). Hindwings and cilia dark grey.

Newcastle and Mittagong, New South Wales; in March, two specimens. This species can be distinguished from all the rest of the genus by the tufted palpi; it is otherwise very obscure in appearance, but possibly the ♂ may present additional characters, involving its separation from the genus.

12. *Xysm. zonarcha*, n.sp.

♂. 15-17 mm. Head white, face and palpi fuscous or dark fuscous. Antennæ dark fuscous. Thorax dark grey, mixed with white posteriorly. Abdomen grey-whitish, anal tuft white. Legs dark fuscous, posterior pair whitish. Forewings elongate, costa moderately arched, apex rounded, hindmargin very obliquely rounded; 7 absent; white, transversely strigulated with dark fuscous; an irregular rather outwardly oblique dark fuscous fascia from $\frac{2}{5}$ of costa, reaching more than half across wing; a rather inwardly oblique dark fuscous linear mark from $\frac{3}{4}$ of costa, reaching half across wing; cilia white. Hindwings grey; cilia whitish-grey, base darker.

Duaringa, Queensland; three specimens received from Mr. G. Barnard, taken in January. The species is very distinct by the two conspicuous marks from costa, sharply defined strigulation, and very rounded forewings.

13. *Xysm. euryptera*, n.sp.

♂. 28 mm. Head and palpi grey-whitish. Antennæ grey. Thorax and abdomen grey. Legs dark fuscous, apex of joints and posterior pair grey-whitish. Forewings elongate, much dilated posteriorly, costa moderately arched, apex very obtuse,

hindmargin rounded, little oblique; 7 and 8 stalked; pale fuscous-grey, densely strewn with whitish scales, and transversely strigulated with dark fuscous; a distinct transverse linear dark fuscous mark in disc above middle at $\frac{2}{3}$; cilia fuscous-whitish, base more fuscous-tinged. Hindwings whitish-fuscous; cilia as in forewings.

Duringa, Queensland; one specimen received from Mr. G. Barnard. Although obscurely marked, it is readily known by the peculiarly dilated and obtuse form of the forewings, and large size.

14. *Xysm. lasiocola*, n.sp.

♂. 17 mm. Head, palpi, thorax, and abdomen rather light brown-grey. Antennæ grey. Legs dark grey, apex of joints tinged with whitish-ochreous. Forewings elongate, costa moderately arched, apex obtuse, hindmargin obliquely rounded; 7 and 8 stalked; grey-whitish, closely strigulated transversely and reticulated with fuscous, forming two or three larger and darker fuscous spots on posterior half of costa: cilia fuscous-whitish, basal third with alternate fuscous and whitish quadrate spots. Hindwings grey, thinly scaled; cilia grey, more whitish towards tips.

Mount Kosciusko, New South Wales; one specimen taken on the very summit of the mountain (7200 feet), in January. An inconspicuous insect, distinguished rather by the absence of the special characteristics of its allies, but the well-marked spots at the base of cilia of forewings are a good point.

15. *Xysm. protorna*, n.sp.

♂. 19-22 mm. Head white, face and centre of crown sometimes fuscous-tinged. Palpi fuscous, beneath whitish. Antennæ grey-whitish. Thorax fuscous, posteriorly whitish, generally with a whitish anterior dorsal spot. Abdomen whitish-grey. Legs dark fuscous, apex of joints and posterior pair grey-whitish. Forewings elongate, costa rather strongly arched, apex obtuse, hindmargin very obliquely rounded; 7 absent; whitish-grey or white, with scattered more or less indistinct fuscous or dark fuscous strigulæ; a rather narrow irregular sometimes ill-defined dark fuscous fascia

from $\frac{1}{3}$ of costa to middle of inner margin, more or less interrupted on lower half: cilia grey-whitish. Hindwings light grey; cilia whitish, base grey.

Sydney, New South Wales; at the end of February and beginning of March, eight specimens, mostly taken at lamps. Especially distinguished by the peculiar form of forewings, white head, and form of antemedian fascia.

16. *Xysm. sacosa*, n.sp.

♂♀. 27-35 mm. Head, palpi, and thorax fuscous, mixed with grey-whitish. Antennæ whitish. Abdomen grey. Legs dark fuscous, posterior tarsi fuscous-whitish. Forewings elongate, costa in ♂ moderately arched, in ♀ more strongly and fringed with cilia, especially on anterior half, apex obtuse, hindmargin obliquely rounded; 7 and 8 long-stalked; pale fuscous, suffused with whitish, transversely strigulated and reticulated with dark fuscous; markings formed by an irregular fuscous or dark fuscous suffusion, incompletely defined; a fascia near base, externally angulated in middle; a small quadrate spot on inner margin at $\frac{2}{3}$; a fascia from $\frac{2}{3}$ of costa to beyond middle of inner margin, angulated on submedian fold; three quadrate spots on costa towards $\frac{3}{4}$, connected by a broad very irregular fascia narrowed downwards with anal angle: cilia grey-whitish, base spotted with dark fuscous. Hindwings grey-whitish, distinctly strigulated throughout with grey; cilia whitish.

Sydney, New South Wales; in July, six specimens. A winter insect, characterised by large size and more complex marking, and differing from all the rest of the genus by the well-marked strigulation of the hindwings, and fringed costa of forewings of ♀.

17. *Xysm. adelopis*, n.sp.

♂♀. 22-25 mm. Head fuscous, sometimes mixed with whitish on crown. Palpi whitish, above dark fuscous. Antennæ whitish. Thorax fuscous mixed with whitish. Abdomen dark fuscous, sometimes mixed with whitish, anal tuft of ♀ whitish-ochreous. Legs dark fuscous, posterior pair grey-whitish. Forewings elongate,

rather narrow, costa moderately arched, apex obtuse, hindmargin very obliquely rounded; 7 and 8 stalked; fuscous, more or less suffusedly irrorated with whitish, and transversely strigulated with dark fuscous; sometimes a small dark fuscous spot on inner margin before middle; a moderate dark fuscous fascia from $\frac{2}{5}$ of costa to beyond middle of inner margin, sometimes perceptible towards costa only; a dark fuscous spot on costa at $\frac{2}{3}$, and another at anal angle, sometimes little indicated; cilia fuscous, somewhat mixed with whitish. Hindwings rather dark fuscous; cilia fuscous, base darker.

Sydney, New South Wales; from February to June, five specimens. A larval case, attributed to this species, is nearly cylindrical, rather curved, granulated with grains of coarse sand. Recognisable by the rather narrow forewings, and general dark grey colouring, especially of the hindwings.

18. *Xysm. Guildingi*, Scott.

(*Conoeci Guildingi*, Scott, Austr. Lep. 27, pl. IX; *C. irrorea*, Feld., Reis. Nov. pl. cxxxviii, 39, 40.)

♂♀. 22-30 mm. Forewings elongate; grey, evenly strigulated with darker. Hindwings rather dark fuscous.

Sydney and Newcastle, New South Wales. Larva blackish, head and segments 2-4 testaceous; case elongate-conical, granulated with fragments of bark, &c.; feeds on *Kunzea*, *Leptospermum*, *Juncus*, &c. Although this species is represented as common, I have no specimens which I can refer to it; the above description and account is taken from the authors quoted.

19. *Xysm. charitodes*, n.sp.

♂. 19 mm. Head light brownish-ochreous, face and palpi fuscous. Antennæ and thorax fuscous. Abdomen grey, anal tuft pale ochreous. Legs dark fuscous, posterior pair whitish. Forewings elongate, costa moderately arched, sinuate in middle, apex obtuse, hindmargin slightly rounded, oblique; 7 absent; light fuscous, with a few whitish scales, and obscurely strigulated

with darker fuscous, more distinctly on costa; a dark fuscous quadrate spot on inner margin at $\frac{2}{5}$; a dark fuscous irregular fascia from beneath costa before middle to inner margin beyond middle, preceded and followed on inner margin by quadrate spots of whitish suffusion; an indistinct dark fuscous streak from beneath costa near apex to anal angle: cilia grey-whitish. Hindwings light grey; cilia grey-whitish.

Sydney, New South Wales; one specimen in June. Although an obscure species, it seems to be sufficiently distinguished by the ochreous tinge of the head, form of forewings, and light grey hindwings.

20. *Xysm. crepuscularis*, n.sp.

♂. 18 mm. Head, palpi, thorax and abdomen grey, mixed with whitish; abdomen somewhat ochreous-tinged posteriorly. Antennæ fuscous. Legs dark fuscous, posterior pair grey-whitish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin slightly rounded, rather strongly oblique; 7 absent; grey, with a few whitish scales, and some scattered dark fuscous scales tending to form short strigulæ, especially on costa and inner margin; two obscure parallel series of about four dark fuscous dots from about $\frac{2}{5}$ of costa to $\frac{2}{5}$ of inner margin, enclosed space slightly whitish; a well-marked dark fuscous dot in disc at $\frac{2}{3}$: cilia whitish-grey. Hindwings grey; cilia whitish-grey.

Albany, West Australia; one specimen in September. Also an inconspicuous species, specially characterised by the peculiar markings of forewings.

21. *Xysm. heliochaeres*, n.sp.

♂♀. 17-20 mm. Head and palpi whitish mixed with dark fuscous. Antennæ dark fuscous. Thorax and abdomen grey mixed with whitish. Legs dark fuscous, apex of joints and posterior pair grey-whitish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin gently rounded, rather strongly oblique; 7 and 8 long-stalked; in ♂ pale fuscous, irrorated with whitish, with indistinct scattered fuscous strigulæ, in ♀ whitish strigulated with blackish-fuscous; a straight dark fuscous line

from $\frac{1}{4}$ of costa to middle of inner margin, limiting a fuscous fascia or suffusion extending more or less completely to base, and followed by a rather broad distinctly white or whitish fascia; in ♀ a small quadrate dark fuscous spot on costa in middle; a dark fuscous irregular fascia from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin, and another from $\frac{1}{5}$ of costa to anal angle, confluent on a blackish-fuscous dot in middle, both nearly obsolete in ♂ except on margins, but discal dot conspicuous; costa spotted with dark fuscous towards apex: cilia grey-whitish, in ♀ mixed with dark fuscous. Hindwings grey; cilia in ♂ grey-whitish, in ♀ grey.

Sydney, New South Wales; Melbourne, Victoria; in July and August, rather common. The species may be recognised by the more or less distinct straight oblique whitish band of the forewings; the ♀ is smaller and more strongly marked than the ♂. The imago flies freely in the sunshine.

22. *Xysm. reticulata*, n.sp.

♂♀. 12-15 mm. Head fuscous, somewhat mixed with whitish. Palpi dark fuscous, beneath whitish. Antennæ, thorax, and abdomen fuscous. Legs dark fuscous, posterior pair grey-whitish. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; 7 and 8 long-stalked; dark fuscous, irrorated with numerous small cloudy white spots, sharper and tending to be partially confluent in ♀; the partial absence of these produces in ♂ darker markings, an oblique basal patch, an oblique median fascia, and two posterior fasciæ confluent on lower half and terminating in anal angle, all ill-defined and in ♀ scarcely traceable: cilia fuscous, mixed with whitish towards tips. Hindwings dark fuscous; cilia as in forewings.

Melbourne and Fernshaw, Victoria; in September and November, two specimens. This inconspicuous insect is smaller than any of the preceding, but not so small as the next two species; the markings are very obscure.

23. *Xysm. phaulodes*, n.sp.

♂♀. 10-12 mm. Head, palpi, antennæ, thorax, abdomen, and legs dark fuscous; posterior legs whitish. Forewings elongate,

costa gently arched, apex roundpointed, hindmargin very obliquely rounded; 7 absent, 8 and 9 from a point or short-stalked; in ♂ dark fuscous, irregularly and obscurely irrorated with white, which forms a suffusion in disc towards base, a cloudy straight median fascia, and some scattered posterior dots; in ♀ white, strigulated throughout with dark fuscous, with irregular dark fuscous fasciæ before and beyond middle, the latter furcate towards costa: cilia rather dark fuscous, with a few white scales. Hindwings and cilia dark fuscous.

Hobart, Tasmania: in March, five specimens bred from cases found on a fence; the description of the case was unfortunately lost. Very similar to the preceding and following, but the neuration is peculiar and seems the best distinction; the markings, though not identical, are so ill-defined that they are hard to trace.

24. *Xysm. pygmaea*, n.sp.

♂. 8 mm. Head, palpi, antennæ, thorax, and abdomen fuscous; legs dark fuscous, apex of joints and posterior pair fuscous-whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin very obliquely rounded; 7 absent; dark fuscous, with numerous scattered small obscure spots of whitish-ochreous or whitish-fuscous scales: cilia fuscous, with some fuscous-whitish scales. Hindwings rather dark fuscous; cilia fuscous.

Mount Victoria (3000 feet), New South Wales; four specimens in November, in a forest gully. The small size and absence of definite markings will distinguish it from all the rest.

25. *Xysm. nephelodes*, n.sp.

♂. 15-18 mm. Head and antennæ whitish or fuscous-whitish. Palpi dark fuscous, beneath whitish. Thorax pale grey. Abdomen whitish-grey. Legs dark grey, posterior pair whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin very obliquely rounded; 7 absent; grey, densely and suffusedly irrorated throughout with white: cilia grey-whitish. Hindwings whitish-grey; cilia grey-whitish.

Sydney, Blackheath (3500 feet), and Shoalhaven, New South Wales; from October to January, five specimens amongst rocks. Easily known by the uniform whitish-grey colouring.

26. *Xysm. apochroa*, n.sp.

♂. 13-14 mm. Head, palpi, antennæ, thorax, and abdomen white. Legs dark fuscous, posterior pair white. Forewings elongate, rather narrow, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; 7 and 8 stalked; white: cilia white. Hindwings and cilia white.

Mount Lofty (2000 feet), South Australia; two specimens in October. This must not be confused with the equally white *Lepidoscia palleuca*.

27. *Xysm. pelochroa*, n.sp.

♂. 12-13 mm. Head and palpi ochreous-whitish. Antennæ light fuscous. Thorax pale brownish-ochreous. Abdomen dark fuscous. Legs dark fuscous, posterior pair ochreous-whitish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin rounded, rather strongly oblique; 7 and 8 stalked; pale brownish-ochreous, with scattered fuscous scales, tending to form indistinct strigule; sometimes two or three small fuscous spots on inner margin: cilia whitish-ochreous. Hindwings dark fuscous; cilia fuscous, mixed with whitish-ochreous towards tips.

Brisbane, Queensland; three specimens amongst dense scrub in September. Differs from all in the uniform brownish-ochreous forewings.

28. *Xysm. carlotta*, n.sp.

♂. 12-14 mm. Head ochreous-yellow. Palpi, antennæ, and thorax dark fuscous. Abdomen dark fuscous, beneath ochreous-yellow. Legs dark fuscous, apex of joints and posterior pair ochreous-yellowish. Forewings elongate, costa gently arched, apex roundpointed, hindmargin rounded, rather strongly oblique; 7 absent; clear ochreous-yellow; markings dark fuscous; a streak along basal $\frac{1}{4}$ of costa, extended at base to inner margin; a moderate straight fascia from before middle of costa to beyond

middle of inner margin; a straight narrower fascia from $\frac{2}{3}$ of costa to anal angle; a variable fascia from costa before apex to second fascia below middle, sometimes connected with it also by a bar above middle, sometimes extending suffusedly to apex and hindmargin so as to become marginal: cilia dark fuscous, sometimes mixed with whitish-yellowish towards tips. Hindwings pale ochreous-yellow; a variable marginal band of dark fuscous irroration from apex to below middle of hindmargin, narrowed downwards; cilia as in forewings.

Sydney (Parramatta), New South Wales; in May, six specimens flying in the early morning sunshine at 6 a.m. I took them on different mornings, but never saw them at any other time of day; it is an elegant and very distinct species.

29. *Xysm. chrysopetala*, n.sp.

♂. 12 mm. Head ochreous-yellow. Palpi, antennæ, and thorax dark fuscous. Abdomen dark fuscous, beneath pale yellowish. Legs dark fuscous, apex of joints and posterior pair ochreous-whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin rounded, rather strongly oblique; 7 absent; clear ochreous-yellow; a dark purplish-fuscous streak along basal third of costa, extended at base to inner margin; apical half beyond a straight line from middle of costa to beyond middle of inner margin wholly dark purplish-fuscous, except a yellow spot on costa at $\frac{3}{4}$, and another on inner margin at $\frac{3}{4}$: cilia dark purplish-fuscous. Hindwings and cilia dark purplish-fuscous.

Sydney, New South Wales; two specimens on fences in September. Also very distinct.

30. *Xysm. hamalitha*, n.sp.

♀. 16 mm. Head and antennæ white. Palpi white, terminal joint dark fuscous. Thorax fuscous. Abdomen grey-whitish. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin obliquely rounded; 7 absent; white, with a few scattered

fuscous or dark fuscous scales ; markings fuscous mixed with dark fuscous ; a small spot on base of costa ; a small ill-defined spot in disc near base ; a moderate fascia from $\frac{2}{3}$ of costa to middle of inner margin, slightly angulated in middle ; a rather irregular fascia from $\frac{2}{3}$ of costa to anal angle ; a wedge-shaped spot on costa before apex ; an elongate spot on hindmargin below apex : cilia white, opposite wing-markings fuscous. Hindwings grey ; cilia whitish-grey, basal third rather dark fuscous.

Toowoomba (3000 feet), Queensland ; Mount Lofty (2000 feet), South Australia ; two specimens amongst rocks.

31. *Xysm. basiferana*, Walk.

(*Sciaphila basiferana*, Walk. 350.)

♂♀. 12-15 mm. Head white. Palpi and antennæ dark fuscous. Thorax dark fuscous, posterior extremity white. Abdomen grey, anal tuft ochreous-whitish. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, costa rather strongly arched, apex roundpointed, hindmargin rounded, rather strongly oblique ; 7 absent ; white ; markings blackish-fuscous ; a narrow basal mark, somewhat produced along costa ; a rather narrow fascia from $\frac{2}{3}$ of costa to middle of inner margin ; a fascia from about $\frac{3}{4}$ of costa to anal angle, furcate at both extremities, upper anterior fork sometimes obsolete ; a series of small spots along hindmargin and apical part of costa : cilia white, base marked with dark fuscous opposite wing-markings. Hindwings pale grey ; cilia ochreous-whitish.

Sydney, New South Wales ; bred rather freely in September and October. Larva 16-legged, stout, legs long, head small ; whitish-grey ; head and 2nd segment black, 3rd segment with a narrow dark grey transverse plate : feeds in a portable case on lichens on damp rocks and fences, in August and September : case cylindrico-conical, broadest at $\frac{1}{3}$ above mouth, finely granulated, whitish-green-grey ; mouth very oblique, apex rather bluntly flattened.

32. *Xysm. cataphracta*, n.sp.

♂♀. 15-17 mm. Head white. Palpi; antennæ, and thorax dark fuscous. Abdomen pale grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin obliquely rounded; 7 absent; white; markings dark fuscous; a narrow basal mark, somewhat produced along costa; three slender somewhat irregular fasciæ; first at $\frac{1}{4}$, not reaching costa; second from before middle of costa to middle of inner margin; third from $\frac{2}{3}$ of costa to anal angle; a dot on inner margin before third fascia; a short transverse mark from costa before apex; a slender streak along hindmargin from apex to near anal angle: cilia white, base dark fuscous opposite wing-markings. Hindwings in ♂ whitish-grey, in ♀ grey; cilia whitish.

Hobart, Tasmania; Adelaide, South Australia; in October and December, two specimens. The markings are more slender than in any of the allied species.

33. *Xysm. characota*, n.sp.

♂. 13-15 mm. Head white. Palpi, antennæ, and thorax dark fuscous. Abdomen grey-whitish. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin obliquely rounded; 7 and 8 stalked; white; markings dark fuscous; a narrow basal mark, somewhat produced along costa; an erect fascia-like mark from inner margin at $\frac{1}{4}$, reaching more than half across wing; a moderate fascia from before middle of costa to beyond middle of inner margin; a slightly inwards-angulated fascia from $\frac{2}{3}$ of costa to anal angle, where it coalesces with a slender submarginal fascia from costa before apex; sometimes some dark fuscous scales on hindmargin: cilia white. Hindwings whitish-grey; cilia whitish.

Sydney and Blackheath (3500 feet), New South Wales; Melbourne, Victoria; in February and April, three specimens.

34. *Xysm. trifasciana*, Walk.*(Penthina trifasciana*, Walk. 377.)

♂. 16-17 mm. Head white. Palpi and antennæ dark fuscous. Thorax dark fuscous, posterior extremity white. Abdomen pale yellowish-ochreous. Legs dark fuscous, posterior pair pale yellowish-ochreous. Forewings elongate, costa rather strongly arched, apex obtuse, hindmargin obliquely rounded; 7 and 8 stalked; white; markings purple-blackish; a narrow basal mark, produced along costa, sometimes reaching first fascia; three moderately broad fasciæ; first at $\frac{1}{4}$, sometimes running into second beneath costa; second from before middle of costa to beyond middle of inner margin; third from about $\frac{3}{4}$ of costa to anal angle, dilated and furcate on costa; sometimes a slender streak along upper half of hindmargin: cilia whitish-ochreous, towards tips dark fuscous, base also dark fuscous opposite wing-markings. Hindwings dark grey, towards inner margin sometimes suffused with pale ochreous-yellowish; cilia grey, on inner margin pale ochreous-yellowish.

Brisbane, Queensland; Sydney, New South Wales; in April, three specimens. Although the form of variation is curious and exceptional, I have no doubt that the specimens described belong to the same species.

35. *Xysm. melanarthra*, n.sp.

♀. 10 mm. Head pale ochreous-yellowish. Palpi, antennæ, and thorax dark fuscous. Abdomen dark fuscous, posteriorly mixed with pale yellowish, anal tuft ochreous-yellow. Legs dark fuscous, apex of joints whitish-ochreous. Forewings elongate, costa rather strongly arched, apex obtuse, hindmargin obliquely rounded; 7 absent; yellowish-white; markings purple-blackish; a large basal patch, outer edge extending from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin, curved; a rather broad fascia from before middle of costa to beyond middle of inner margin; a fascia from about $\frac{3}{4}$ of costa to anal angle, dilated and furcate towards costa; a

narrow line along upper half of hindmargin: cilia whitish, basal half dark fuscous opposite wing-markings (imperfect). Hindwings and cilia dark grey.

Albany, West Australia; one specimen in October.

36. *Xysm. chrysuræ*, n.sp.

♂. 12-13 mm. Head ochreous-yellow, face dark fuscous. Palpi and antennæ dark fuscous. Thorax dark fuscous, posterior extremity yellow-whitish. Abdomen ochreous-yellow, basal third dark fuscous. Legs dark fuscous, posterior pair whitish-yellowish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin obliquely rounded; 7 absent; dark purple-fuscous; four semi-oval ochreous-white spots, two on inner margin in middle and before anal angle, sometimes confluent, two on costa beyond middle and at $\frac{4}{5}$; an irregular ochreous-white streak along upper $\frac{2}{3}$ of hindmargin, sometimes interrupted: cilia fuscous. Hindwings and cilia dark grey.

Albany, West Australia; in September and October, four specimens.

6. LEPIDOSCIA, n.g.

Head rough-haired; ocelli present; tongue absent. Antennæ $\frac{2}{3}$, in ♂ serrate, strongly ciliated (2-3), basal joint with pecten. Labial palpi rather short, porrected, loosely scaled or sometimes with long rough hairs, second joint sometimes with two or three apical bristles, terminal joint moderate, tolerably pointed. Maxillary palpi absent. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate, 7 and 8 stalked or coincident, rarely 8 and 9 stalked, 7 when present running to hindmargin, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{1}{2}$; 4 absent, 6 and 7 sometimes from a point.

Doubtless a development of *Xysmatodoma*, from which it differs essentially only by the absence of vein 4 of the hindwings, which is clearly coincident with 5. All the species are Australian. Probably the larvæ are all case-bearers, as in *Xysmatodoma*. I am not acquainted with the ♀ of any one of the species, and it is

therefore not improbable that this sex may be apterous; however, I have not much material of any species.

- | | | |
|---|-----|------------------------|
| 1. Hindwings with black basal patch..... | 37. | <i>magnifica</i> . |
| Hindwings without black basal patch..... | 2. | |
| 2. Head yellowish. | 3. | |
| Head not yellowish..... | 8. | |
| 3. Hindwings partly yellow..... | 4. | |
| Hindwings not yellow..... | 7. | |
| 4. Forewings with two pale fasciæ before middle..... | 5. | |
| Forewings with one pale fascia before middle..... | 6. | |
| 5. Hindwings with dark area containing yellow spots..... | 38. | <i>comochora</i> . |
| Hindwings with dark area not containing yellow spots. | 39. | <i>magnella</i> . |
| 6. Hindwings with apical third dark fuscous | 43. | <i>punctiferella</i> . |
| Hindwings with apical $\frac{2}{3}$ fuscous..... | 44. | <i>tyrobathra</i> . |
| 7. Forewings with pale subcostal streak..... | 40. | <i>melitora</i> . |
| Forewings without pale subcostal streak.. | 45. | <i>chloropetala</i> . |
| 8. Forewings wholly white..... | 50. | <i>palleuca</i> . |
| Forewings not wholly white..... | 9. | |
| 9. Hindwings grey-whitish..... | 41. | <i>microsticha</i> . |
| Hindwings grey..... | 10. | |
| 10. Forewings sharply strigulated with dark fuscous..... | 42. | <i>strigulata</i> . |
| Forewings not strigulated..... | 11. | |
| 11. Forewings without pale markings..... | 49. | <i>varicoma</i> . |
| Forewings with pale markings..... | 12. | |
| 12. Forewings with fasciæ..... | 13. | |
| Forewings with pale marginal spots only.. | 48. | <i>amphiscia</i> . |
| 13. Forewings grey with cloudy whitish fasciæ | 47. | <i>sciodesma</i> . |
| Forewings whitish with narrow well-defined dark fasciæ..... | 46. | <i>desmophthora</i> . |

37. *Lep. magnifica*, n.sp.

♂. 24 mm. Head black, crown mixed with ferruginous. Palpi, antennæ, and thorax black; thorax crested. Abdomen deep ochreous-yellow, basal third and subapical ring blackish. Legs black, posterior tibiæ ochreous-orange. Forewings oblong, costa gently arched, apex rounded, hindmargin obliquely rounded; 7 absent; purple-black, sprinkled with pale yellowish; four whitish-ochreous fasciæ, on costa ochreous-yellowish; first near base, narrow, irregular, not reaching costa; second at $\frac{1}{3}$, moderate, outer edge angulated in middle; third moderate, interrupted in middle, extremities of both halves rounded; in one wing a small costal spot beyond this; fourth from costa at $\frac{1}{5}$ to hindmargin above anal angle, contracted below middle: cilia dark fuscous, with a whitish-ochreous bar on fourth fascia. Hindwings ochreous-orange; a black basal patch, indented in middle, emitting a short streak near inner margin; a black discal dot; a rather broad dark fuscous apical blotch, reaching to middle of hindmargin, including a yellow dot on costa: cilia ochreous-yellow, round apical blotch dark fuscous.

Ardrossan, South Australia; in September; one specimen (Adelaide Museum). This and the next species differ from the rest in the long rough hairs of the palpi, and this species is also peculiar in the possession of a thoracic crest; in other respects there is no essential difference, and the forms can be conveniently included together.

38. *Lep. comochora*, n.sp.

♂. 25-26 mm. Head orange or ochreous-yellow, face blackish. Palpi, antennæ, thorax, and legs blackish. Abdomen blackish, beneath pale ochreous-yellowish. Forewings elongate, posteriorly somewhat dilated, costa gently arched, apex obtuse, hindmargin obliquely rounded; 7 absent; blackish; markings whitish-ochreous; a fascia near base, attenuated upwards, not quite reaching costa; a fascia-like blotch from inner margin before middle, sometimes almost reaching a small spot or dot on costa at $\frac{1}{3}$; a moderate rounded spot on middle of costa, sometimes

including a black costal dot, and another on inner margin before anal angle ; a rather irregular blotch on costa about $\frac{1}{5}$, including a black costal dot ; a spot on hindmargin above anal angle ; a small spot on costa before apex : cilia rather dark fuscous. Hindwings ochreous-yellow ; a narrow dark fuscous hindmarginal fascia, forming two strong triangular projections below middle, and merged in a large apical irregularly defined dark fuscous patch, which contains three ochreous-yellow spots, sometimes partly confluent or connected with disc ; cilia dark fuscous.

Melbourne, Victoria ; two specimens received from Mr. G. H. Raynor and Mr. J. A. Kershaw.

39. *Lep. magnella*, Walk.

(*Incurcaria magnella*, Walk. 489.)

♂. 25 mm. Head yellowish, face fuscous. Thorax dark fuscous. Forewings elongate, dark fuscous ; markings ochreous-yellow ; a fascia-like spot on inner margin at $\frac{1}{4}$, attenuated upwards, not reaching costa ; a moderate straight fascia from before middle of costa to middle of inner margin ; a triangular spot on inner margin before anal angle ; a transverse mark from costa at $\frac{1}{5}$, almost confluent with a small spot on hindmargin below middle. Hindwings dark fuscous ; basal third ochreous-yellow.

Sydney, New South Wales ; the above description is taken from the type in the British Museum, which is the only one known to me.

40. *Lep. melitora*, n.sp.

♂. 15-16 mm. Head yellow-ochreous. Palpi and antennæ dark fuscous. Thorax dark fuscous, suffused with ochreous posteriorly. Abdomen light ochreous-yellowish. Legs dark fuscous, posterior pair whitish-ochreous. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded ; 7 present ; dark fuscous, more or less strewn with whitish-ochreous dots ; markings whitish ochreous, yellowish-tinged ; a subcostal streak from base, terminating in a semicircular spot on middle of costa ; an irregular spot on inner margin before

middle, and a semicircular spot before anal angle, sometimes confluent; a spot on costa at $\frac{2}{3}$, and a smaller one beyond it; an irregular cloudy submarginal streak: cilia fuscous, mixed with whitish-ochreous. Hindwings rather dark grey; cilia grey.

Albany, West Australia; three specimens in September and October.

41. *Lep. microsticha*, n.sp.

♂. 15-16 mm. Head white. Palpi and antennæ dark fuscous. Thorax white, suffused with fuscous anteriorly. Abdomen whitish-grey. Legs dark fuscous, posterior pair whitish. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded; 7 sometimes present; white, with scattered fuscous strigulae, most marked on anterior half of costa; markings rather dark fuscous; a short inwardly oblique streak from costa at $\frac{2}{3}$, apex sometimes bent inwards and continued as a subcostal streak to disc at $\frac{1}{3}$; an inwardly oblique streak from costa at $\frac{3}{4}$, and an outwardly oblique streak from anal angle, their extremities sometimes connected; a spot on costa before apex; some hindmarginal dots, sometimes forming a connected streak: cilia white, on costa barred with dark fuscous. Hindwings grey-whitish; cilia whitish.

Albany and York, West Australia; in September and October, four specimens.

42. *Lep. strigulata*, n.sp.

♂. 19 mm. Head fuscous, mixed with whitish on crown. Palpi and antennæ dark fuscous. Thorax and abdomen fuscous. Legs dark fuscous, posterior pair fuscous-whitish. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded; 7 absent; whitish, strongly strigulated and reticulated throughout with rather dark fuscous; two or three more conspicuous dark fuscous marks on costa about $\frac{1}{3}$, with obsolete indications of a darker fascia connected with them, and two or three other similar marks on costa about $\frac{3}{4}$: cilia fuscous-whitish, base more fuscous-tinged. Hindwings pale fuscous; cilia as in forewings.

Ardrossan, South Australia; one specimen in January.

43. *Lep. punctiferella*, Walk.

(*Sentica punctiferella*, Walk. 508.)

♂. 21 mm. Head light yellowish, face fuscous. Thorax dark fuscous. Forewings elongate, dark fuscous; markings whitish; a narrow fascia from middle of costa to middle of inner margin; a transverse bar from costa at $\frac{3}{4}$, reaching more than half across wing; a row of small cloudy spots along hindmargin and round apex. Hindwings light ochreous-yellow; apical third dark fuscous.

Sydney, New South Wales; the only specimen I have seen is the type in the British Museum, from which the above description is drawn.

44. *Lep. tyrobathra*, n.sp.

♂. 20-25 mm. Head ochreous-yellowish, face mixed with fuscous. Palpi and antennæ fuscous. Thorax fuscous, anterior margin yellowish. Abdomen pale ochreous-yellowish. Legs dark fuscous, apex of joints and posterior tibiæ whitish-ochreous. Forewings elongate, costa rather strongly arched, apex obtuse, hindmargin very obliquely rounded; 7 absent; 8 and 9 stalked; rather dark fuscous; markings whitish-ochreous; a basal dot; a small elongate spot on inner margin at $\frac{1}{4}$; a moderate irregular fascia before middle, broadly dilated on costa, where it includes two or three dark strigulæ; a moderate spot on costa at $\frac{3}{4}$, and another on inner margin before anal angle; an irregular submarginal series of cloudy dots: cilia pale fuscous, base darker. Hindwings fuscous; basal third pale ochreous-yellowish; cilia fuscous, on inner margin whitish-yellowish.

Melbourne, Victoria; two specimens received from Mr. G. H. Raynor and Mr. J. A. Kershaw.

45. *Lep. chloropetala*, n.sp.

♂. 15 mm. Head whitish-ochreous, yellowish-tinged. Palpi, antennæ, and thorax dark fuscous. Abdomen grey. Legs dark fuscous, posterior pair ochreous-whitish. Forewings elongate, costa gently arched, apex obtuse, hindmargin rounded, rather strongly oblique; 7 absent; rather dark fuscous; markings

whitish-ochreous, yellowish-tinged; a large triangular blotch extending on inner margin from near base to middle, its apex nearly reaching costa at $\frac{2}{3}$; a large subquadrate spot on inner margin before anal angle; a small spot on costa beyond middle, and another at $\frac{3}{4}$: cilia fuscous. Hindwings and cilia grey.

Sydney, New South Wales; one specimen in August.

46. *Lep. desmophthora*, n.sp.

♂. 17 mm. Head whitish. Palpi and antennæ dark fuscous. Thorax dark fuscous, with a cloudy whitish anterior spot. Abdomen grey. Legs dark fuscous, posterior pair grey-whitish. Forewings elongate, costa gently arched, apex obtuse, hindmargin rounded, rather strongly oblique; 7 absent; ochreous-whitish; markings rather dark fuscous; a streak along basal third of costa, extended at base to inner margin; a moderately broad fascia from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin, suddenly strongly attenuated on costal fourth; a somewhat irregular fascia from $\frac{1}{4}$ of costa to anal angle; some fuscous scales on hindmargin: cilia pale whitish-fuscous, mixed with ochreous-whitish. Hindwings grey; cilia whitish-grey.

Wirrabara, South Australia; one specimen in October.

47. *Lep. sciodesma*, n.sp.

♂. 13-15 mm. Head whitish. Palpi, antennæ, thorax, abdomen and legs dark grey; posterior legs grey-whitish. Forewings elongate; costa gently arched, apex obtuse, hindmargin rounded, rather strongly oblique; 7 absent; grey; markings formed by a whitish suffusion; two rather broad very ill-defined cloudy fasciæ, first from $\frac{2}{5}$ of costa to before middle of inner margin, second from $\frac{3}{4}$ of costa to anal angle; a cloudy suffusion towards hindmargin: cilia grey, base mixed with whitish. Hindwings grey; cilia whitish-grey.

Deloraine and Hobart, Tasmania; in November, five specimens.

48. *Lep. amphiscia*, n.sp.

♂. 10 mm. Head whitish-grey. Palpi, antennæ, and thorax dark fuscous. Abdomen grey. Legs dark fuscous, posterior pair whitish-fuscous. Forewings elongate, costa moderately arched, apex obtuse, hindmargin obliquely rounded; $\bar{7}$ absent; grey, with some scattered whitish scales; an obscure cloudy whitish spot on middle of costa, another on middle of inner margin, a third on costa at $\frac{3}{4}$, a fourth before anal angle, and a fifth at apex, all very ill-defined: cilia grey, base mixed with whitish. Hindwings grey; cilia whitish-grey.

Deloraine, Tasmania; one specimen in November.

49. *Lep. raricomu*, n.sp.

♂. 14 mm. Head grey. Palpi, antennæ, thorax, abdomen, and legs dark fuscous; posterior legs whitish-fuscous. Forewings elongate, costa gently arched, apex rounded, hindmargin obliquely rounded; $\bar{7}$ absent; rather dark fuscous: cilia fuscous, base darker. Hindwings rather dark fuscous, thinly scaled; cilia fuscous, base darker.

Blackheath (3500 feet), New South Wales; in October, one specimen.

50. *Lep. palleuca*, n.sp.

♂. 14-15 mm. Head, palpi, thorax, and abdomen white. Antennæ and legs dark fuscous, posterior legs white. Forewings elongate, rather narrow, costa gently arched, apex round-pointed, hindmargin extremely obliquely rounded; $\bar{7}$ absent; white: cilia white. Hindwings and cilia white.

Fernshaw and Mount Macedon, Victoria; Blackwood, South Australia; in October and November, five specimens.

7. ERIOCOTTIS, Z.

Head rough-haired; ocelli absent (or in exotic species present); tongue rudimentary. Antennæ $\frac{3}{3}$, basal joint without pecten. Labial palpi moderate, porrected, second joint loosely rough-scaled (in exotic species with apical bristles), terminal joint short,

tolerably pointed. Maxillary palpi moderately long, tolerably filiform, folded. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate, 7 to hindmargin, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; veins tolerably parallel.

A genus of very few species, hitherto only known from Southern Europe and North Africa. In the absence of the ♂, it is uncertain whether the following species is correctly referred to it; but it agrees with the generic characters in all important particulars. It is possible however that the ♂ might show peculiar characters which might involve the creation of a new genus.

51. *Er. euryphracta*, n.sp.

♀. 15 mm. Head and palpi pale yellowish-ochreous. Antennæ light fuscous. Thorax, abdomen, and legs dark fuscous, posterior legs whitish-ochreous. Forewings elongate, costa gently arched, apex rounded, hindmargin very obliquely rounded; whitish-ochreous, yellowish-tinged; markings dark purplish-fuscous; a streak along basal half of costa, meeting median fascia; a cloudy streak along inner margin from base to beyond middle, not reaching fascia; a rather broad straight fascia from costa beyond middle to $\frac{3}{4}$ of inner margin; a small spot on costa beyond this; a moderate hindmarginal fascia from apex to anal angle, attenuated to a point beneath: cilia whitish-ochreous mixed with fuscous, terminal third fuscous. Hindwings rather dark fuscous, towards base with some pale yellowish hairs; cilia whitish-ochreous, yellowish-tinged, base mixed with pale fuscous, tips fuscous opposite apex.

Port Lincoln, South Australia; in November, one specimen.

8. *MESOPHERNA*, n.g.

Head densely rough-haired, face loosely haired; ocelli absent; tongue developed. Antennæ $\frac{2}{3}$, in ♂ filiform, ciliated (1), basal joint without pecten. Labial palpi moderate, slender, ascending, second joint shortly rough-scaled beneath, with two or three apical bristles, terminal joint moderate, pointed. Maxillary palpi very short, obtuse, loosely scaled. Posterior tibiæ clothed with long

hairs. Forewings with vein 1 furcate, 7 and 8 sometimes stalked, 7 to costa or apex, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{3}{4}$; 5 and 6 sometimes stalked.

At present restricted to the three following species; it indicates rather accurately the connecting link between the *Tinea* and *Xysmatodoma* groups.

- | | |
|--|------------------------|
| 1. Head wholly white; forewings narrow..... | 2. |
| Forehead grey; forewings not narrow..... | 52. <i>palustris</i> . |
| 2. Margins of white median streak indented in middle..... | 53. <i>castella</i> . |
| Margins of white median streak not indented in middle..... | 54. <i>isomacra</i> . |

52. *Mes. palustris*, n.sp.

♂♀. 14-18 mm. Head white, hairs of forehead mixed with grey. Palpi dark grey, beneath white. Antennæ grey. Thorax pale brownish-ochreous, shoulders sprinkled with white. Abdomen grey. Legs dark fuscous, posterior pair grey-whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin very obliquely rounded; 7 and 8 separate; light brownish-ochreous, sprinkled with fuscous; a moderately broad cloudy irregular white subcostal streak from base to $\frac{2}{3}$, thence bent upwards to costa at $\frac{1}{5}$, lower edge indented by ochreous-brown round dots at $\frac{1}{4}$, $\frac{2}{5}$, and $\frac{2}{3}$; a cloudy white submarginal or marginal suffusion from apex to above anal angle: cilia pale brownish-ochreous, somewhat mixed with whitish. Hindwings grey; cilia grey-whitish.

Sydney, New South Wales; Deloraine, Tasmania; in October and November, taken commonly in swampy places.

53. *Mes. castella*, Walk.

(*Prays castella*, Walk. 541.)

♂♀. 21-24 mm. Head and thorax white. Palpi white, above dark fuscous. Antennæ dark grey, mixed with white. Abdomen grey, sides and segmental margins white. Legs dark fuscous,

apex of joints and hairs of posterior tibiae white. Forewings elongate, narrow, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; 7 and 8 separate; silvery-white; markings rather dark brown-grey, mixed with some blackish-fuscous scales; a round dot near base in middle; a cloudy streak along costa from near base to apex, attenuated anteriorly, lower edge forming a triangular projection in middle; a cloudy streak along inner margin from near base to beyond anal angle, upper edge forming an irregular flat projection in middle and a strong triangular projection on anal angle: cilia white, on costa and anal angle suffused with fuscous. Hindwings rather light fuscous, hindmargin darker; cilia fuscous-whitish.

Sydney, New South Wales; Melbourne, Victoria; in November, three specimens.

54. *Mes. isomacra*, n.sp.

♀. 30 mm. Head white. Palpi grey, beneath white. Antennae whitish. Thorax white, sprinkled with dark fuscous. Abdomen grey. Legs dark fuscous, apex of joints whitish, posterior tibiae grey-whitish. Forewings very elongate, costa gently arched, apex obtuse, hindmargin very obliquely rounded; 7 and 8 stalked; light fuscous, suffusedly mixed with whitish and dark fuscous; a whitish suffusion forming a broad cloudy median longitudinal streak from base to apex, edged beneath by a narrow suffused blackish-fuscous streak, which sends a short projection upwards at $\frac{1}{5}$: cilia fuscous, mixed with whitish towards base. Hindwings and cilia rather light fuscous.

Melbourne, Victoria; one specimen received from Mr. G. H. Raynor.

9. *ACRIDOTARSA*, n.g.

Head rough-haired; ocelli present; tongue absent. Antennae $\frac{5}{6}$, in ♂ biserrate, pubescent, basal joint with well-defined pecten. Labial palpi rather long, porrected, second joint with long dense projecting tuft of scales towards apex beneath, terminal joint half second, slender, filiform, acute, ascending. Maxillary palpi obsolete. Posterior tibiae rather long, bent, with short hairs,

middle and posterior tarsi elongate, much longer than tibiae. Forewings with vein 1 furcate, 7 to apex, 11 from $\frac{1}{3}$. Hindwings 1, elongate-ovate, cilia 1; veins 5 and 6 somewhat approximated at base.

A curious and distinct genus, perhaps a development of *Mesopherna*.

55. *Acr. mylitis*, n.sp.

♂. 13-15 mm. Head white. Palpi white, second joint externally pale ochreous except apex. Antennae whitish-ochreous. Thorax white, patagia pale shining ochreous. Abdomen grey. Legs grey-whitish, anterior pair dark grey. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin very obliquely rounded; bronzy-ochreous, densely and suffusedly irrorated with white; the absence of irroration forms a slender dark fascia from costa beyond middle to anal angle, and several dark strigulae on posterior half of costa, and towards anal angle: cilia grey-whitish, basal half obscurely barred with greyish-ochreous. Hindwings and cilia grey.

Geraldton, West Australia; in November, seven specimens.

10. IPHIERGA, n.g.

Head densely rough-haired; ocelli present; tongue absent. Antennae $\frac{1}{2}$, in ♂ strongly bipectinated, basal joint without pecten. Labial palpi moderately long, curved, ascending, second joint with dense projecting scales beneath, sometimes forming a long tuft in front, terminal joint moderate, rather thick, somewhat pointed. Maxillary palpi absent. Posterior tibiae clothed with appressed scales. Forewings with vein 1 furcate, 4 sometimes absent, 7 absent, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$; vein 4 absent, transverse vein absent between 6 and 7.

A distinctly characterised genus, confined to Australia; it is nearly related to *Ardiosteres*.

- | | |
|-------------------------------|------------------------|
| 1. Palpi strongly tufted..... | 57. <i>pentulias</i> . |
| Palpi slightly tufted..... | 2. |

2. Forewings with dark fuscous submarginal
 fascia..... 56. *euphragma*.
 Forewings without dark submarginal fascia... 58. *stasiodes*.

56. *Iph. euphragma*, n.sp.

♂. 13-14 mm. Head and palpi deep ochreous-yellow; palpi slightly tufted. Antennæ ochreous-whitish. Thorax dark fuscous. Abdomen light grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, costa rather strongly arched, apex rounded, hindmargin rounded, somewhat oblique; 4 present; white, slightly ochreous-tinged; markings blackish-fuscous; a narrow basal patch, outer edge straight; two straight irregular-edged fasciæ, first before, second beyond middle; a dot or small spot on costa at $\frac{3}{4}$, and sometimes one on inner margin before anal angle; an irregular variable submarginal fascia from costa before apex to anal angle, when broad becoming almost marginal: cilia white, base spotted with dark fuscous opposite wing-markings. Hindwings and cilia light or dark grey.

Duarina, Queensland; Mount Lofty, South Australia; four specimens received from Mr. G. Barnard.

57. *Iph. pentulias*, n.sp.

♂. 17 mm. Head and palpi ferruginous-ochreous; palpi strongly tufted. Antennæ grey. Thorax dark fuscous. Abdomen grey. Legs dark fuscous, posterior pair whitish. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded; 4 absent; pale whitish-ochreous, brownish-tinged; markings blackish-fuscous; five slender nearly straight rather irregular-edged fasciæ; first almost basal; second at $\frac{1}{4}$; third median, interrupted above and below middle; fourth at $\frac{2}{3}$, interrupted below middle; fifth from $\frac{1}{5}$ of costa to anal angle; a spot on costa before apex, and two small spots on hindmargin below apex: cilia whitish-ochreous. Hindwings light grey; cilia grey-whitish.

Duarina, Queensland; one specimen received from Mr. G. Barnard.

58. *Iph. stasiodes*, n.sp.

♂. 13-15 mm. Head and palpi yellow-ochreous, ferruginous-tinged; palpi hardly tufted. Antennæ ochreous. Thorax fuscous, anterior margin black. Abdomen pale ochreous. Legs dark fuscous, apex of joints and posterior pair whitish-ochreous. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded; 4 absent; pale whitish-brown; markings blackish-fuscous; a narrow subbasal fascia; two slender somewhat angulated fasciæ, widely interrupted below middle and sometimes narrowly beneath costa also, first from $\frac{2}{5}$ of costa to $\frac{2}{5}$ of inner margin, second from $\frac{3}{5}$ of costa to before anal angle; some irregular scattered dots in disc; three small spots on posterior fourth of costa: cilia whitish-ochreous. Hindwings and cilia whitish-fuscous.

Duaringa, Queensland; four specimens received from Mr. G. Barnard.

11. ARDIOSTERES, n.g.

Head with short dense rough hairs; ocelli absent; tongue absent. Antennæ $\frac{1}{2}$, in ♂ dentate, fasciculate-ciliated (2), basal joint with pecten. Labial palpi moderately long, porrected, clothed with dense loose scales somewhat tufted in front, terminal joint very short, concealed, pointed. Maxillary palpi absent. Thorax with posterior crest. Posterior tibiæ clothed with appressed scales. Forewings with vein 1 furcate, 7 and 8 stalked, 7 to apex, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{1}{4}$; veins tolerably parallel.

The single species is confined to Australia. The genus, distinguished by the peculiar palpi, is probably related to the following.

59. *Ard. moretonella*, Walk.

(*Tinea moretonella*, Walk. Suppl. 1812.)

♂♀. 18-24 mm. Head ochreous-yellow. Palpi dark fuscous, apex ochreous-yellow. Antennæ dark fuscous. Thorax dark fuscous, apex of patagia whitish-ochreous. Abdomen pale yellowish-ochreous. Legs dark fuscous, apex of joints and posterior pair

whitish-ochreous. Forewings elongate, moderately broad, costa moderately arched, apex obtuse, hindmargin rather obliquely rounded; pale whitish-ochreous; markings rather dark fuscous, irregularly margined with darker; a rather broad irregular basal fascia, including one or two pale spots; a moderate fascia from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin, posterior edge irregularly dilated towards middle; a small spot on costa beyond this, and sometimes one or two strigulae in disc; an irregular fascia from $\frac{2}{3}$ of costa, broadly dilated downwards to inner margin, where it extends from $\frac{3}{5}$ to anal angle, and contains two or three pale spots or strigulae; a spot on costa beyond this, its apex sometimes connected with it; an irregular apical blotch, containing three or four pale spots, and connected by a bar with preceding fascia below middle: cilia whitish-ochreous, sharply barred with dark fuscous, and with a dark fuscous antemedian line. Hindwings rather dark fuscous; cilia fuscous somewhat mixed with whitish-ochreous.

Duarina, Queensland; Bathurst, New South Wales; in March, ten specimens. The markings are rather variable, but the species is easy to recognise.

12. SCARDIA, Tr.

Head densely rough-haired; ocelli present; tongue short. Antennae $\frac{3}{4}$ - $\frac{5}{6}$, joints closely set, serrate, in ♂ pubescent, basal joint with pecten. Labial palpi rather long, curved, ascending, second joint with dense rough scales beneath more or less tufted in front, with several apical bristles, terminal joint rather long or moderate, shortly rough-scaled in front or more or less dilated with rough scales, obtuse or somewhat pointed. Maxillary palpi moderate or rather short, porrected, loosely scaled. Thorax sometimes with posterior crest. Posterior tibiae rough-haired. Forewings with vein 1 furcate, 4 sometimes absent, 7 to costa, 8 and 9 sometimes stalked, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{1}{2}$ - $\frac{2}{3}$; veins tolerably parallel.

A genus of few species, including several in Europe and North America besides the Australian. The larvæ are not case-bearers.

- | | | |
|---|-----|-------------------------|
| 1. Forewings with raised tufts on surface..... | 66. | <i>primaeva</i> . |
| Forewings without tufts..... | 2. | |
| 2. Forewings with vein 4 present..... | 3. | |
| Forewings with vein 4 absent..... | 4. | |
| 3. Forewings with dark median fascia..... | 64. | <i>clonodes</i> . |
| Forewings without dark median fascia..... | 65. | <i>celsella</i> . |
| 4. Forewings silvery-white..... | 5. | |
| Forewings ochreous..... | 6. | |
| 5. Forewings with 6 or 7 dark fasciæ..... | 60. | <i>australasiella</i> . |
| Forewings with 9 or 10 dark fasciæ..... | 61. | <i>dictyotis</i> . |
| 6. Forewings with ochreous-brown dorsal blotches..... | 62. | <i>inconcisella</i> . |
| Forewings without brown blotches..... | 63. | <i>pyrochroa</i> . |

60. *Scard. australasiella*, Don.

(*Tinea australasiella*, Don., Ins. N. Holl.; *T. cossuna*, Lew., Ins. N.S. Wales, 19; *T. clathrata*, Feld., Reis. Nov. pl. CXL. 30.)

♂♀. 20-31 mm. Head orange. Palpi orange, base usually dark fuscous. Antennæ dark fuscous. Thorax pale orange, anterior third dark fuscous. Abdomen rather dark fuscous, sides and segmental margins and anal tuft light orange, towards base wholly light orange. Legs dark fuscous, posterior tibiæ light orange. Forewings elongate, rather narrow, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; 4 absent, silvery-white; base pale orange; six or seven slender somewhat irregular direct purple-blackish fasciæ; second and third usually connected in middle, third and fourth usually connected or confluent near inner margin and sometimes connected above middle, fourth and fifth connected below middle, fifth sometimes interrupted in middle, fifth and sixth connected in middle, seventh connected once or twice with sixth or often partially or wholly absent: cilia whitish-orange, more or less strongly barred with blackish. Hindwings dark fuscous-purplish; cilia whitish-orange, on costa and sometimes round apex more or less suffused with purplish-grey.

Brisbane, Queensland; Sydney, New South Wales; Ballarat and Warragul, Victoria; Georges Bay, Tasmania; Wirrabara, Port Lincoln, and Kangaroo Island, South Australia; in September, October, January and April, rather common. The larva feeds on lichens on rocks. Felder's insect is represented as being from Fiji, but this is not at all probable, and as his localities are frequently erroneous, the record may be neglected until confirmed.

61. *Scard. dictyotis*, n.sp.

♂♀. 25-31 mm. Differs from *australasiella* only as follows: Abdomen dark fuscous, segmental margins and anal tuft light orange. Forewings with nine or ten slender irregular fasciæ; third twice connected with second and fourth, sometimes obsolete except between connections, fourth twice connected with fifth, fifth twice connected with sixth and sometimes confluent with it on margins, sixth connected with seventh below and sometimes above middle, seventh connected with eighth in middle, eighth twice connected with ninth, sometimes interrupted above middle, tenth subapical, often interrupted.

Perth and Albany, West Australia; in October and November, rather common. If intermediate forms are discovered in the connecting districts, this and the preceding can be united as geographical forms of the same species; at present they remain quite distinct, and it seems best to give this form a name.

62. *Scard. inconcisella*, Walk.

(*Tinea inconcisella*, Walk. 474.)

♂♀. 14-26 mm. Head and palpi light yellow-ochreous, second joint of palpi externally sprinkled with dark fuscous. Antennæ fuscous. Thorax whitish-ochreous, partially suffused with deeper ochreous and anteriorly with fuscous. Abdomen fuscous. Legs dark fuscous, apex of joints and hairs of posterior tibiæ whitish-ochreous. Forewings elongate, costa gently arched, apex round-pointed, hindmargin very obliquely rounded; 4 absent; light ochreous, partially suffused with brownish-ochreous, deeper in ♂,

strewn with small indistinct subquadrate whitish-ochreous spots arranged in about three longitudinal series and on edges of dark markings, and partially margined or connected by blackish scales; disc sometimes partially suffused with whitish-ochreous; a wedge-shaped ochreous-brownish blotch on base of inner margin, its apex extending to disc at $\frac{1}{3}$; a semicrescentic ochreous-brown blotch from inner margin beyond middle, very obliquely curved over posteriorly, not reaching half across wing; a blackish longitudinal suffusion towards hindmargin in middle, suffused with brown beneath: cilia ochreous mixed with blackish-fuscous, barred with ochreous-whitish twice near apex and twice at anal angle. Hindwings dark fuscous-purplish; cilia light purplish-fuscous.

Murrurundi, Sydney, and Cooma (3000 feet), New South Wales; Melbourne, Victoria; from September to February, common. The larva feeds in rotten wood.

63. *Scard. pyrochroa*, n.sp.

♂. 14-16 mm. Head whitish-ochreous, sides of crown orange-ochreous. Palpi whitish-ochreous, second joint externally sprinkled with dark fuscous. Antennæ whitish-ochreous. Thorax whitish-ochreous, shoulders suffused with ochreous-orange. Abdomen whitish-ochreous, last segment fuscous except anal tuft. Legs pale ochreous. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; 4 absent; ochreous-orange, irregularly marbled with pearly whitish-yellowish or whitish; some fine scattered black scales posteriorly, especially towards anal angle; cilia pale whitish-yellowish, mixed with ochreous-orange, tips dark fuscous on anal angle and on a subapical dot. Hindwings dark fuscous-purplish; cilia whitish-ochreous, purplish-tinged.

Brisbane, Queensland; two specimens in September.

64. *Scard. clonodes*, n.sp.

♂. 21 mm. Head and palpi whitish-ochreous, palpi externally mixed with dark fuscous. Antennæ fuscous. Thorax whitish-

ochreous, shoulders mixed with fuscous. Abdomen fuscous. Legs dark fuscous, with numerous whitish-ochreous rings. Forewings elongate, costa moderately arched, apex obtuse, hindmargin obliquely rounded; 4 present, 8 and 9 stalked; light ochreous-brownish, with irregularly scattered dark fuscous and whitish strigulae and small spots; costa spotted with blackish-fuscous; a rather dark fuscous spot beneath costa at $\frac{1}{4}$, and one at $\frac{1}{4}$ of inner margin; a moderate rather dark fuscous fascia from beyond middle of costa to beyond middle of inner margin; an irregular band proceeding from costal extremity of this to $\frac{1}{5}$ of disc and thence to costa before apex: cilia fuscous, irregularly barred with dark fuscous and whitish. Hindwings rather dark purplish-fuscous; cilia fuscous-whitish, with dark fuscous cloudy basal line and suffusedly barred with dark fuscous.

Sydney (South Creek), New South Wales; one specimen in March.

65. *Scard. celsella*, Walk.

(*Tinea celsella*, Walk. 482; *T. adjunctella*, ib. 1006.)

♀. 20 mm. Head and palpi light ochreous mixed with rather dark fuscous. Antennae fuscous. Thorax and abdomen rather dark fuscous. Legs dark fuscous, apex of joints whitish-ochreous. Forewings elongate, costa moderately arched, apex obtuse, hindmargin rounded, rather strongly oblique; 4 present; light fuscous, strewn with dark fuscous or blackish scales, tending to form transverse strigulae; costa paler, spotted with blackish-fuscous; a small cloudy dark fuscous spot in disc before middle, another on fold beneath middle, and a third larger in disc at $\frac{2}{3}$; a dark fuscous suffusion towards hindmargin: cilia light fuscous mixed with dark fuscous. Hindwings rather dark purplish-fuscous; cilia fuscous-whitish, ochreous-tinged, with a cloudy fuscous line near base.

Murrurundi and Newcastle, New South Wales; two specimens in November.

66. *Scard. primaeva*, n.sp.

♂♀. 14-17 mm. Head, palpi, antennae, thorax, abdomen, and legs dark fuscous; palpi more or less mixed with ochreous-whitish;

legs with apex of joints ochreous-whitish. Forewings elongate, in ♀ narrower, costa moderately arched, apex obtuse, hindmargin obliquely rounded; 4 present, 7 and 8 sometimes stalked; surface with several tufts of raised scales towards inner margin; in ♂ dark slate-colour, coarsely irrorated with black, forming irregular spots in disc, with ochreous-white dots at base and anal angle, and extreme costal edge ochreous-white from $\frac{2}{5}$ to near apex, marked with black spots; in ♀ purplish-fuscous, irrorated with dark fuscous, most strongly in disc, costa spotted with blackish-fuscous, with two blackish-fuscous rather oblique fasciæ from costa before and beyond middle, becoming obsolete before inner margin, second generally followed by a more or less distinct pale suffusion extending to apex: cilia slaty-fuscous irrorated with blackish. Hindwings rather dark fuscous, purplish-tinged; cilia fuscous, with cloudy dark fuscous basal line.

Toowoomba (2000 feet) and Brisbane, Queensland; Newcastle and Sydney, New South Wales; from September to February, not uncommon.

13. MIMOSCOPA, n.g.

Head rough-haired; ocelli present; tongue absent. Antennæ $\frac{5}{6}$ in ♂ filiform, shortly ciliated, basal joint with pecten. Labial palpi moderate, porrected, second joint somewhat rough-scaled towards apex beneath and with some scattered bristles, terminal joint moderate, filiform, tolerably pointed. Maxillary palpi long, filiform, folded. Posterior tibiae clothed with rough hairs. Forewings with vein 1 furcate, 7 to costa, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{4}{5}$; transverse vein absent between 4 and 5, forked parting-vein strongly defined, 5 and 6 somewhat approximated.

Nearly related to *Tinea*, of which it is probably an offshoot; but the single species has a peculiar facies, nearly resembling the genus *Catoryetis* in the *Xyloryctidae*; whether the resemblance has anything to do with mimicry, or is associated with a similar habitat, there is at present no evidence to show.

67. *Mim. ochetaula*, n.sp.

♂. 13 mm. Head fuscous-whitish, sides of crown white, face more fuscous-tinged. Palpi fuscous, apex of joints whitish. Antennæ pale fuscous. Thorax ochreous-brown. Abdomen fuscous. Legs dark fuscous; apex of joints and hairs of posterior tibiæ whitish-ochreous. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin slightly sinuate, very oblique; ochreous-brown; a rather broad straight white median longitudinal streak from base to apex, lower edge triangularly indented at $\frac{2}{3}$; a narrow white longitudinal subdorsal streak from base, becoming obsolete towards anal angle; a whitish suffusion on costa about $\frac{3}{4}$: cilia fuscous-whitish, with two cloudy dark ochreous-fuscous lines, and a white bar at apex. Hindwings rather light grey; cilia whitish-grey.

Sydney, New South Wales; in March, one specimen.

14. BLABOPHANES, Z.

Head densely rough-haired; ocelli absent; tongue short. Antennæ $\frac{5}{6}$, in ♂ pubescent-ciliated or simple, joints closely set, basal joint with small pecten. Labial palpi moderate, porrected, with tolerably appressed scales, second joint with several long bristles towards apex, terminal joint moderate, obtuse or tolerably pointed. Maxillary palpi long, tolerably filiform, folded. Posterior tibiæ clothed with hairs. Forewings with a naked usually transparent depression in disc beneath; vein 1 furcate, 3 and 4 stalked, sometimes 6 and 7, or 7 and 8, or 9 and 10 stalked, 7 to costa, 11 from near middle or sometimes from near posterior angle of cell. Hindwings 1, elongate-ovate, cilia $\frac{2}{4}$; sometimes 5 and 6 stalked.

A genus of limited extent but cosmopolitan distribution; it is a direct development of *Tinea*. The larvæ feed on refuse of various kinds; hence the species are sometimes domestic; one of the Australian species has thus been introduced from Europe, and another is common to Australia and New Zealand; the other two are endemic.

- | | |
|--|---------------------------|
| 1. Forewings with well-marked pale dorsal streak | 2. |
| Forewings without pale dorsal streak..... .. | 3. |
| 2. Head ferruginous-ochreous..... .. | 71. <i>ferruginella</i> . |
| Head ochreous-whitish..... .. | 70. <i>ethelella</i> . |
| 3. Forewings dark fuscous with white blotches | 68. <i>meliorella</i> . |
| Forewings whitish-ochreous with dark fuscous
blotch..... .. | 69. <i>argillacea</i> . |

68. *Blab. meliorella*, Walk.

(*Tinea meliorella*, Walk. 483; *T. oecophoroides*, ib. 1005; *T. vivipara*, Scott, Trans. Ent. Soc. N. S. Wales, I. 33, pl. 4.)

♂♀. 12-21 mm. Head white. Palpi blackish-fuscous, tip white. Antennæ dark-fuscous, towards apex more whitish. Thorax blackish or dark fuscous, with a white anterior spot. Abdomen pale ochreous-yellowish. Legs blackish, posterior pair pale ochreous yellowish. Forewings elongate, rather narrow, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; ochreous-fuscous or purplish-fuscous, mixed or suffused with blackish-fuscous; markings white, sometimes ochreous-tinged; a large trapezoidal blotch occupying basal $\frac{2}{3}$ of wing except base and a streak along costa; a large semioval blotch on costa beyond middle; a variable spot on anal angle, sometimes nearly obsolete; a variable spot on costa before apex, and another on hindmargin beneath apex, their extremities sometimes almost coalescing; cilia white, with broad dark fuscous bands at apex and above anal angle. Hindwings fuscous-purplish, sometimes brassy-tinged; cilia pale whitish-yellowish, sometimes with a dark grey suffusion at apex.

Duaringa, Toowoomba (2000 feet), and Brisbane, Queensland; Sydney, Bowenfels, and Bathurst (2500 feet), New South Wales; Melbourne and Warragul, Victoria; Wirrabara, Mount Lofty, and Port Lincoln, South Australia; Geraldton and Albany, West Australia; from June to February, common and probably of universal distribution on the main land, but not yet found in Tasmania. Scott observed this species to be viviparous; there is

nothing improbable in this, as the larvæ may feed in some rapidly decaying substance, though he was unable to rear them ; I do not doubt the correctness of his observation, but have been unable to confirm it ; on the contrary, I have more than once observed the female in confinement deposit eggs in the normal way ; hence the habit must be variable, and may perhaps be influenced by the heat of the weather, or by the undue retention of the eggs in the absence of suitable food for the larvæ.

69. *Blab. argillacea*, n.sp.

♂♀. 13-18 mm. Head white, ochreous-tinged. Palpi dark fuscous, mixed with whitish. Antennæ whitish-fuscous. Thorax fuscous-whitish, patagia dark fuscous. Abdomen whitish-grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, rather narrow, costa gently arched, apex obtuse, hindmargin obliquely rounded ; pale ochreous, densely and suffusedly irrorated with ochreous-whitish, with a few scattered blackish scales, especially towards costa posteriorly and anal angle ; anterior half of costal edge blackish ; three blackish dots on submedian fold, indicating marginal indentations of an obsolete pale dorsal streak ; discal impression pale, placed in an oblique ill-defined dark fuscous suffusion : cilia pale whitish-ochreous, with rows of black points. Hindwings pale whitish-fuscous, with brassy-yellowish reflections ; cilia ochreous-whitish.

Melbourne and Warragul, Victoria ; Adelaide, South Australia ; four specimens in September and December.

70. *Blab. ethelella*, Newm.

(*Tinea ethelella*, Newm., Trans. Ent. Soc. Lond. iii. (n.s.), 288 ; *T. rectella*, Walk. 482 ; *Blabophanes namuella*, Feld., Reis. Nov. pl. cXL. 44 ; *B. ethelella*, Meyr., Trans. N.Z. Inst. 1887, 97.)

♂♀. 13-20 mm. Head ochreous-whitish. Thorax dark fuscous, with broad ochreous-white dorsal stripe. Forewings dark fuscous ; costal area dotted with ochreous-whitish ; an ochreous-whitish irregular-edged dorsal streak from base to anal angle ; a transparent ochreous-whitish discal spot : cilia ochreous-whitish, barred

with dark fuscous, and with two dark fuscous lines. Hindwings light grey; cilia whitish-grey, more whitish terminally.

Glen Innes (3500 feet), Bathurst, Sydney, and Cooma (3000 feet), New South Wales; Melbourne, Victoria; Georges Bay and Hobart, Tasmania, Wirrabara and Mount Lofty, South Australia; York and Albany, West Australia; also throughout New Zealand: from September to May, common everywhere, but usually near dwellings, often at lamps.

71. *Blab. ferruginella*, Hb.

(*Tinea ferruginella*, Hb.; *Blabophanes ferruginella*, Meyr., Trans. N.Z. Inst. 1887, 97.)

♂♀. 10-13 mm. Head ferruginous-ochreous. Thorax dark fuscous, with broad whitish-ochreous dorsal stripe. Forewings dark fuscous; costal and posterior areas coarsely strigulated with whitish-ochreous; a whitish-ochreous or pale ochreous irregular-edged dorsal streak from near base to anal angle; a large transparent ochreous-whitish discal spot: cilia whitish-ochreous, barred with dark fuscous, on hindmargin sometimes obsolete. Hindwings pale grey; cilia grey-whitish.

Toowoomba (2000 feet), Queensland; Bathurst and Sydney, New South Wales; Melbourne, Victoria; Hobart, Tasmania; Perth, West Australia; from August to March and in June, rather common, but less so than the preceding. An accidental introduction from Europe, occurring now also in North America and New Zealand.

15. *TINEA*, L.

Head densely rough-haired; ocelli present or absent; tongue short. Antennæ $\frac{2}{3}$ - $\frac{5}{6}$, in ♂ ciliated, pubescent, or simple, joints usually closely set, basal joint sometimes with small pecten. Labial palpi moderate, porrected, second joint shortly rough-scaled or smooth, with a few long bristles towards apex, terminal joint moderate, tolerably pointed. Maxillary palpi long, tolerably filiform, folded. Posterior tibiæ clothed with loose hairs. Forewings with vein 1 furcate, 7 to costa, sometimes 6 and 7, or 7 and

8 stalked, 11 from before middle. Hindwings $\frac{3}{4}$ -1, elongate-ovate or ovate-lanceolate, cilia $\frac{2}{3}$ -1; sometimes 5 and 6 stalked.

A large and cosmopolitan genus, being one of the earliest developed forms of the family. The larvæ are occasionally but not usually case-bearers; they often feed on dry refuse, and hence some species have become domestic, and several have thus been introduced into Australia by civilization; probably a majority feed on lichens or dead wood, but a few eat leaves, and these are sometimes miners within the substance of the leaf: although normally possessed of sixteen legs, some of the leaf-miners are apodal. These variations in habit make the genus a very interesting one to study.

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| 1. Thorax dark fuscous with pale dorsal stripe..... | 2. |
| Thorax without pale dorsal stripe..... | 10. |
| 2. Sides of crown sharply dark fuscous..... | 83. <i>erebosoma</i> . |
| Sides of crown not dark fuscous..... | 3. |
| 3. Forewings with pale costal streak..... | 4. |
| Forewings without pale costal streak.... | 6. |
| 4. Forewings with costal streak interrupted at $\frac{3}{4}$ | 87. <i>colleta</i> . |
| Forewings with costal streak not interrupted..... | 5. |
| 5. Forewings with upper edge of dark median streak projecting at $\frac{4}{5}$ | 88. <i>acrozyga</i> . |
| Forewings with upper edge of dark median streak straight throughout... | 89. <i>lativittella</i> . |
| 6. Forewings with pale suffused submedian streak..... | 86. <i>chaotica</i> . |
| Forewings without pale submedian streak | 7. |
| 7. Forewings with white costal dots or spots | 8. |
| Forewings without white costal spots. .. | 84. <i>porphyrota</i> . |
| 8. Forewings with dorsal streak three-toothed..... | 85. <i>tridectis</i> . |
| Forewings with dorsal streak with more than three teeth..... | 9. |

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| 9. Forewings with dorsal streak six-toothed | 90. <i>tetropa</i> . |
| Forewings with dorsal streak numerously serrate..... | 91. <i>tryphera</i> . |
| 10. Forewings yellowish | 11. |
| Forewings not yellowish | 12. |
| 11. Forewings with dark costal streak..... | 102. <i>nectarea</i> . |
| Forewings without dark costal streak .. | 103. <i>teleochra</i> . |
| 12. Head wholly white | 13. |
| Head not wholly white..... | 18. |
| 13. Thorax wholly dark fuscous..... | 14. |
| Thorax not wholly dark fuscous..... | 15. |
| 14. Forewings with terminal half white..... | 78. <i>tapetiella</i> . |
| Forewings with terminal half not white | 93. <i>muricata</i> . |
| 15. Forewings with two transverse fasciæ... | 74. <i>altilis</i> . |
| Forewings without fasciæ..... | 16. |
| 16. Forewings with groundcolour white | 17. |
| Forewings with groundcolour greyish-ochreous | 95. <i>spodina</i> . |
| 17. Forewings with strong black line in costal cilia..... | 97. <i>monophthalma</i> . |
| Forewings without strong black line in costal cilia.. .. | 100. <i>microspora</i> . |
| 18. Forewings with strong white dorsal streak | 82. <i>diaphora</i> . |
| Forewings without paler dorsal streak... | 19. |
| 19. Head wholly yellowish..... | 20. |
| Head not wholly yellowish | 22. |
| 20. Forewings with fasciæ of fine white lines | 81. <i>dicharacta</i> . |
| Forewings without fasciæ..... | 21. |
| 21. Head orange ; forewings deep purple.... | 79. <i>pyrotricha</i> . |
| Head light yellowish ; forewings fuscous | 92. <i>melitocoma</i> . |
| 22. Antennæ sharply annulated with white and dark fuscous..... | 99. <i>phauloptera</i> . |
| Antennæ not sharply annulated..... | 23. |

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| 23. Forewings without defined markings.... | 24. |
| Forewings with defined markings..... | 27. |
| 24. Forewings with line in costal cilia very strong..... | 96. <i>epimochla</i> . |
| Forewings with line in costal cilia moderate or absent..... | 25. |
| 25. Forewings white..... | 98. <i>vetula</i> . |
| Forewings dark fuscous..... | 26. |
| 26. Head dark fuscous..... | 80. <i>amaurodes</i> . |
| Head ferruginous-fuscous..... | 94. <i>phoenicopa</i> . |
| 27. Head wholly fuscous..... | 28. |
| Head not wholly fuscous..... | 29. |
| 28. Forewings fuscous..... | 77. <i>pellionella</i> . |
| Forewings greyish-ochreous spotted with fuscous..... | 76. <i>fuscipunctella</i> . |
| 29. Forewings with strong dark fuscous blotches from costa..... | 75. <i>granella</i> . |
| Forewings without dark fuscous blotches from costa..... | 30. |
| 30. Forewings with strong dark fuscous blotches from inner margin..... | 72. <i>bisepta</i> . |
| Forewings without dark fuscous blotches from inner margin..... | 31. |
| 31. Forewings with slender fascia and costal spots..... | 73. <i>monozona</i> . |
| Forewings with discal dots only..... | 101. <i>aethurodes</i> . |

72. *Tin. bisepta*, n.sp.

♀. 15 mm. Head white, face mixed with fuscous. Palpi dark fuscous. Antennæ whitish. Thorax white, shoulders with dark fuscous spot. Abdomen grey-whitish. Legs dark fuscous, ringed with whitish, posterior pair whitish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin obliquely rounded; pale greyish-ochreous, more or less wholly suffused with white; markings dark fuscous; a short very oblique mark from costa

near base, furcate on costa; three small costal spots at $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{5}{8}$, and several scattered costal dots between these; two oblique wedge-shaped blotches from inner margin, first at $\frac{1}{3}$, reaching more than half across wing, second at $\frac{2}{3}$, not reaching half across wing; a few scattered dark fuscous scales in disc posteriorly, and one or two dots on hindmargin: cilia white. Hindwings pale grey; cilia whitish.

Shoalhaven, New South Wales; one specimen in January.

73. *Tin. monozona*, n.sp.

♂. 11 mm. Head white, face fuscous. Palpi dark fuscous, beneath whitish. Antennæ whitish. Thorax whitish, shoulders and posterior extremity fuscous. Abdomen grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, costa moderately arched, apex obtuse, hindmargin rounded, rather strongly oblique; light fuscous, densely and suffusedly irrorated with white, with scattered dark fuscous scales tending to form strigulae; a slender fuscous fascia from $\frac{2}{5}$ of costa to middle of inner margin, becoming dark fuscous at extremities; two small dark fuscous spots on costa at $\frac{2}{3}$ and $\frac{3}{4}$, and one on inner margin before anal angle: cilia fuscous-whitish, base spotted with dark fuscous. Hindwings whitish-grey; cilia whitish.

Mount Victoria (3300 feet), New South Wales; in November, one specimen.

74. *Tin. altilis*, n.sp.

♂♀. 7-10 mm. Head white. Palpi dark fuscous, apex of joints white. Antennæ white, ringed with blackish. Thorax white, sprinkled with fuscous, shoulders spotted with fuscous. Abdomen grey. Legs dark fuscous, banded with white. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; pale whitish-ochreous, with some fine scattered deep yellow-ochreous scales; markings formed by a deep yellow-ochreous irroration, suffused with blackish on costa; a series of spots along costa, of which one before and one beyond middle give rise to slender angulated fasciae, marked with blackish above and below

middle; two small spots on anterior third of inner margin, one on fold near base, and some scales along hindmargin: cilia pale whitish-ochreous, mixed with yellow-ochreous and some blackish points. Hindwings rather dark grey; cilia grey.

Sydney, New South Wales; in December, five specimens.

75. *Tin. granella*, L.

♂♀. 9-15 mm. Head ochreous-whitish or whitish-ochreous, sides of crown sometimes fuscous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin extremely obliquely rounded; pale whitish-ochreous, irrorated with fuscous and dark fuscous; six dark fuscous costal spots or blotches, first three fascia-like, oblique, first two reaching submedian fold, second shortly produced posteriorly at apex, third thickest, reaching half across wing, last three forming small spots: cilia ochreous-whitish, broadly barred with fuscous and mixed with dark fuscous. Hindwings grey, darker in ♀; cilia grey.

Sydney, New South Wales; in September, five specimens. A widely distributed European species, artificially introduced; the larva feeds on grain.

76. *Tin. fuscipunctella*, Hw.

(*Tinea fuscipunctella*, Hw., Meyr. Trans. N.Z. Inst. 1887, 100.)

♂♀. 9-16 mm. Head and thorax fuscous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin extremely obliquely rounded; light greyish-ochreous, irregularly suffusedly spotted with fuscous; a dark fuscous dot or small spot in disc at $\frac{1}{3}$, a second obliquely beyond it on fold, and a third in disc at $\frac{2}{3}$: cilia pale greyish-ochreous, basal half mixed with fuscous and dark fuscous. Hindwings light grey, yellowish-shining, towards apex darker; cilia whitish-grey.

Brisbane and Toowoomba (2000 feet), Queensland; Newcastle, Bathurst, and Sydney, New South Wales; Fernshaw and Casterton, Victoria; Launceston, Deloraine, Campbelltown, and Georges Bay, Tasmania; Mount Lofty and Port Lincoln, South Australia;

Northampton, West Australia ; from August to March, and in June, generally common in houses. A domestic species, introduced from Europe ; common also in New Zealand and North America. The larva feeds on dry refuse.

77. *Tin. pelliionella*, L.

♂♀. 10-15 mm. Head and thorax fuscous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin extremely obliquely rounded ; fuscous ; an obscure small darker fuscous spot in disc at $\frac{2}{3}$, a second beneath it on fold, and a third in disc at $\frac{2}{3}$: cilia fuscous. Hindwings grey, with purple and yellowish reflections ; cilia light grey.

Sydney, New South Wales ; Port Lincoln, South Australia ; Carnarvon, West Australia ; in October and November, several specimens. Also introduced from Europe, and occurring now also in New Zealand and North America, but less common than the last ; the larva is a case-bearer, and feeds on cloth, &c., in houses, being sometimes very destructive.

78. *Tin. tapetiella*, L.

(*Tinea tapetiella* (*tapetzella*) L., Meyr. Trans. N.Z. Inst. 1887, 98 ; *T. palaestrica*, Butl., Proc. Zool. Soc. Lond. 1877, 404.)

♂♀. 12-21 mm. Head white. Thorax dark fuscous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded ; ochreous-white ; basal $\frac{2}{3}$ blackish-fuscous ; a grey spot in disc at $\frac{2}{3}$, and some irregularly scattered small grey spots or strigulae posteriorly, especially towards anal angle ; a black dot on inner margin at $\frac{3}{4}$, and two before apex : cilia ochreous-white, round apex dark grey. Hindwings grey ; cilia grey-whitish.

Newcastle and Sydney, New South Wales ; Melbourne, Victoria ; Hobart, Tasmania ; in October and from January to March, rather common in houses. A European species, now introduced also into New Zealand, North America, and probably elsewhere ; the larva feeds especially on furs, skins, &c.

79. *Tin. pyrotricha*, n.sp.

♂♀. 13-15 mm. Head deep orange. Palpi, antennæ, thorax, abdomen, and legs dark fuscous; legs with apex of joints whitish, hairs of posterior tibiæ whitish-grey. Forewings very elongate, narrow, costa gently arched, apex tolerably acute, hindmargin extremely obliquely rounded; very deep purple, with blue and coppery reflections; cilia rather dark fuscous. Hindwings rather dark purplish-fuscous; cilia rather dark fuscous.

Melbourne, Victoria; two specimens received from Mr. G. H. Raynor.

80. *Tin. amaurodes*, n.sp.

♂. 14 mm. Head dark fuscous, with some whitish hairs. Palpi whitish, terminal joint fuscous except apex. Antennæ, thorax, abdomen, and legs dark fuscous; posterior tibiæ and apex of tarsal joints fuscous-whitish. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; fuscous, coarsely irrorated with dark fuscous: cilia fuscous, with a cloudy darker line. Hindwings and cilia rather dark fuscous, with purple and yellowish reflections.

Adelaide, South Australia; one specimen, taken in October, received from Mr. O. B. Lower.

81. *Tin. dicharacta*, n.sp.

♂. 6 mm. Head and palpi orange-ochreous. Antennæ, thorax, abdomen, and legs dark fuscous, hairs of posterior tibiæ whitish. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; dark fuscous, with bright coppery-golden and purple reflections; four fasciæ composed of fine white transverse lines; first of two lines, near base, obsolete towards costa; second of three or four lines, from $\frac{2}{5}$ of costa to middle of inner margin, curved; third of two lines, from $\frac{2}{5}$ of costa to anal angle, widely interrupted in disc; fourth of two lines, from $\frac{1}{4}$ of costa to middle of hindmargin, widely interrupted: cilia dark fuscous, mixed with white round apex. Hindwings and cilia rather dark fuscous, with purplish and golden reflections.

Sydney, New South Wales; one specimen in November.

82. *Tin. diaphora*, n.sp.

♂♀. 13-15 mm. Head light fuscous, face and palpi blackish. Antennæ whitish-fuscous. Thorax white, shoulders and anterior margin blackish-fuscous. Abdomen ochreous-grey. Legs dark fuscous, posterior pair suffused with whitish. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; purple-blackish; a strong irregular-edged white streak from base along inner and hindmargin to apex, sometimes mixed with whitish-ochreous posteriorly; a fine blackish hindmarginal line: cilia fuscous irrorated with whitish, basal third suffusedly barred with white and dark fuscous. Hindwings light grey; cilia grey-whitish.

Sydney, New South Wales; Melbourne, Victoria; from October to January, not uncommon on *Eucalyptus*-trunks. Larva 16-legged, elongate, cylindrical, with scattered whitish hairs; dirty whitish; head and second segment dark fuscous; very active; feeds on dead wood of *Eucalyptus*, between loose pieces, spinning a good deal of web, mixed with refuse, in August and September.

83. *Tin. erebocosma*, n.sp.

♂♀. 10-12 mm. Head white, sides of crown sharply dark fuscous. Palpi dark fuscous, beneath whitish. Antennæ dark fuscous. Thorax dark fuscous, with white dorsal stripe. Abdomen grey. Legs dark fuscous, apex of joints and posterior tibiæ whitish. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; dark purplish-fuscous, irrorated with blackish; a rather narrow white streak along inner margin from base to anal angle, its upper edge four times waved; two or three whitish dots on costa towards apex; two or three small white spots on hindmargin, sometimes confluent to form an irregular streak: cilia fuscous irrorated with whitish, on costa dark fuscous spotted with whitish. Hindwings grey; cilia grey-whitish, base greyer.

Sydney, New South Wales; in October and November, seven specimens.

84. *Tin. porphyrota*, n.sp.

♀. 10-12 mm. Head light ochreous-yellowish. Palpi and antennæ dark fuscous. Thorax dark fuscous, with a whitish dorsal stripe. Abdomen dark grey. Legs dark fuscous, hairs of posterior tibiæ whitish. Forewings very elongate, costa gently arched, apex acute, slightly produced, hindmargin extremely obliquely rounded; deep fuscous-purple, irrorated with blackish-grey; a moderate whitish-ochreous streak along inner margin from near base to anal angle, extremities attenuated: cilia dark fuscous-purplish mixed with blackish-grey, beneath anal angle whitish-ochreous. Hindwings grey, with golden reflections; cilia whitish-grey.

Deloraine, Tasmania; in November, five specimens.

85. *Tin. tridectis*, n.sp.

♀. 12 mm. Head ochreous-yellowish. Palpi and antennæ rather dark fuscous. Thorax dark fuscous, with whitish-ochreous dorsal stripe. Abdomen pale fuscous. Legs dark fuscous, apex of joints whitish-ochreous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; purplish-fuscous, suffusedly irrorated with dark fuscous; an ochreous-whitish dot above middle at $\frac{1}{3}$; an ochreous-whitish streak along inner margin from near base to anal angle, attenuated posteriorly, its upper edge forming three subtriangular projections; a moderate subtriangular ochreous-whitish spot on costa at $\frac{3}{4}$: cilia fuscous mixed with dark fuscous. Hindwings rather light fuscous, slightly brassy-tinged; cilia light fuscous.

Melbourne, Victoria; one specimen received from Mr. G. H. Raynor.

86. *Tin. chaotica*, n.sp.

♂♀. 11-14 mm. Head whitish-ochreous. Palpi dark fuscous, apex whitish-ochreous. Antennæ fuscous. Thorax dark fuscous, with whitish-ochreous dorsal stripe. Abdomen dark grey. Legs dark fuscous, apex of joints and hairs of posterior tibiæ whitish-ochreous. Forewings very elongate, costa gently arched, apex

acute, hindmargin extremely obliquely rounded ; fuscous, irrorated with dark fuscous ; generally a strong ochreous-whitish longitudinal submedian streak from base to hindmargin above anal angle, thence continued as a suffused band along hindmargin to costa, but this is sometimes obscure or partially absent or mixed with groundcolour ; two blackish-fuscous spots on upper edge of this before and beyond middle, and two others on lower edge, sometimes extended as oblique marks to inner margin, sometimes placed in a whitish subdorsal suffused streak : cilia ochreous-whitish, with dark fuscous suffused blotches at apex and above anal angle, and a blackish line near base. Hindwings grey ; cilia whitish-grey.

Fernshaw, Victoria ; Deloraine and Mount Wellington, Tasmania ; from November to January, common. This is an exceedingly variable insect, and usually very obscure in appearance, though hardly likely to be confused with any other ; the allied species have their markings much more clearly defined.

87. *Tin. colleta*, n.sp.

♂. 10-11 mm. Head pale whitish-yellow. Palpi dark fuscous. Antennæ grey. Thorax dark fuscous, with whitish-yellowish dorsal stripe. Abdomen grey. Legs dark fuscous, posterior pair ochreous-whitish. Forewings very elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded ; dark purplish-fuscous mixed with blackish ; markings pale whitish-yellowish ; a broad streak along costa from near base to $\frac{3}{4}$, attenuated to extremities ; a moderate streak along inner margin from base to anal angle ; a blotch from costa immediately before hindmargin, not reaching either of the longitudinal streaks : cilia light fuscous mixed with darker, at apex dark fuscous, on costal blotch whitish-yellowish. Hindwings grey ; cilia whitish-grey.

Sydney, New South Wales ; in September and October, two specimens.

88. *Tin. acrozygga*, n.sp.

♂. 9-11 mm. Head whitish-yellowish, face sometimes ferruginous-tinged. Palpi and antennæ dark fuscous. Thorax dark

fuscous, with yellow-whitish dorsal stripe. Abdomen grey. Legs dark fuscous, posterior pair ochreous-whitish. Forewings very elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; white suffusedly mixed with whitish-yellowish, especially towards margins; a broad straight dark fuscous median longitudinal streak from base to hindmargin, upper edge with a triangular projection at $\frac{1}{2}$ not reaching costa: cilia fuscous mixed with blackish, on costa and anal angle yellow-whitish. Hindwings light grey; cilia grey-whitish.

Sydney, New South Wales; Geraldton and Perth, West Australia; in September and October, six specimens. Larva 16-legged, abdominal legs very rudimentary; elongate, slender, somewhat flattened, tapering at both ends, segments rather deeply incised; ochreous-yellow; dorsal vessel dull greenish; head very small, black; second segment suffused with blackish; anal segment minute, black: mines a flat discoloured blotch occupying apical portion of leaves of *Haakea dactyloides* (*Proteaceae*), in August; pupa free, within the mine.

89. *Tin. lativittella*, Walk.

(*Elachista lativittella*, Walk. 898.)

♂♀. 9-12 mm. Head pale whitish-yellowish, face often ferruginous-tinged. Palpi and antennae dark fuscous. Thorax dark fuscous, with yellow-whitish dorsal stripe. Abdomen grey. Legs dark fuscous, posterior pair ochreous-whitish. Forewings very elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; white, suffused with whitish-ochreous towards margins; a broad straight dark purple-fuscous median longitudinal streak from base to hindmargin, upper edge straight throughout: cilia fuscous mixed with blackish, on costa and anal angle ochreous-whitish. Hindwings pale grey; cilia grey-whitish.

Sydney and Blackheath (3500 feet), New South Wales; Perth, West Australia; from August to November, and in February, rather common. Larva 16-legged, elongate, cylindrical, slightly tapering at both ends; dull yellowish-grey; head reddish-ochreous,

second and anal segments rather lighter ochreous; feeds on *Isopogon anemonifolius* (*Proteaceae*), uniting four or five needles into a firm tube, and eating away upper portion, in September; pupa free within the tube.

90. *Tin. tetropa*, n.sp.

♂. 14 mm. Head and palpi ochreous-whitish. Antennæ dark fuscous. Thorax dark fuscous, with ochreous-whitish dorsal stripe. Abdomen grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings very elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; dark fuscous; six white spots on costa, fourth and fifth (at $\frac{1}{2}$ and $\frac{3}{4}$) large, others small; a whitish-ochreous streak along inner margin from base to anal angle, deeper ochreous towards upper edge, upper edge with six short irregular projections; a white dot in disc near apex, and another on hindmargin beneath apex: cilia pale whitish-fuscous mixed with dark fuscous, on costa spotted obscurely with whitish. Hindwings grey; cilia pale grey.

Mount Lofty, South Australia; one specimen received from Mr. O. B. Lower.

91. *Tin. tryphera*, n.sp.

♂. 13-17 mm. Head pale whitish-yellowish. Palpi whitish, beneath dark fuscous. Antennæ dark fuscous. Thorax dark fuscous, with yellow-whitish dorsal stripe. Abdomen grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings very elongate, costa gently arched, apex tolerably acute, hindmargin extremely obliquely rounded; rather dark fuscous; two white dots on costa beyond middle, and sometimes three or four others towards apex; a whitish-ochreous yellowish-tinged streak along inner margin from base to anal angle, upper edge with numerous irregular serrations, margined by a blackish suffusion: cilia rather dark fuscous, on anal angle whitish, on costa dotted with whitish. Hindwings pale grey; cilia whitish-grey.

Sydney, Blackheath (3500 feet), and Mittagong, New South Wales; in August, October, and March, six specimens. Larva 16-legged, somewhat flattened, tapering at both ends; dull blackish,

tinged with green, darkest on dorsal and spiracular lines; spots minute, pale; head small, ochreous-brown, on crown blackish; second and anal segments black: feeds between joined leaves of *Persoonia salicina* (*Proteaceae*), in July; pupa in a dense white cocoon.

92. *Tin. melitocoma*, n.sp.

♂. 10 mm. Head ochreous-yellowish. Antennæ dark fuscous. Thorax fuscous. Abdomen grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings very elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; ochreous-brown, irrorated with dark fuscous: cilia light ochreous-brownish, mixed with dark fuscous. Hindwings and cilia grey.

Mittagong (2000 feet), New South Wales; one specimen in March.

93. *Tin. muricata*, n.sp.

♂. 6 mm. Head and palpi whitish. Antennæ, thorax, abdomen, and legs dark fuscous, posterior tibiæ and apex of tarsal joints whitish. Forewings elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; deep fuscous-purple, with a few scattered pale fuscous scales: cilia fuscous mixed with dark fuscous. Hindwings fuscous, tinged with golden-purplish; cilia light fuscous.

Sydney, New South Wales; one specimen in November.

94. *Tin. phoenicopa*, n.sp.

♂♀. 6-7 mm. Head ferruginous, with some whitish-ochreous hairs. Palpi whitish. Antennæ, thorax, abdomen, and legs dark fuscous, posterior tibiæ and apex of tarsal joints whitish. Forewings elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; purple-fuscous, irrorated with dark fuscous, sometimes with scattered ochreous-whitish scales, especially posteriorly: cilia purplish-fuscous mixed with whitish, with a strong black line at $\frac{1}{3}$. Hindwings rather dark purplish-grey; cilia grey.

Sydney, New South Wales; Wirrabara, South Australia; in October, locally common.

95. *Tin. spodina*, n.sp.

♂. 8-9 mm. Head, palpi, and thorax white. Antennæ whitish. Abdomen grey. Legs dark grey, apex of joints and posterior pair whitish. Forewings elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; pale greyish-ochreous or whitish-fuscous, irrorated with fuscous or dark fuscous: cilia whitish-fuscous, with complete dark fuscous lines at $\frac{1}{3}$ and tips, base mixed with dark fuscous points. Hindwings rather dark grey, with strong purple and brassy reflections; cilia light grey.

Sydney, New South Wales; in September and October, five specimens. Larva undescribed, mining in leaves of *Persoonia lanceolata* (*Proteaceae*), in September; when full-fed it cuts out a narrow flattened-cylindrical case to pupate in.

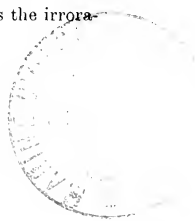
96. *Tin. epimochla*, n.sp.

♂. 9 mm. Head fuscous, mixed with whitish posteriorly. Palpi and antennæ whitish. Thorax fuscous, sprinkled with whitish. Abdomen and legs dark fuscous, apex of tarsal joints and hairs of posterior tibiae whitish. Forewings elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; dark purplish-fuscous, finely and closely irrorated with whitish: cilia whitish-fuscous, with antemedian, subapical, and apical dark fuscous lines, antemedian line in costal cilia very strong and black. Hindwings dark purplish-fuscous; cilia dark grey.

Sydney, New South Wales; in September, one specimen.

97. *Tin. monophthalma*, n.sp.

♂♀. 8-14 mm. Head, palpi, antennæ, and thorax white. Abdomen whitish-grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; white finely irrorated with dark grey posteriorly; sometimes the irro-



tion extends throughout the wing, but is always more dense posteriorly; the irroration is rarely ochreous-fuscous; sometimes a small round spot of darker suffusion in disc at $\frac{3}{4}$: cilia white, finely irrorated with dark fuscous, with antemedian, subapical, and apical dark lines, antemedian line in costal cilia very strong and black. Hindwings rather dark grey, with purple and brassy reflections; cilia whitish-grey, darker towards base.

Brisbane, Queensland; Sydney, Bathurst, and Mount Kosciusko (4300 feet), New South Wales; Deloraine, Tasmania; Woodside, South Australia; Albany, West Australia; from September to March, very common.

98. *Tin. vetula*, n.sp.

♂♀. 10-13 mm. Head white, forehead more or less suffused with ochreous-yellow. Palpi, antennæ, thorax, abdomen, and legs white; anterior tibiæ dark fuscous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; white, finely and sometimes very slightly sprinkled with pale ochreous-yellow: cilia white. Hindwings rather dark grey; cilia whitish-grey, suffused with white towards apex and anal angle.

Sydney, New South Wales; in November and December, common. Larva apodal, elongate, cylindrical, segments deeply incised, last two much attenuated, head very small, semicircular: dull deep yellow; mouth blackish: mines an elongate pearshaped blotch in leaves of *Banksia integrifolia* (*Proteaceae*), in July, both surfaces thickened and fleshy as in a gall; often several in one leaf: pupa within the mine.

99. *Tin. phauloptera*, n.sp.

♂♀. 8-9 mm. Head white, forehead fuscous. Palpi white. Antennæ white, annulated with dark fuscous. Thorax white, sprinkled with dark fuscous. Abdomen whitish-grey. Legs dark fuscous, middle pair mixed with white, posterior pair white. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; white, rather thinly irrorated

with dark fuscous or ochreous-brown; generally a suffused ochreous-brown spot on inner margin at $\frac{3}{4}$, and a more or less ill-defined cloudy fascia from $\frac{2}{3}$ of costa to anal angle, but these are sometimes obsolete: cilia white, irrorated with dark fuscous, basal third white barred with ochreous-brown, limited by a line of black points. Hindwings light grey; cilia whitish-grey.

Sydney, New South Wales; Deloraine, Tasmania; from September to November, common. Larva apodal, head and second segment enormously large, thence suddenly narrower and attenuated posteriorly throughout, segments deeply incised, head semi-elliptical; whitish, dorsal vessel conspicuously green; head and dorsal area of second segment black: mines a broad gradually dilated gallery in leaves of *Banksia serrata* (*Proteaceae*), usually along margin, in July; when full-fed, cuts out an oval case from the leaf to pupate in, and lets itself down.

100. *Tin. microspora*, n.sp.

♀. 9 mm. Head and palpi white. Antennæ white, spotted with dark fuscous. Thorax white. Abdomen ochreous-whitish. Legs white, anterior pair dark fuscous. Forewings elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; white; a few scattered blackish scales, especially towards anal angle: cilia white, with a very few blackish points arranged in a median line, and a small spot at anal angle. Hindwings grey-whitish; cilia white.

Perth, West Australia; in October, one specimen.

101. *Tin. aelurodes*, n.sp.

♂♀. 8-10 mm. Head white or ochreous-white, forehead fuscous or pale ochreous. Palpi and antennæ white. Thorax ochreous-white. Abdomen grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings very elongate, costa gently arched, apex tolerably acute, hindmargin very obliquely rounded; whitish-ochreous, irrorated with rather dark fuscous; two blackish-fuscous dots obliquely placed and sometimes confluent in middle of disc, and a third in disc at $\frac{3}{4}$: cilia ochreous-whitish irrorated

with dark fuscous, with a strong black line at $\frac{1}{3}$. Hindwings grey, with brassy and purple reflections; cilia light grey, towards tips more whitish.

Albany, West Australia; in December, five specimens.

102. *Tin. nectarea*, n.sp.

♂♀. 8-11 mm. Head light ochreous-yellow, face ferruginous. Palpi white. Antennæ dark fuscous. Thorax pale yellow. Abdomen dark grey. Legs dark fuscous, apex of joints and posterior pair ochreous-whitish. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; light ochreous-yellow; markings dark coppery-fuscous; a streak along costa from base to beyond middle; a large apical patch, its anterior edge straight, extending from $\frac{3}{4}$ of costa to inner margin before anal angle: cilia coppery-fuscous, with three dark fuscous lines. Hindwings rather dark fuscous, with coppery or brassy reflections; cilia grey, more whitish towards tips.

Brisbane, Queensland; Sydney and Bathurst, New South Wales; Melbourne, Victoria; Georges Bay, Tasmania; Albany, West Australia; from September to March, common. I have bred this species from flattened-oval irregular-edged cases, found in plenty on stems of *Acacia decurrens*, in September, but these were probably pupation-cases only, as in some other species; I failed to find the larvæ feeding, and they may have come from *Eucalyptus* trees near.

103. *Tin. teleochra*, n.sp.

♂♀. 12 mm. Head whitish-ochreous, yellowish-tinged. Palpi whitish, externally fuscous. Antennæ grey, in ♀ ringed with whitish. Thorax pale ochreous-yellowish, shoulders with a dark fuscous spot. Abdomen grey-whitish. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate, costa gently arched, apex tolerably acute, hindmargin very obliquely rounded; whitish-ochreous, somewhat mixed with pale shining ochreous; a few scattered dark fuscous scales, tending to form

small dots: cilia whitish-ochreous, terminal half on hindmargin suffused with rather dark fuscous. Hindwings whitish-grey; cilia grey-whitish.

Sydney, New South Wales; in August, two specimens.

16. CHRYSORYCTIS, Meyr.

Head densely rough-haired; ocelli absent; tongue short. Antennæ almost or quite 1, in ♂ shortly pubescent or simple, joints closely set, basal joint without pecten. Labial palpi moderate, porrected, second joint shortly rough-scaled, with several bristles towards apex, terminal joint short, rough-scaled beneath, tolerably pointed. Maxillary palpi long, tolerably filiform, folded. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate, 7 to costa, 11 from before middle. Hindwings $\frac{3}{4}$ -1, elongate-ovate or ovate-lanceolate, cilia 1; veins tolerably parallel.

Differs from *Tinea* essentially only by the longer antennæ, which are almost or quite as long as the forewings, whilst in *Tinea* they are at least one-sixth shorter; but the difference is sufficiently well-marked, and the genus is a natural and easily recognisable one, all the species being yellow with similar dark markings. The genus is confined to the Australian region, and is doubtless an endemic development of *Tinea*.

- | | | |
|--|------|-------------------|
| 1. Thorax whitish-ochreous, anteriorly suffused with fuscous..... | 115. | <i>ochracea</i> . |
| Thorax dark purple-fuscous..... | 2. | |
| 2. Forewings with broad dark basal fascia... | 109. | <i>purella</i> . |
| Forewings with only extreme base dark... | 3. | |
| 3. Forewings with dark hindmarginal fascia | 4 | |
| Forewings without dark hindmarginal fascia..... | 11. | |
| 4. Forewings with hindmarginal fascia containing pale markings..... | 5. | |
| Forewings with hindmarginal fascia not containing pale markings.....,..... | 8. | |

5. Forewings with fascia containing a yellow spot..... 6.
 Forewings with fascia containing a curved whitish fascia..... 104. *xystidophora*.
6. Included yellow spot costal..... 107. *eurybaphes*.
 Included yellow spot hindmarginal..... 7.
7. Forewings with costal dark streak extending to $\frac{1}{5}$ 106. *tyrannica*.
 Forewings with costal dark streak extending to $\frac{1}{3}$ 105. *fraudenta*.
8. Forewings with erect mark from anal angle 114. *balanosema*.
 Forewings without erect anal mark 9.
9. Forewings with anterior edge of fascia triangularly projecting..... 108. *irruptella*.
 Forewings with anterior edge of fascia not triangularly projecting 10.
10. Forewings with fascia broad, extending to $\frac{3}{4}$ of costa.... 110. *hypocritica*.
 Forewings with fascia narrow, extending to $\frac{7}{8}$ of costa or less..... 111. *talantias*.
11. Abdomen grey..... 113. *meliphanes*.
 Abdomen light yellowish-ochreous 112. *ochranthes*.

104. *Chrys. xystidophora*, n.sp.

♂♀. 15-19 mm. Head pale ochreous-yellowish. Palpi and antennæ dark fuscous. Thorax rather dark coppery-fuscous. Abdomen light brownish-ochreous. Legs dark fuscous, hairs of posterior tibiæ brownish-ochreous. Forewings elongate, costa gently arched, apex tolerably acute, hindmargin very obliquely rounded; bright clear yellow; extreme base dark coppery-fuscous, shortly produced along costa; a rather dark purple-fuscous apical patch, anterior edge limited by a nearly straight darker line from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin; within this patch is a cloudy whitish strongly inwards-curved fascia from costa before apex to hindmargin above anal angle: cilia whitish-fuscous, with several

dark fuscous lines, basal third sometimes suffused with white so as to form with fascia of wing an annular patch. Hindwings rather dark purplish-bronzy-fuscous; cilia fuscous.

Duaringa and Rosewood, Queensland; Bathurst and Sydney, New South Wales; in September, November, and March, not uncommon.

105. *Chrys. fraudulenta*, Ros.

(*Tinea fraudulens*, (form. *prav.*), Rosenst., Ann. Mag. Nat. Hist. 1885, 437, pl. XI., 12.)

♀. 14-15 mm. Head light ochreous-yellow. Palpi whitish. Antennæ pale fuscous. Thorax rather dark coppery-fuscous. Abdomen greyish-ochreous. Legs dark fuscous, posterior tibiæ greyish-ochreous. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin very obliquely rounded; bright clear yellow; a narrow dark coppery-fuscous streak along basal third of costa, extended at base to inner margin; a deep purple apical patch, mixed and margined with dark fuscous, anterior edge extending from $\frac{2}{3}$ of costa to $\frac{2}{4}$ of inner margin, hardly curved, containing a large oval clear yellow spot resting on hindmargin beneath apex: cilia fuscous-whitish irrorated with dark fuscous. Hindwings rather dark purplish-bronzy-fuscous; cilia light fuscous.

Sydney, New South Wales; Melbourne, Victoria; Mount Graham, South Australia; Carnarvon, West Australia; in October, December, and January, not uncommon. I have altered the inadmissible form of Rosenstock's specific name.

106. *Chrys. tyrannica*, n.sp.

♂♀. 13-16 mm. Head light ochreous-yellow. Palpi dark fuscous. Antennæ whitish, base dark fuscous. Thorax rather dark coppery-fuscous. Abdomen pale ochreous. Legs dark fuscous, posterior tibiæ ochreous-whitish. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin very obliquely rounded; bright clear yellow; a rather dark coppery-fuscous streak along basal fifth of costa, extended at base to inner

margin; a deep purple apical patch, mixed and margined with dark fuscous, anterior edge extending from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin, almost straight, containing a small suffused pale yellow spot near hindmargin beneath apex: cilia fuscous-whitish irrorated with dark fuscous. Hindwings rather dark bronzy-fuscous; cilia light fuscous.

Duaringa, Queensland; in October and February, three specimens received from Mr. G. Barnard.

107. *Chrys. eurybaphes*, n.sp.

♂♀. 18-22 mm. Head light ochreous-yellow. Palpi and antennæ dark fuscous. Thorax dark purplish-fuscous. Abdomen and legs dark fuscous, hairs of posterior tibiæ brownish-ochreous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; light golden-yellow; markings dark purple-fuscous; a streak along costa from base to apical patch, extended at base to inner margin; a large apical patch, anterior edge extending from beyond middle of costa to $\frac{2}{3}$ of inner margin, straight, containing a sometimes cloudy yellow spot on costa at $\frac{1}{3}$: cilia dark purple-fuscous. Hindwings rather dark bronzy-fuscous; cilia fuscous.

Blackheath (3500 feet), New South Wales; Port Lincoln, South Australia; in October and November, six specimens.

108. *Chrys. irruptella*, Walk.

(*Oecophora irruptella*, Walk. 686.)

♂♀. 17-22 mm. Head light ochreous-yellow. Palpi dark fuscous. Antennæ whitish, towards base dark fuscous. Thorax dark purplish-fuscous. Abdomen light ochreous-brownish. Legs dark fuscous, hairs of posterior tibiæ pale greyish-ochreous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; pale golden-yellow; markings dark purple-fuscous; a streak along costa from base to $\frac{2}{3}$, extended at base to inner margin; an apical patch, its anterior edge extending from $\frac{5}{8}$ of costa to inner margin before anal angle, lower half

straight, upper half emarginate so as to form a triangular median projection: cilia dark purple-fuscous. Hindwings rather dark bronzy-fuscous; cilia fuscous.

Melbourne, Victoria; Launceston, Deloraine, and Hobart, Tasmania; from October to December, rather common.

109. *Chrys. purella*, Walk.

(*Incurvaria purella*, Walk. 491.)

♂♀. 11-14 mm. Head light ochreous-yellow. Palpi and antennæ dark fuscous. Thorax dark purple-fuscous. Abdomen pale ochreous. Legs dark fuscous, hairs of posterior tibiæ whitish-ochreous. Forewings very elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; light golden-yellow; markings dark purple-fuscous; a rather broad basal fascia, produced as a narrow streak on costa to about middle; an apical patch, anterior edge extending from $\frac{2}{3}$ or $\frac{3}{4}$ of costa to $\frac{3}{4}$ or $\frac{1}{2}$ of inner margin, straight: cilia dark purplish-fuscous. Hindwings ochreous-fuscous; cilia light brownish-ochreous.

Duaringa, Queensland; Bathurst and Sydney, New South Wales; Quorn and Mount Lofty, South Australia; in October and March, not uncommon.

110. *Chrys. hypocritica*, n.sp.

♂♀. 14-20 mm. Head light ochreous-yellow. Palpi dark fuscous. Antennæ whitish. Thorax dark purplish-fuscous. Abdomen light yellowish-ochreous (in one specimen grey). Legs dark fuscous, hairs of posterior tibiæ whitish-ochreous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; light golden-yellow; markings dark purple-fuscous; a narrow suffused streak along costa from base to about middle, extended at base to inner margin; an apical patch, anterior edge extending from $\frac{3}{4}$ of costa to inner margin before anal angle, curved near costa: cilia dark purple-fuscous. Hindwings rather dark purplish-bronzy-fuscous; cilia fuscous.

Blackheath (3500 feet) and Bathurst (2300 feet), New South Wales; Mount Lofty and Port Lincoln, South Australia; in November and January, six specimens.

111. *Chrys. talantias*, n.sp.

♂♀. 17-18 mm. Head light ochreous-yellow. Palpi and antennæ dark fuscous. Thorax rather dark purplish-fuscous, posterior extremity whitish-ochreous. Abdomen pale ochreous. Legs dark fuscous, hairs of posterior tibiæ whitish-ochreous. Forewings elongate, costa gently arched, apex acute, hindmargin extremely obliquely rounded; pale ochreous-yellow; markings rather dark purple-fuscous; a narrow cloudy streak along costa from base to near middle, extended at base to inner margin; a narrow hindmarginal fascia, anterior edge running from $\frac{7}{8}$ or $\frac{9}{10}$ of costa to anal angle, straight: cilia fuscous. Hindwings rather dark bronzy-fuscous; cilia light ochreous-fuscous.

Duaringa, Queensland; Geraldton, West Australia; in November, four specimens.

112. *Chrys. ochranthes*, n.sp.

♂♀. 15-22 mm. Head pale ochreous-yellow. Palpi and antennæ dark fuscous. Thorax dark purple-fuscous. Abdomen light yellow-ochreous. Legs dark fuscous, hairs of posterior tibiæ pale ochreous. Forewings very elongate, costa moderately arched, apex acute, hindmargin very obliquely rounded; whitish-ochreous, yellowish tinged; a narrow dark purplish-fuscous streak along costa from base to near middle, extended at base to inner margin; sometimes a few scattered dark fuscous scales near apex and hindmargin: cilia dark purplish-fuscous. Hindwings dark bronzy-fuscous; cilia fuscous.

Trafalgar, Victoria; Launceston, Deloraine, Campbelltown, Georges Bay, and Hobart, Tasmania; Mount Lofty, South Australia; from November to January, common.

113. *Chrys. meliphanes*, n.sp.

♂♀. 13-17 mm. Head pale whitish-ochreous. Palpi and antennæ fuscous. Thorax dark purplish-fuscous. Abdomen grey. Legs dark fuscous, hairs of posterior tibiae whitish-ochreous. Forewings elongate, costa gently arched, apex very acute, hindmargin extremely obliquely rounded; pale whitish-yellow; a dark fuscous streak along costa from base to $\frac{2}{3}$; cilia fuscous, mixed with dark purple-fuscous towards base. Hindwings rather dark bronzy-fuscous; cilia fuscous.

Quorn, Wirrabara, and Mount Lofty, South Australia; in October and November, common.

114. *Chrys. balanosema*, n.sp.

♂♀. 14-15 mm. Head pale ochreous-yellow. Palpi dark fuscous. Antennæ whitish-fuscous. Thorax purplish-fuscous, posterior extremity whitish-ochreous. Abdomen pale greyish-ochreous. Legs dark fuscous, posterior pair whitish-ochreous. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin extremely obliquely rounded; whitish-ochreous; a narrow cloudy dark fuscous streak along costa from base to about middle, extended at base to inner margin; a narrow very indistinct fuscous suffusion along hindmargin, connected with a cloudy fuscous erect mark from anal angle, reaching more than half across wing; cilia ochreous-whitish, densely irrorated with dark purple-fuscous. Hindwings rather dark bronzy-fuscous; cilia fuscous.

Wollongong, New South Wales; in October, two specimens.

115. *Chrys. ochracea*, n.sp.

♂♀. 12-15 mm. Head light ochreous-yellowish. Palpi dark fuscous. Antennæ whitish-ochreous. Thorax whitish-ochreous, anteriorly suffused with fuscous. Abdomen whitish-ochreous. Legs dark fuscous, posterior pair whitish-ochreous. Forewings very elongate, costa moderately arched, apex acute, hindmargin very obliquely rounded; whitish-ochreous; costal edge dark fuscous

at base: cilia whitish-ochreous, terminal half irrorated with fuscous. Hindwings rather dark bronzy-fuscous; cilia whitish-fuscous.

Sydney, New South Wales; from October to January, and in March, seven specimens.

17. *TINEOLA*, H-S.

Head densely rough-haired; ocelli absent; tongue short. Antennæ $\frac{5}{2}$, in ♂ pubescent, joints closely set, basal joint with pecten. Labial palpi moderate, porrected, second joint loosely scaled, with several long bristles towards apex, terminal joint moderate, tolerably pointed. Maxillary palpi very short. Posterior tibiæ clothed with loose hairs. Forewings with vein 1 furcate, 7 to costa, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{2}{3}$ -1; veins tolerably parallel.

This genus, closely allied to *Tinea* and only differing from it by the undeveloped maxillary palpi, is represented only by one introduced species.

116. *Tin. biselliella*, Hüm.

(*Tineola biselliella*, Hüm., Meyr. Trans. N.Z. Inst. 1887, 101.)

♂♀. 11-15 mm. Head pale yellow-ochreous, sometimes more or less ferruginous-tinged. Thorax whitish-ochreous. Forewings elongate, narrow, costa gently arched, apex acute, hindmargin extremely obliquely rounded; whitish-ochreous: cilia whitish-ochreous. Hindwings pale whitish-ochreous-grey; cilia whitish-ochreous.

Glen Innes (3500 feet) and Sydney, New South Wales; Hobart, Tasmania; Port Lincoln, South Australia; Geraldton and Perth, West Australia; from October to February and in June, rather common. Introduced from Europe, and also occurring in New Zealand and North America. The larva feeds on hair, wool, &c., especially in the lining of furniture.

18. *MACRAEOLA*, n.g.

Head densely rough-haired; ocelli absent; tongue short. Antennæ over 1, in ♂ simple, joints closely set, basal joint with

pecten. Labial palpi moderate, porrected, second joint loosely scaled, with a few long bristles towards apex, terminal joint moderate, tolerably pointed. Maxillary palpi absent. Posterior tibiæ clothed with loose hairs. Forewings with vein 1 furcate, 6 and 7 stalked, 7 to costa, 11 from before middle. Hindwings $\frac{4}{5}$, lanceolate, cilia 2; veins 5 and 6 stalked.

A development of *Tinea*, characterised by the loss of the maxillary palpi, and the increased development of the antennæ, which are longer than the forewings. Only the one endemic species is at present known.

117. *Macr. linobola*, n.sp.

♂♀. 7-10 mm. Head and thorax whitish-ochreous. Palpi and antennæ dark fuscous. Abdomen whitish-grey. Legs dark fuscous, apex of joints and hairs of posterior tibiæ whitish-ochreous. Forewings elongate, narrow, costa gently arched, apex acute, hindmargin extremely obliquely rounded; pale greyish-ochreous, with numerous irregularly scattered dark fuscous spots; the coalescence of these forms an irregular median fascia, and an interrupted one at $\frac{3}{4}$; cilia pale greyish-ochreous. Hindwings grey; cilia light grey.

Sydney, New South Wales; from January to March, three specimens.

19. DEMOBROTIS, n.g.

Head densely rough-haired; ocelli absent; tongue rudimentary. Antennæ $\frac{5}{6}$ in ♂ simple, joints closely set, basal joint with pecten. Labial palpi moderate, porrected, second joint loosely scaled, with a few bristles towards apex, terminal joint moderate, tolerably pointed. Maxillary palpi long, tolerably filiform, folded. Posterior tibiæ clothed with fine hairs. Forewings with vein 1 furcate, 3 absent, 4 absent, 6 and 7 stalked, 7 to costa, 9 and 10 stalked, 11 from $\frac{1}{3}$. Hindwings $\frac{2}{3}$, narrow-lanceolate or linear, cilia 3-6; transverse vein absent between 2 and 5, 3 absent, 4 absent, 6 and 7 stalked.

An endemic development of *Tinea*, from which it differs essentially by the loss of several veins. I have only been able to fully examine the neuration of the first species; of the other two I possess only single specimens, and they are so small and narrow-winged that I cannot see the neuration satisfactorily without denudation, but it seems notwithstanding to be similar; the excessive narrowness of the wings in these two species makes it improbable that the neuration is less degraded than in the first, and in any case they can be distinguished from *Tinea* by the linear hindwings.

- | | |
|--|-------------------------|
| 1. Hindwings lanceolate, cilia 3. | 118. <i>anaglypta</i> . |
| Hindwings linear, cilia 6..... | 2. |
| 2. Forewings with groundcolour white..... | 120. <i>hemiphara</i> . |
| Forewings with groundcolour pale greyish-ochreous..... | 119. <i>ocymorpha</i> . |

118. *Dem. anaglypta*, n.sp.

♂♀. 7-8 mm. Head white, crown spotted with dark fuscous. Palpi dark fuscous. Antennæ white, obscurely ringed with dark fuscous. Thorax white, sprinkled with dark fuscous. Abdomen whitish-grey. Legs dark fuscous, apex of joints and hairs of posterior tibiæ whitish. Forewings elongate-lanceolate; white, with scattered dark fuscous strigulæ; markings dark fuscous; an oblique mark from costa at $\frac{1}{5}$, a second from costa before middle, reaching half across wing and confluent with a longitudinal mark in disc, a small spot on costa beyond middle, and an oblique mark from costa at $\frac{3}{4}$, confluent with a longitudinal mark in disc; a spot on submedian fold at $\frac{1}{3}$, and a longitudinal mark on fold beyond middle: cilia white, with three or four lines of dark fuscous points. Hindwings lanceolate, cilia 3; grey; cilia whitish-grey.

Sydney, New South Wales; in December and January, five specimens. Larva feeds in a portable case on lichens on rocks, fences, &c.; case small, cylindrical, apex rather tapering, granulated with fragments of lichen and minute grains of sand, mouth large, very oblique.

119. *Dem. ocymorpha*, n.sp.

♂. 7 mm. Head whitish-ochreous. Palpi and antennæ dark fuscous. Thorax whitish-ochreous, shoulders with a dark fuscous spot. Abdomen light grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate-lanceolate, narrow; pale greyish-ochreous, with a few blackish scales; costa and inner margin marked with whitish strigulae, on costa separated by small black spots; a blackish fascia before middle, and a broader one beyond middle, both interrupted in disc with ochreous; a black longitudinal mark in disc towards apex, surrounded by an ochreous suffusion: cilia very pale greyish-ochreous, with two fine black lines, inner line limiting a round black spot above apex marked with two white dots. Hindwings linear, cilia 6; grey; cilia pale ochreous-grey.

Sydney, New South Wales; in March, one specimen.

120. *Dem. hemiphara*, n.sp.

♂. 8 mm. Head and antennæ ochreous-white. Palpi white, with a dark grey median band. Thorax white, shoulders dark fuscous. Abdomen whitish. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings elongate-lanceolate, narrow; white, partially finely sprinkled with ochreous-yellowish; markings fuscous, mixed with blackish; a patch extending over nearly basal half of wing, outer edge rather oblique; a streak along costa from $\frac{2}{5}$ to apex, marked with three or four whitish strigulae, and one along hindmargin from anal angle to apex, confluent together posteriorly and with a short longitudinal streak in disc towards apex: cilia fuscous-whitish, basal half on costa fuscous mixed with blackish and marked with extensions of white costal strigulae. Hindwings linear, cilia 6; grey; cilia whitish-grey.

Brisbane, Queensland; Sydney, New South Wales; in September and October, two specimens.

20. ENDOPHTHORA, Meyr.

Head densely rough-haired; ocelli present; tongue obsolete. Antennæ $\frac{5}{5}$, in ♂ simple, joints closely set, basal joint with pecten.

Labial palpi moderate, porrected, second joint with appressed scales, slightly rough beneath, with a few long bristles towards apex, terminal joint moderate, tolerably pointed. Maxillary palpi long, filiform, folded. Posterior tibiæ clothed with long fine hairs. Forewings with vein 1 simple, 4 absent, 7 to costa, 11 from $\frac{1}{3}$. Hindwings $\frac{2}{3}$ - $\frac{3}{4}$, narrow-lanceolate, cilia 2-3; veins 5 and 6 sometimes stalked.

Besides the following species there are four in New Zealand, and it is therefore probable that the genus is a development of *Tinea*, originating in New Zealand, of which a straggler has made its way to the Australian region.

121. *End. oxytona*, n.sp.

♂. 10-11 mm. Head white, face mixed with fuscous. Palpi white, externally dark fuscous except apex of joints. Antennæ white, annulated with dark fuscous. Thorax white, mixed with dark fuscous. Abdomen whitish-grey. Legs dark fuscous, apex of joints and posterior pair whitish. Forewings very elongate, narrow, costa gently arched, apex acute, hindmargin extremely obliquely rounded; white, mixed with pale ochreous; markings fuscous irrorated with black; a broad streak along costa from base to beyond middle, apex truncate; an irregular suffusion along inner margin from base to anal angle, where it expands into a spot, and is preceded by some scattered black scales in disc; a small cloudy spot on costa at $\frac{3}{4}$; cilia white, on hindmargin irrorated with pale ochreous, with two or three incomplete lines of black points, with a blackish elongate spot at apex. Hindwings light grey; cilia ochreous-grey-whitish.

Port Lincoln, South Australia; in November, two specimens.

21. *MYCHONOA*, n.g.

Head rough-haired; ocelli present; tongue developed. Antennæ $\frac{5}{6}$, in ♂ pubescent, joints closely set, basal joint without pecten. Labial palpi moderate, rather drooping, loosely scaled, slender, terminal joint as long as second, pointed. Maxillary palpi

rudimentary. Posterior tibiæ with appressed scales. Forewings with vein 1 simple, 7 absent, 10 absent, 11 from middle. Hindwings $\frac{1}{3}$, elongate-ovate, cilia 1; veins 3 and 4 stalked, 7 absent.

A peculiar and rather isolated genus, apparently allied to *Tinea*, but with the structure partially degraded. Only the one species is known to me.

122. *Mych. mesozona*, n.sp.

♂. 12 mm. Head pale brownish-ochreous. Palpi pale ochreous, externally mixed with dark fuscous. Antennæ fuscous. Thorax, abdomen, and legs dark fuscous, posterior legs suffused with whitish-ochreous. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; dark ochreous-fuscous, with numerous irregular transverse partially confluent pale leaden-grey lines; a dark spot of groundcolour on middle of inner margin: cilia ochreous-fuscous, with several lines of dark fuscous points. Hindwings and cilia dark fuscous.

Rosewood, Queensland; one specimen in September, amongst dense scrub.

22. DRYADAULA, n.g.

Head rough-haired; ocelli present; tongue absent. Antennæ $\frac{5}{6}$, in ♂ filiform, simple, basal joint with pecten. Labial palpi moderately long, porrected, second joint rough-scaled towards apex beneath, terminal joint moderately long, dilated with rather loose scales. Maxillary palpi long, filiform, folded. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate (?), 7 and 8 stalked, 7 to costa, 11 from $\frac{1}{3}$. Hindwings 1, elongate-ovate, cilia 1; vein 5 absent, 6 and 7 from a point or stalked, 6 to hindmargin.

Nearly allied to the following genera, but the exact relationship is uncertain. Besides the one Australian species I have a second from New Zealand.

123. *Dryad. glycinopa*, n.sp.

♂♀. 9-10 mm. Head yellow-whitish, crown more yellowish-tinged. Palpi whitish, second joint with a brownish subapical band. Antennæ whitish, with three dark fuscous bands on apical

half. Thorax pale yellowish. Abdomen grey. Legs whitish, anterior and middle tarsi spotted with blackish. Forewings very elongate, costa gently arched, apex roundpointed, hindmargin extremely obliquely rounded; pale whitish-yellowish, ochreous-tinged; markings yellow-ochreous, suffused with fuscous on costa, intervening spaces more whitish towards costa; a very oblique streak from costa near base to fold, and another from $\frac{2}{3}$ of costa to middle of disc; an oblique blotch on costa about $\frac{2}{3}$; a spot on costa before apex; an irregular obscure suffusion along inner margin; an irregular longitudinal line of blackish scales towards hindmargin above middle; a suffused blackish line along hindmargin from apex to anal angle: cilia whitish-yellowish, partially suffused with yellow-ochreous. Hindwings grey or pale grey; cilia whitish-grey or whitish.

Blackheath (3500 feet), New South Wales; Deloraine, Tasmania; in November and February, three specimens.

23. CHOROCOSMA, n.g.

Head rough-haired; ocelli present; tongue absent. Antennæ $\frac{5}{5}$, in ♂ filiform, simple, basal joint without pecten. Labial palpi moderately long, porrected, slender, with appressed scales, second joint with some scattered bristles, terminal joint moderate, tolerably pointed. Maxillary palpi long, filiform, folded. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate (?), 4 absent, 7 and 8 stalked, 7 to hindmargin, 11 from $\frac{1}{3}$. Hindwings $\frac{3}{4}$, ovate-lanceolate, cilia $1\frac{1}{4}$; cell open between 3 and 4, 6 absent.

The genus is more nearly allied to *Dryadaula* than to any other; I have only the one species.

124. *Chor. melanorma*, n.sp.

♂. 9 mm. Head white. Palpi fuscous, internally and at apex white. Antennæ fuscous. Thorax whitish, shoulders with a yellow-ochreous spot. Abdomen grey. Legs blackish ringed with white, hairs of posterior tibiæ whitish. Forewings elongate, costa rather strongly arched, apex acute, hindmargin extremely

oblique, hardly rounded; bright yellow-ochreous; three suffused white angulated fasciæ, more or less confused together, first rather broad, second narrow, not reaching costa, third narrow, cloudy, not reaching inner margin; a sharply defined interrupted black line round apical third of costa and hindmargin to anal angle, surrounded with white, at apex forming a small round black spot: cilia yellow-ochreous, towards tips whitish, with a black spot at apex. Hindwings and cilia light grey.

Sydney, New South Wales; one specimen in October.

24. COMODICA, Meyr.

Head rough-haired; ocelli present; tongue absent. Antennæ $\frac{5}{6}$, in ♂ filiform, simple, with deep notch immediately above basal joint, basal joint elongate, sometimes dilated terminally, sometimes with apical projecting tooth, without pecten. Labial palpi moderately long, porrected, second joint beneath smooth or with dense tuft of scales towards apex, terminal joint moderate, smooth or loosely scaled or with long dense projecting scales beneath throughout. Maxillary palpi long, filiform, folded. Posterior tibiæ clothed with long fine hairs. Forewings sometimes with elongate transparent grooved patch beneath costa towards base, costal area sometimes thickened before 11; 1 furcate, lower fork partially obsolete, 4 absent, 7 sometimes absent, rarely 8 also absent, 11 from $\frac{1}{3}$. Hindwings 1, ovate-lanceolate, cilia 1-1 $\frac{1}{2}$; veins 5 and 6 stalked, 6 to costa.

A development of *Ereunetis*, characterised by the peculiar antennal structure, formerly overlooked by me; it is not yet known outside Australia. The variation of neuration in the forewings appears to occur within the limits of the same species.

- | | |
|--|----------------------------|
| 1. Forewings with two hooks in apical cilia .. | 125. <i>tetracerella</i> . |
| Forewings with one hook in apical cilia..... | 2. |
| 2. Forewings with groundcolour ochreous... .. | 126. <i>acontistes</i> . |
| Forewings with groundcolour not ochreous | 3. |
| 3. Terminal joint of palpi with dense fringe of hairs beneath..... | 128. <i>mystacinella</i> . |
| Terminal joint of palpi smooth, filiform..... | 127. <i>ællophora</i> . |

125. *Com. tetracercella*, Meyr.

(*Comodica tetracercella*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 255.)

The original statement of neuration is partially incorrect ; at least, if veins 5 and 6 of hindwings are ever separate as stated, it must be exceptional, though I do not imagine I was mistaken as to the specimen examined ; these veins are however stalked in all the specimens which I now possess.

126. *Com. acontistes*, Meyr.

(*Erechthias acontistes*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 266.)

127. *Com. aëlophora*, Meyr.

(*Erechthias aëlophora*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 270.)

128. *Com. mystacinella*, Walk.

(*Erechthias mystacinella*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 263.)

Also at Launceston and Hobart, Tasmania.

25. EREUNETIS, Meyr.

Head rough-haired ; ocelli present ; tongue absent. Antennæ $\frac{5}{6}$, in ♂ filiform, simple, basal joint moderate, with or without pecten. Labial palpi moderately long, porrected, second joint with appressed or short rough scales beneath, with some long scattered bristles, terminal joint with tolerably appressed scales or long rough hairs beneath, somewhat pointed. Maxillary palpi long, filiform, folded. Posterior tibiæ clothed with long fine hairs. Forewings with vein 1 furcate, lower fork partially obsolete, 4 absent, 7 and 8 stalked, 7 to costa or sometimes absent, 11 from $\frac{1}{3}$. Hindwings $\frac{1}{2}$ -1, lanceolate, cilia $1\frac{1}{2}$ -2 ; veins 5 and 6 stalked or rarely separate, 6 to costa or apex or rarely hindmargin ; in ♂ sometimes with transparent patch or thickened spot of scales beneath towards base.

A development of *Erechthias*; besides the eight Australian I have also eight New Zealand species. The typical genus *Erechthias*, differing from *Ereunetis* (according to the present revised definition) by the presence of all veins in the forewings, is confined to New Zealand. *Decadarchis*, Meyr., cannot be maintained as a distinct genus, and must be merged in *Ereunetis*.

- | | |
|---|----------------------------|
| 1. Forewings with groundcolour blackish-fuscaous | 2. |
| Forewings with groundcolour not blackish-fuscaous..... | 5. |
| 2. Forewings with white costal mark at $\frac{1}{4}$ | 3. |
| Forewings without white costal mark at $\frac{1}{4}$ | 4. |
| 3. Forewings with basal streak interrupted but reaching middle..... | 129. <i>phileris</i> . |
| Forewings with basal streak not passing $\frac{1}{6}$ | 130. <i>oxymacha</i> . |
| 4. Forewings with basal streak more or less completely interrupted..... | 131. <i>symmacha</i> . |
| Forewings with basal streak entire..... | 132. <i>niphadopla</i> . |
| 5. Forewings with white median longitudinal streak!..... | 133. <i>elaeorrhoea</i> . |
| Forewings without white median longitudinal streak..... | 6. |
| 6. Forewings with dark fuscous costal blotches | 135. <i>brontoctypa</i> . |
| Forewings without dark fuscous costal blotches..... | 7. |
| 7. Terminal joint of palpi with long rough hairs beneath | 136. <i>iuloptera</i> . |
| Terminal joint of palpi with appressed scales. | 134. <i>selenophanes</i> . |

129. *Ereun. phileris*, n.sp.

♂♀. 9-11 mm. Head ochreous-white, sides black. Palpi black, internally and at apex white. Antennæ dark grey. Thorax blackish-fuscaous, with white central stripe. Abdomen dark grey. Legs blackish, ringed with white. Forewings very elongate, narrow, costa gently arched, apex roundpointed, hindmargin extremely obliquely rounded; blackish-fuscaous; markings ochreous-

white; a fine median longitudinal streak from base to middle of disc, obliquely interrupted at $\frac{1}{3}$; a very oblique wedgeshaped mark from costa at $\frac{1}{4}$, almost reaching middle of disc; a narrow oblique fascia from beyond middle of costa to middle of hindmargin, lower portion attenuated or partially obsolete; a fine oblique streak from costa at $\frac{1}{3}$ to beneath apex; a moderate streak along inner margin from near base to anal angle, upper edge forming rather strong irregular projections before and beyond middle; a fine more or less interrupted line along hindmargin; a round black apical spot, preceded by a white mark on costa: cilia golden-ochreous, towards tip whitish, with a blackish line, tips round apex dark fuscous. Hindwings and cilia dark fuscous; 6 to apex.

Albany, West Australia; in December, taken in plenty on a fence beneath *Eucalyptus* trees.

130. *Ereun. oxymacha*, n.sp.

♀. 10 mm. Head white, sides black. Palpi black, internally and at apex white. Antennæ dark fuscous. Thorax blackish. Abdomen dark grey. Legs dark fuscous ringed with whitish, hairs of posterior tibiae whitish. Forewings very elongate, narrow, costa gently arched, apex roundpointed, hindmargin extremely obliquely rounded; blackish; markings white; a short linear median mark from base; three oblique wedgeshaped marks from costa, reaching about half across wing, at $\frac{1}{3}$, beyond middle, and $\frac{1}{2}$ respectively; a streak along inner margin from near base to near anal angle, almost interrupted beyond middle; a round blackish apical spot, partly in cilia, preceded by a small triangular white spot on costa: cilia whitish, with a black line, and blackish apical bar. Hindwings with vein 6 to costa; dark grey; cilia grey.

Geraldton, West Australia; one specimen in November.

131. *Ereun. symmacha*, n.sp.

♂♀. 9-11 mm. Head white, sides black. Palpi black, apex white. Antennæ fuscous. Thorax blackish, with white central stripe. Abdomen grey. Legs blackish ringed with white, hairs

of posterior tibiæ whitish. Forewings very elongate, narrow, costa gently arched, apex roundpointed, hindmargin extremely obliquely rounded; blackish-fuscous; markings snow-white; a median streak from base to middle of disc, more or less completely interrupted at $\frac{1}{4}$; a streak along inner margin from near base to anal angle, interrupted near its extremity; an oblique fascia-like streak from costa beyond middle, nearly reaching anal angle; an oblique spot on costa at $\frac{1}{5}$; a round black apical spot, partly in cilia, edged with white anteriorly: cilia whitish, base white, with two or towards anal angle three blackish lines. Hindwings and cilia light grey; 6 to costa.

Blackheath (3500 feet), New South Wales; Melbourne, Victoria; Launceston, Deloraine, and Georges Bay, Tasmania; from November to January, taken in plenty on *Eucalyptus*-trunks.

132. *Ereun. niphadopa*, Meyr.

(*Erechthias niphadopa*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 270.)

133. *Ereun. elaeorrhoea*, Meyr.

(*Erechthias elaeorrhoea*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 267.)

134. *Ereun. selenophanes*, Meyr.

(*Ereunetis selenophanes*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 259.)

Also at Sydney, New South Wales, in August.

135. *Ereun. brontoctypa*, Meyr.

(*Ereunetis brontoctypa*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 259.)

136. *Ereun. iuloptera*, Meyr.

(*Ereunetis iuloptera*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 260.)

26. EURYTYLA, n.g.

Head rough; ocelli present (?); tongue absent. Antennæ $\frac{5}{6}$, in ♂ filiform, simple, basal joint moderate, with pecten. Labial

palpi moderately long, rather drooping, slender, filiform, terminal joint moderate, pointed. Maxillary palpi long, filiform, folded. Posterior tibiæ smooth above, with fine hairs beneath. Abdomen broadly dilated, strongly margined. Forewings with vein 1 furcate (?), 4 absent, 7 to costa, 11 from $\frac{1}{3}$. Hindwings $\frac{2}{3}$, lanceolate, cilia 3; transverse vein absent between 3 and 4, 5 and 6 stalked, 7 absent.

Probably a development of *Ereunetis*.

137. *Eur. automacha*, n.sp.

♂. 7 mm. Head fuscous-whitish. Palpi white, beneath dark fuscous. Antennæ white, above with a black sharply-defined line. Thorax dark fuscous mixed with whitish. Abdomen dark fuscous, margins pale ochreous. Legs dark fuscous, ringed with whitish, posterior tibiæ whitish. Forewings lanceolate; fuscous, irrorated with dark fuscous; markings white; five oblique streaks from costa, reaching about half across wing; a suffusion occupying dorsal half from base to anal angle, except for dark fuscous indentations from disc at $\frac{1}{5}$ and middle; a round black apical spot, preceded by a white spot on costa; cilia whitish, with a black line and apical hook (imperfect). Hindwings and cilia dark fuscous.

Mittagong, New South Wales; one specimen in March.

27. HIPPIOCHAETES, Meyr.

Head rough, face smooth; ocelli present; tongue absent. Antennæ $\frac{5}{6}$, in ♂ filiform, ciliated (1), basal joint moderate, with slight pecten. Labial palpi rather short, slender, filiform, rather drooping. Maxillary palpi moderate, filiform, folded. Posterior tibiæ clothed with long hairs beneath, posterior tarsi with basal joint fringed with hairs. Forewings with vein 1 furcate (?), 4 absent, 7 to costa, 11 from $\frac{1}{3}$. Hindwings $\frac{3}{4}$, lanceolate, cilia 2; veins 5 and 6 stalked, 6 to costa.

The original example is still unique; it is presumably an offshoot of *Ereunetis*.

138. *Hipp. chrysoaspis*, Meyr.

(*Hippiochaetes chrysoaspis*, Meyr., Proc. Linn. Soc. N. S. Wales, 1880, 253.)

28. *HIEROXESTIS*, n.g.

Head with dense erect tuft on crown, face smooth; ocelli small; tongue developed. Antennæ $\frac{5}{3}$, in ♂ serrulate, with whorls of short cilia, basal joint very long, dilated, concave beneath, in ♂ with projection of dense scales on upper edge. Labial palpi moderately long, curved, ascending, smooth-scaled, second joint with several long bristles towards apex, terminal joint half second, rather thick, obtuse. Maxillary palpi long, filiform, folded. Posterior tibiae clothed with very long hairs. Forewings with vein 1 simple, 5 closely approximated at base to 6, 7 and 8 out of 6, 7 to costa, 9 from point with 6, 10 absent, 11 from $\frac{3}{4}$ of cell. Hindwings $\frac{4}{5}$, lanceolate, cilia $1\frac{1}{2}$; vein 4 approximated at base to 7, 5 and 6 out of 7, 6 to hindmargin.

This curious genus stands so far isolated from other Australian forms, that, taking into consideration its mode of feeding, I have suspected it to be an introduction from another region; however, I know no evidence of its occurrence elsewhere. It is allied to the *Tinea* group, but has undergone very great modification.

139. *Hier. omoscopa*, n.sp.

♂♀. 20-22 mm. Head dark fuscous, tuft lighter fuscous, face pale greyish-ochreous. Palpi dark fuscous, internally and at apex of joints pale greyish-ochreous. Antennae pale greyish-ochreous, basal joint dark fuscous. Thorax dark fuscous. Abdomen pale greyish-ochreous. Legs dark fuscous, apex of joints and hairs of posterior tibiae pale greyish-ochreous. Forewings very elongate, long-pointed, apex very narrowly and acutely produced; dark fuscous, purplish-tinged; a pale greyish-ochreous spot on inner margin before anal angle: cilia pale fuscous, base mixed with darker. Hindwings light brassy-fuscous, becoming pale greyish-ochreous towards base; cilia light fuscous, becoming whitish-ochreous towards anal angle.

Newcastle and Sydney, New South Wales; from June to December, sometimes common on fences near houses. It has been bred from larvæ feeding on sheets of cork.

29. TIMAEA, Walk.

Head densely rough-haired on crown, face with appressed hairs; ocelli present; tongue short. Antennæ $\frac{2}{3}$, in ♂ serrate, ciliated (1), basal joint moderate, with pecten. Labial palpi moderately long, ascending, second joint shortly rough-scaled beneath, with numerous long scattered bristles, terminal joint as long as second, slender, with appressed scales, pointed. Maxillary palpi short, loosely scaled. Posterior tibiæ clothed with long rough hairs. Forewings with vein 1 furcate, 7 to costa, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{3}{4}$; veins 5 and 6 somewhat approximated at base, 6 to costa.

The genus must be not very remotely connected with *Tinea*, but the intermediate forms are missing. It nearly represents the ancestral type from which most of the succeeding genera can be derived.

140. *Tim. bivittatella*, Walk.

(*Timaea bivittatella*, Walk. 521; *T. costella*, ib. 521; *Manliana astrictella*, ib. 1012.)

♂♀. 21-24 mm. Head white, forehead and sides of face rather dark fuscous. Palpi white, terminal joint externally dark fuscous towards apex. Antennæ grey-whitish. Thorax whitish-ochreous. Abdomen whitish. Legs dark ochreous-fuscous, posterior pair whitish. Forewings very elongate, costa moderately arched, apex acute, hindmargin very oblique, slightly sinuate; snow-white; a narrow dark fuscous ochreous-tinged streak along costa from near base to near apex, finely attenuated anteriorly; in ♀ also a narrow straight yellowish-brown median longitudinal streak from base to apex; cilia white. Hindwings pale whitish-grey or grey-whitish; cilia whitish.

Sydney and Blackbeath (3500 feet), New South Wales; Melbourne and Warragul, Victoria; Georges Bay, Tasmania; Mount Lofty, South Australia; Perth and Albany, West Australia; from

October to January, common in swampy places. The sexual difference in marking is an unusual character in this group.

30. THUDACA, Walk.

Head with dense erect hairs on crown, face smooth, sometimes with deep cavity in ♂; ocelli present; tongue well-developed. Antennæ $\frac{4}{5}$, in ♂ serrate, very shortly ciliated ($\frac{1}{4}$), basal joint without pecten. Labial palpi long or rather long, somewhat curved, ascending, with appressed scales, second joint more or less long, in ♂ sometimes flatly compressed, terminal joint $\frac{1}{2}$ to $\frac{2}{3}$ of second, more or less pointed, or in ♂ sometimes minute, aborted. Maxillary palpi rudimentary. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate, 7 and 8 stalked, 7 to hindmargin, 11 from before middle. Hindwings 1, elongate-ovate, cilia $\frac{1}{3}$ - $\frac{1}{2}$; veins 3 and 4 from a point or closely approximated at base.

A curious and interesting genus, apparently endemic, especially characteristic of Western Australia. It is not very close to any of its allies, but might be a development of *Timaea*. The singular conformation of the forehead and labial palpi in the ♂ of some species is noticed under *T. crypsidesma*; these species so closely approach others in every other character, that there can be no question of generic separation, but the case is a highly peculiar one, and requires further investigation.

- | | |
|--|------------------------|
| 1. Forewings with white median longitudinal streak from base..... | 2. |
| Forewings without white median longitudinal streak from base | 7. |
| 2. Median streak entire, reaching hindmargin | 153. <i>trabeata</i> . |
| Median streak interrupted posteriorly ... | 3. |
| 3. Costal or subcostal white streak interrupted in middle..... | 4. |
| Costal or subcostal white streak not interrupted..... | 6. |

4. Forewings with a white dorsal streak ... 151. *orthodroma*.
 Forewings with two or three white dorsal spots 5.
5. Median streak with three quadrate projections beneath 150. *cymatistis*.
 Median streak without quadrate projections 149. *ophiosema*.
6. Median streak with two triangular projections beneath 148. *calliphrontis*.
 Median streak without projections beneath 152. *stadianda*.
7. Forewings with ochreous costal streak hardly reaching middle 141 *circumdatella*.
 Forewings with orange subcostal streak reaching $\frac{2}{3}$ or more..... 8.
8. First transverse streak forming a zigzag or absent..... 9.
 First transverse streak straight, present 10.
9. Forewings with inner margin orange except near base.. 142. *heterastis*.
 Forewings with inner margin white throughout 143. *campylota*.
10. First transverse streak reaching subdorsal streak 11.
 First transverse streak not reaching subdorsal streak 12.
11. Face in ♂ with deep cavity; first transverse streak with grey bar..... 146. *mimodora*.
 Face in ♂ flat; first transverse streak not barred 147. *obliquella*.
12. Forewings with inner margin orange except near base..... 145. *haplonota*.
 Forewings with inner margin white throughout 144 *crypsidesma*.

141. *Thud. circumdatella*, Walk.

(*Tonza circumdatella*, Walk. 1012.)

♂. 15-16 mm. Head whitish, sides and forehead brownish-ochreous. Palpi with second joint exceeding base of antennæ, terminal joint $\frac{1}{2}$; whitish, mixed with ochreous-fuscous. Antennæ ochreous-whitish. Thorax whitish, patagia brownish-ochreous. Abdomen ochreous-whitish. Legs white, anterior femora, tibiæ, and basal joint of tarsi dark fuscous. Forewings elongate-oblong, costa moderately arched, apex obtuse, hindmargin straight, oblique; snow-white; a suffused brownish-ochreous streak along basal half of costa, attenuated and very indistinct posteriorly; a straight brownish-orange subdorsal streak from base to anal angle, upper edge with short triangular projection near extremity; cilia ochreous-whitish, basal half brownish-orange. Hindwings ochreous-grey-whitish; cilia ochreous-whitish.

Sydney, New South Wales; in October and March, three specimens.

142. *Thud. heterastis*, n.sp.

♂. 16-20 mm. Head and thorax orange or orange-yellowish. Palpi with second joint somewhat exceeding base of antennæ, terminal joint $\frac{1}{2}$; whitish, more or less infuscated except towards base. Antennæ whitish-ochreous. Abdomen pale whitish-ochreous. Legs ochreous-whitish, anterior femora and tibiæ dark fuscous, middle tibiæ yellow or orange. Forewings elongate-oblong, costa gently arched, apex roundpointed, hindmargin faintly sinuate, oblique; snow-white; a moderate orange streak immediately beneath costa from base to costa near apex, sometimes obsolete beyond $\frac{2}{3}$; a rather broad orange streak along inner margin to anal angle, becoming suddenly subdorsal on basal fourth and not quite reaching base, usually more or less wholly suffused with dark fuscous, posteriorly attenuated; a transverse orange streak suffused with dark fuscous, from subcostal streak at $\frac{2}{3}$ to middle of dorsal streak, forming an obtuse-angled zigzag in middle, sometimes interrupted or wholly absent; a straight orange streak, suffused with dark fuscous, from costa near apex to anal angle,

sometimes widely interrupted or visible at extremities only; some dark fuscous scales on hindmargin: cilia fuscous-whitish, basal half light orange. Hindwings pale whitish-grey, faintly yellowish-tinged; cilia pale whitish-yellowish.

Geraldton, West Australia; in November, five specimens. This species is exceptional in the genus in being highly variable, whilst the rest are very stable.

143. *Thud. campylota*, n.sp.

♂. 17-18 mm. Head and thorax bright orange. Palpi with second joint exceeding base of antennæ, terminal joint $\frac{1}{2}$; whitish, more or less infuscated except towards base. Antennæ pale fuscous. Abdomen whitish-ochreous. Legs whitish-ochreous, anterior pair dark fuscous, middle tibiæ orange. Forewings elongate-oblong, costa gently arched, apex roundpointed, hindmargin straight, oblique; snow-white; markings bright orange, partially blackish-edged; costal edge blackish towards base; a moderate streak immediately beneath costa from base to costa before apex; a subdorsal somewhat irregular streak from base almost to anal angle; a transverse streak from $\frac{2}{3}$ of subcostal streak to middle of subdorsal, forming an obtuse-angled zigzag in middle; a straight rather irregular-edged streak from extremity of subcostal to extremity of subdorsal streak; some blackish scales on hindmargin: cilia orange, towards tips whitish-ochreous. Hindwings light grey; cilia whitish-yellowish.

Perth, West Australia; in November, two specimens.

144. *Thud. crypsidesma*, n.sp.

♂. 19-20 mm. Head light yellow-ochreous, sides bright orange, face with large deep central cavity containing a flocculent hairy substance. Palpi light orange; second joint rather dilated and flattened, partially denuded externally, with flocculent loose hairs internally, hardly reaching base of antennæ, appressed to face, terminal joint minute, aborted. Antennæ pale fuscous. Thorax orange, somewhat mixed with whitish posteriorly. Abdomen whitish-ochreous, with small expansible tuft of hairs on each side

near base. Legs dark fuscous, middle tibiæ orange, posterior pair whitish-ochreous. Forewings elongate-oblong, costa gently arched, apex roundpointed, hindmargin slightly sinuate, oblique; snow-white; markings bright orange; costal edge blackish near base; a moderate streak immediately beneath costa from base to costa before apex; a subdorsal streak, black-edged above, from base to anal angle; two black-edged straight transverse streaks, first from subcostal streak at $\frac{2}{3}$ to above middle of subdorsal but not nearly reaching it, suffusedly barred with blackish-grey above middle, second from extremity of subcostal to subdorsal before extremity, suffused with blackish-grey towards costa and on a bar above lower end; a blackish line along hindmargin: cilia light ochreous-yellowish, basal half orange, with a cloudy dark grey bar above apex. Hindwings grey; cilia pale whitish-yellowish.

Melbourne, Victoria; Port Lincoln, South Australia; in November, two specimens. The remarkable structure of the frontal cavity in this and the next two species, with the accessory modification of the palpi, is highly peculiar, and I know nothing quite analogous to it in other families; it seems to me very surprising that so profound a modification of structure (for the cavity appears to occupy the greater portion of the head), without connecting links, should distinguish these species from others so closely allied to them in all other respects that, in the case of *T. mimodora* which possesses this structure and *T. obliquella* which does not, I am hardly able to detect any difference except in this particular. From the nature of the flocculent substance in the cavity, I suppose it to be a scent-producing organ. If the lateral tufts of the abdomen are also for the same purpose, the provision would seem to be profuse.

145. *Thud. haplonota*, n.sp.

♂♀. 19-20 mm. Head bright orange, face whitish-orange, in ♂ with cavity as in *T. crypsidesma*. Palpi light orange; second joint in ♂ rather dilated and flattened, hardly reaching base of antennæ, appressed to face, with long flocculent hairs on inner side, in ♀ normal, rather exceeding base of antennæ, apex infuscated,

terminal joint in ♂ minute, aborted, in ♀ $\frac{1}{2}$, whitish, anteriorly infuscated. Antennæ pale fuscous. Thorax bright orange, posteriorly somewhat mixed with whitish. Abdomen whitish-ochreous, with rather long expansible tuft of hairs on each side near base. Legs dark fuscous, middle tibiæ orange, posterior pair whitish-ochreous. Forewings elongate-oblong, costa gently arched, apex roundpointed, hindmargin straight, oblique; silvery-white; markings bright orange; costal edge blackish near base; a moderate streak immediately beneath costa from base to costa before apex; a rather broad dorsal streak, partly black-edged above, from base to anal angle, attenuated posteriorly, leaving inner margin slenderly white near base only; two straight partially black-edged transverse streaks, first from subcostal streak at $\frac{3}{4}$ to above middle of subdorsal but not nearly reaching it, suffusedly barred with blackish-grey above middle, second from extremity of subcostal to subdorsal before extremity, suffused with blackish-grey towards costa and on a bar above lower end; a few blackish scales on hindmargin: cilia ochreous-yellowish, basal half orange, with cloudy dark grey bar above apex. Hindwings light grey, faintly yellowish-tinged; cilia pale whitish-yellowish.

Geraldton, West Australia; in November, four specimens.

146. *Thud. mimodora*, n.sp.

♂. 17-18 mm. Head bright orange, face lighter, with cavity as in *T. crypsidesma*. Palpi light orange; second joint dilated and flattened, not reaching base of antennæ, appressed to face, with long flocculent hairs on inner side, terminal joint minute, aborted. Antennæ pale fuscous. Thorax bright orange, sometimes whitish posteriorly. Abdomen whitish-ochreous. Legs dark fuscous, middle tibiæ orange, posterior pair whitish-ochreous. Forewings elongate-oblong, costa moderately arched, apex roundpointed, hindmargin straight, oblique; snow-white; markings bright orange; costal edge blackish near base; a moderate streak immediately beneath costa from base to costa before apex; a moderate subdorsal streak from base to anal angle, edged above

with a few black scales; two straight partially black-edged transverse streaks, first from subcostal at $\frac{2}{3}$ to middle of subdorsal streak, obscurely barred with dark grey above middle, second from apex of subcostal to subdorsal before apex, suffused with dark grey towards costa and on a bar above lower end; a few blackish scales on hindmargin: cilia ochreous-yellowish, basal half orange, with cloudy dark grey bar above apex. Hindwings grey, lighter towards base, faintly yellowish-tinged; cilia pale whitish-yellowish.

Sydney, New South Wales; in February and March, two specimens.

147. *Thud. obliquella*, Walk.

(*Thudaca obliquella*, Walk. 825.)

♂♀. 16-18 mm. Differs from *T. mimodora* only as follows: face in ♂ without cavity; palpi in both sexes orange, infuscated except towards base, second joint cylindrical, exceeding base of antennæ, terminal joint $\frac{1}{2}$; middle tarsi more whitish; forewings with first transverse streak without dark bar above middle, second transverse streak without dark bar above lower end; a blackish line along hindmargin: hindwings lighter grey, suffused with pale whitish-ochreous.

Sydney and Newcastle, New South Wales; in October, December, January, and March, common. Larva 16-legged, elongate, rather tapering towards extremities; head and second segment oblong, second segment rather constricted behind; with scattered blackish hairs; dull green, incisions yellow; a dark fuscous-red dorsal stripe, containing a much paler central line, marked with white on incisions and wholly whitish anteriorly; spiracular whitish; spots small, black, ringed with whitish; head green, crown reddish-tinged, spotted with black; legs green, anal claspers dark purplish-crimson: it feeds on *Leptospermum* (*Myrtaceae*), hardly making any web, in September and October. Pupa naked, standing erect on tail, which is truncate; it exactly imitates a leaf of *Leptospermum*; green, with a dorsal ridge, and white lateral lines, head produced into a sharp curved spine.

148. *Thud. calliphrontis*, n.sp.

♀. 20 mm. Head white mixed with dark fuscous. Palpi white sprinkled with dark fuscous, second joint much exceeding base of antennæ, terminal joint $\frac{1}{2}$. Antennæ white, annulated with pale fuscous. Thorax white, patagia and a central spot deep ochreous. Abdomen ochreous-whitish. Legs whitish, anterior pair dark fuscous, middle pair sprinkled with dark fuscous. Forewings elongate-oblong, costa moderately arched, apex roundpointed, hindmargin straight, oblique; brownish-ochreous, posteriorly irrorated with black between veins; markings snow-white; costal edge blackish near base; a narrow suffusion along middle third of costa; a moderate streak from costa near base beneath costa to costa again before apex, posteriorly emitting two slender branches from upper edge; a moderate irregular median longitudinal streak from base to hindmargin above middle, constricted at $\frac{1}{3}$, lower edge with triangular projections before and after constriction, narrowly interrupted at $\frac{3}{4}$, bent upwards posteriorly, furcate at apex; a cloudy streak of mixed white and blackish scales along inner margin from base to anal angle: cilia white, with a blackish line, tips brownish-ochreous. Hindwings whitish-grey; cilia whitish.

Port Lincoln, South Australia; one specimen in November.

149. *Thud. ophiosema*, n.sp.

♂. 16 mm. Head pale whitish-ochreous. Palpi ochreous-whitish, second joint mixed with ochreous and dark fuscous, exceeding base of antennæ, terminal joint $\frac{1}{2}$. Antennæ whitish. Thorax pale ochreous mixed with whitish. Abdomen pale whitish-ochreous. Legs whitish, anterior pair dark fuscous, middle tibiae with basal and apical dark fuscous spots. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; light ochreous-brown, somewhat darker posteriorly; a white costal streak from near base to $\frac{4}{5}$, interrupted by an inwardly oblique bar of groundcolour about middle; a white spot on inner margin at $\frac{1}{3}$, preceded by a dark fuscous suffusion, and two small

cloudy white spots on inner margin at $\frac{2}{3}$; a moderate white median longitudinal streak from base to $\frac{1}{3}$, sinuate upwards in middle, and with extremity bent upwards, partially margined with dark fuscous suffusion, which is continued posteriorly as a broad band to hindmargin; a moderate irregular-edged white submarginal streak from apex to anal angle: cilia whitish, base somewhat mixed with brownish. Hindwings and cilia ochreous-whitish.

Geraldton, West Australia; one specimen in November.

150. *Thud. cymatistis*, n.sp.

♂♀. 14-16 mm. Head ochreous-whitish. Palpi white, somewhat sprinkled with dark fuscous, second joint exceeding base of antennæ, terminal joint $\frac{2}{3}$. Antennæ ochreous-whitish. Thorax ochreous-whitish, patagia ochreous, sometimes wholly brownish-ochreous. Abdomen ochreous-whitish. Legs white, anterior pair dark fuscous, middle tibiæ with dark fuscous basal and apical bands. Forewings elongate, costa gently arched, apex roundpointed, hindmargin rounded, rather strongly oblique; ochreous brown, lighter towards base and costa; markings snow-white; a streak along costa from near base to middle; an elongate blotch along costa from beyond middle to $\frac{1}{3}$; an irregular median longitudinal streak from base to $\frac{3}{4}$, lower margin forming quadrate projections at base, middle, and apex; a white spot on inner margin at $\frac{1}{3}$ and another at $\frac{2}{3}$; an irregular submarginal streak from apex to anal angle: cilia pale grey, basal third mixed with ochreous and barred with white at apex, middle of hindmargin, and anal angle. Hindwings whitish-grey; cilia ochreous-whitish.

Carnarvon, West Australia; taken in plenty in October.

151. *Thud. orthodroma*, n.sp.

♂♀. 13-14 mm. Head white, mixed with dark fuscous. Palpi rather dark fuscous, base and apex of joints white, second joint exceeding base of antennæ, terminal joint $\frac{1}{2}$. Antennæ ochreous-whitish. Thorax brownish-ochreous, posterior extremity white. Abdomen whitish-ochreous. Legs whitish, anterior pair dark

fuscous, middle pair with basal and apical bands of tibiae and apical suffusion of tarsi dark fuscous. Forewings elongate, costa gently arched, apex almost acute, hindmargin very obliquely rounded; golden-ochreous-brown; markings snow-white; a streak along costa from $\frac{1}{5}$ to before middle; a subcostal streak from before middle to costa at $\frac{3}{4}$; a median longitudinal streak from base to $\frac{3}{4}$, lower edge emarginate in middle, apex bent upwards; a streak along inner margin from $\frac{1}{4}$ to near anal angle; an elongate blotch along upper $\frac{2}{3}$ of hindmargin, and a small spot on anal angle: cilia light ochreous-grey, base mixed with ochreous-brown, with a white bar at apex. Hindwings light grey; cilia pale whitish-ochreous, greyish-tinged.

Geraldton, West Australia; in November, common.

152. *Thud. stadiaula*, n.sp.

♂. 15 mm. Head white, crown mixed with ochreous-brown. Palpi dark fuscous, base and apex of joints white, second joint exceeding base of antennae, terminal joint $\frac{1}{2}$. Antennae brownish-ochreous. Thorax brownish-ochreous, posterior extremity white. Abdomen whitish-ochreous. Legs white, anterior pair dark fuscous, middle pair with basal and apical bands of tibiae and apical suffusion of tarsi dark fuscous. Forewings elongate, costa gently arched, apex roundpointed, hindmargin rounded, rather strongly oblique; deep coppery-golden-ochreous; markings silvery-white; a streak along costa from near base to near apex, becoming subcostal for a short distance in middle; a straight median longitudinal streak from base to $\frac{5}{6}$, apex truncate; a streak along inner margin from near base to anal angle; an elongate spot extending along upper $\frac{2}{3}$ of hindmargin: cilia light greyish-ochreous, basal half darker ochreous-grey, with a white bar at apex. Hindwings pale whitish-ochreous-grey; cilia whitish-ochreous.

Geraldton, West Australia; in November, two specimens.

153. *Thud. trabeata*, n.sp.

♂♀. 15-18 mm. Head white, face and forehead brownish-ochreous, back of crown with two ochreous-brown stripes. Palpi

rather dark fuscous, base and apex of joints whitish, second joint much exceeding base of antennæ, terminal joint $\frac{1}{2}$. Antennæ fuscous. Thorax golden-ochreous, with white dorsal stripe. Abdomen whitish-ochreous. Legs rather dark fuscous, middle tibiæ whitish, posterior pair whitish-ochreous. Forewings elongate, costa gently arched, apex roundpointed, hindmargin very obliquely rounded; deep golden-ochreous; markings snow-white; a straight subcostal streak from costa near base to costa again near apex; a straight median longitudinal streak from base to hindmargin beneath apex; a streak along inner margin from base to anal angle, attenuated near base: cilia whitish-ochreous, basal third deeper ochreous, with a white apical bar. Hindwings light grey; cilia whitish-ochreous.

Sydney, Blackheath (3500 feet), and Mount Kosciusko (6000 feet), New South Wales; Georges Bay, Tasmania; Mount Lofty, South Australia; Geraldton and Perth, West Australia; from October to February, common.

31. *DASCIA*, n.g.

Head with dense rough hairs on crown, projecting between antennæ, face smooth; ocelli present; tongue short. Antennæ $\frac{3}{4}$, in ♂ serrate, shortly ciliated ($\frac{1}{2}$), basal joint without pecten. Labial palpi moderate, porrected, terminal joint and apex of second beneath with dense rough projecting hairs forming a loose tuft. Maxillary palpi rudimentary. Posterior tibiæ clothed with long hairs. Forewings with vein 1 furcate, 7 to costa, 11 from middle. Hindwings 1, ovate-lanceolate, cilia 1; veins 5 and 6 approximated towards base.

An isolated genus, standing about midway between *Zelleria* and the *Tinea* group, but the nature of its relationship to them is at present uncertain: it may really be a transitional link.

154. *Dasc. sagittifera*, n sp.

♂♀. 11-15 mm. Head ochreous-white, between antennæ sometimes mixed with blackish. Palpi dark fuscous, towards apex white. Antennæ grey, base white. Thorax ochreous-white,

anterior margin mixed with blackish. Abdomen grey. Legs dark fuscous, posterior pair grey-whitish. Forewings elongate, costa gently arched, apex roundpointed, hindmargin slightly sinuate, rather strongly oblique; dark grey, with scattered black scales; a broad cloudy white median streak from base to $\frac{2}{3}$, extending to inner margin at base, containing some scattered black scales, lower edge very irregular and marked with a small black spot on submedian fold at $\frac{1}{3}$, another beneath middle, and a longitudinal black mark in disc beyond middle, apex of streak truncate immediately beyond this; a broad oblique white suffusion from apex of wing, almost reaching extremity of median streak; a small white suffusion on anal angle: cilia white with two black lines, at apex and anal angle with grey spots mixed with blackish. Hindwings grey; cilia whitish-grey.

Sydney, Blackheath (3500 feet), and Bathurst (2500 feet), New South Wales; Melbourne, Victoria; Hobart, Tasmania; in November, December, and March, common.

32. *ACMOSARA*, Meyr.

The type is no longer in my hands, and I can add nothing to the original description of this genus; it is related to *Zelleria*, but not very closely.

155. *Acm. polyxena*, Meyr.

Acmosara polyxena, Meyr., Proc. Linn. Soc. N. S. Wales, 1886, 1043.)

33. *ZELLERIA*, Stt.

Head with dense rough hairs on crown, projecting between antennæ, face smooth; ocelli present; tongue developed. Antennæ $\frac{3}{4}$ - $\frac{4}{5}$, in ♂ serrate, simple, basal joint with pecten. Labial palpi moderate, rather drooping, with appressed scales, terminal joint longer than second, slightly roughened, tolerably pointed. Maxillary palpi rudimentary. Posterior tibiæ smooth-scaled. Forewings sometimes with thickened costal patch between 11 and 12; 1 simple or very shortly furcate, 2 remote from 3, 4 and 5 sometimes stalked, 7 to hindmargin, 11 from before middle. Hind-

wings $\frac{1}{3}$ -1, lanceolate, cilia $1\frac{1}{2}$ - $2\frac{1}{2}$; vein 4 absent, 5 and 6 approximated towards base.

Developed apparently from a form approaching *Dascia*. The genus is represented elsewhere by a few species in Europe and one in New Zealand, but will no doubt be eventually discovered in other regions also. Some European species have veins 4 and 5 of the forewings coincident; the genus *Zelleria* has been restricted to these by Wocke, and a genus *Hofmannia* formed to receive the rest, and I formerly adopted this view, but on consideration of the close agreement of these forms in all other respects, it now seems to me unnecessary to separate them.

- | | |
|--|-----------------------------|
| 1. Forewings with costa almost straight.... | 2. |
| Forewings with costa moderately strongly
arched | 3. |
| 2. Head ochreous, centre of crown some-
times whitish..... | 156. <i>cynetica</i> . |
| Head grey irrorated with white..... | 157. <i>arazodes</i> . |
| 3. Forewings with groundcolour grey..... | 4. |
| Forewings with groundcolour not grey.. | 5. |
| 4. Forewings with black line in cilia; head
mixed with fuscous..... | 158. <i>memorella</i> . |
| Forewings without black line in cilia;
head wholly white..... | 159. <i>aphrospora</i> . |
| 5. Forewings wholly white..... | 165. <i>sigillata</i> . |
| Forewings not wholly white..... | 6. |
| 6. Forewings with blackish dot before
middle | 161. <i>proterospila</i> ♂. |
| Forewings without blackish dot before
middle..... | 7. |
| 7. Forewings wholly pale whitish-yellow... 164. <i>citrina</i> ♂. | |
| Forewings not wholly whitish-yellow... | 8. |
| 8. Forewings sprinkled with dark grey
posteriorly..... | 160. <i>callidoxa</i> . |
| Forewings not sprinkled with dark grey
posteriorly..... | 9. |

- | | |
|---|-----------------------------|
| 9. Forewings with median white streak. . . | 10. . |
| Forewings without median white streak | 11. |
| 10. Forewings with costal area suffused with
orange..... | 162. <i>pyroleuca</i> . |
| Forewings with costal area not orange... | 163. <i>mystarcha</i> . |
| 11. Forewings with costal edge blackish.... | 161. <i>proterospila</i> ♀. |
| Forewings with costal edge white..... | 164. <i>citrina</i> ♀. |

156. *Zell. cynetica*, n.sp.

♂♀. 12-15 mm. Head brownish-ochreous or reddish-ochreous, face whitish-ochreous, middle of crown sometimes whitish. Palpi dark fuscous mixed with white. Antennæ pale ochreous. Thorax light brownish-ochreous or purplish-fuscous. Abdomen pale grey. Legs dark fuscous, posterior pair suffused with ochreous-whitish. Forewings very elongate, narrow, parallel-sided, long-pointed, apex acute, produced; varying from pale fuscous to reddish-ochreous, with reddish-purple reflections; an irregular dark fuscous irroration, especially posteriorly and on costal edge; inner margin sometimes narrowly whitish; a very oblique cloudy dark fuscous mark from inner margin near base, not reaching beyond submedian fold, often reduced to a spot on fold; sometimes an elongate dark fuscous spot on inner margin beyond this; sometimes several blackish dots on fold and costa; a small dark fuscous spot above anal angle: cilia pale greyish-ochreous or whitish-fuscous, round apex reddish-ochreous with a terminal black hook. Hindwings light grey, thinly scaled towards base: cilia pale ochreous-greyish.

Brisbane, Queensland; Murrurundi, Sydney, and Blackheath (3500 feet), New South Wales; Launceston, Deloraine, Georges Bay, and Hobart, Tasmania; from October to December and in March, common: a variable insect.

157. *Zell. aracodes*, n.sp.

♂. 14-15 mm. Head and thorax light grey irrorated with white. Palpi whitish, externally dark grey. Antennæ whitish.

Abdomen whitish-grey. Legs dark grey, posterior tibiæ whitish. Forewings very elongate, narrow, parallel-sided, apex round-pointed; ochreous-grey or fuscous, mixed with white, especially towards inner margin, and irrorated with darker fuscous; costal, subcostal, submedian, and subdorsal longitudinal series of blackish dots; a slender cloudy dark fuscous fascia from $\frac{2}{5}$ of costa to $\frac{2}{3}$ of inner margin, ill-defined above, blackish on lower half; a blackish longitudinal spot on inner margin beyond middle; a white dot on costa near apex, followed by a small blackish spot: cilia pale ochreous-grey, round apex dark fuscous somewhat mixed with whitish. Hindwings grey, thinly scaled towards base; cilia pale ochreous-grey.

Geraldton and Albany, West Australia; in September and October, two specimens.

158. *Zell. memorella*, n.sp.

♂♀. 9-13 mm. Head white, more or less mixed with fuscous. Palpi white, beneath fuscous. Antennæ whitish. Thorax white mixed with fuscous. Abdomen whitish-grey. Legs dark fuscous, middle pair partially suffused with white, posterior pair whitish. Forewings elongate, narrow, costa moderately arched, apex acute, somewhat produced, hindmargin and inner margin continuous, straight; grey, irregularly and suffusedly mixed with white, tending especially to form a broad white longitudinal suffused streak along submedian fold; some variable scattered black dots, tending to form longitudinal series; a blackish oblique spot on fold before middle, sometimes extended as an oblique mark to disc; sometimes a blackish longitudinal spot on inner margin at $\frac{2}{3}$: cilia pale ochreous-greyish, round apex with a sharp black median line and fuscous terminal line, below apex with a white spot on terminal half. Hindwings pale grey, thinly scaled towards base; cilia whitish-ochreous-grey.

Sydney and Mount Kosciusko (5500 feet), New South Wales; Georges Bay and Hobart, Tasmania; York and Albany, West Australia; from November to January, common.

159. *Zell. aphrospora*, n.sp.

♂♀. 11-12 mm. Head, palpi, antennæ, and thorax white. Abdomen grey-whitish. Legs white, anterior pair dark grey. Forewings elongate, narrow, costa moderately arched, apex acute, hindmargin extremely obliquely rounded; rather light greyish-ochreous, densely strewn with white throughout; an ill-defined short blackish dash on fold before middle; an indistinct blackish dot close above anal angle, and sometimes traces of another above this: cilia pale greyish-ochreous, base suffused with white round apex, with some blackish points near hindmargin above anal angle, and on a small spot at apex. Hindwings pale grey; cilia pale greyish-ochreous.

Port Lincoln, South Australia; in November, five specimens.

160. *Zell. callidoxa*, n.sp.

♂♀. 13-15 mm. Head whitish-ochreous, sides of crown white. Palpi whitish, beneath ochreous. Antennæ grey, towards base white. Thorax white, with a pale orange stripe on each side of back, patagia orange. Abdomen whitish-ochreous-grey. Legs fuscous, posterior pair whitish. Forewings elongate, narrow, costa moderately arched, apex acute, produced, hindmargin and inner margin continuous, nearly straight; bright orange, paler towards costa and inner margin; costal edge blackish; a slender white streak along basal third of costa; a white longitudinal median streak from base, gradually dilated posteriorly so as to extend along costa from about $\frac{2}{3}$ to apex, sprinkled with blackish-grey posteriorly, including a grey dot at $\frac{2}{3}$: cilia whitish-ochreous, base mixed with orange, tips at apex dark grey, above apex wholly white. Hindwings pale grey; cilia whitish-ochreous, greyish-tinged.

Port Lincoln and Mount Lofty, South Australia; in November, seven specimens.

161. *Zell. proterospila*, n.sp.

♂♀. 12-16 mm. Head white, face ochreous-tinged; back of crown pale ochreous-yellowish. Palpi white, terminal joint sometimes grey externally. Antennæ pale greyish-ochreous, towards

base white. Thorax white, with a pale orange stripe on each side of back, patagia orange. Abdomen whitish-ochreous-grey. Legs whitish, anterior pair grey. Forewings elongate, narrow, costa moderately arched, apex acute, hindmargin and inner margin continuous, nearly straight; bright orange, becoming pale yellow towards costa and sometimes towards inner margin also; costal edge blackish-grey; a slender white streak along anterior half of costa; in ♂ a white longitudinal median streak from base, gradually dilated posteriorly so as to extend along costa from $\frac{2}{3}$ to apex, sprinkled with blackish-grey posteriorly, including a round blackish dot before middle and another at $\frac{2}{3}$; in ♀ a ferruginous streak of same form, without black dots: cilia pale greyish-ochreous, becoming dark grey at apex on terminal half, in ♂ above apex white sprinkled with dark grey, in ♀ becoming orange or ferruginous towards base, tips white on costa. Hindwings and cilia grey.

Geraldton, York, and Albany, West Australia; from October to December, common.

162. *Zell. pyroleuca*, n.sp.

♂. 17 mm. Head yellowish-white, face pale ochreous, sides ferruginous. Palpi whitish. Antennæ light grey, towards base white. Thorax white, with a pale orange stripe on each side of back, patagia orange except inner edge. Abdomen whitish-grey-ochreous. Legs rather dark fuscous, posterior pair whitish. Forewings elongate, rather narrow, costa moderately arched, apex acute, rather produced, hindmargin and inner margin continuous, nearly straight; pale orange, darker towards costa; costal edge very finely blackish; a slender white streak along anterior half of costa; a suffused white median longitudinal streak from base to middle, lower edge extended as a fine streak above submedian fold to above anal angle; a suffused white subdorsal streak and a narrow dorsal streak from base to near anal angle, tending to be partially confluent, indistinct posteriorly: cilia pale greyish-ochreous, basal half deep orange on costa and upper half of hindmargin, terminal half blackish at apex. Hindwings grey; cilia pale greyish-ochreous.

Bathurst (2300 feet), New South Wales ; in November, one specimen.

163. *Zell. mystarcha*, n.sp.

♂♀. 14-16 mm. Head white, sides of face pale ochreous. Palpi white. Antennæ grey-whitish, towards base white. Thorax white, with a pale yellow stripe on each side of back, patagia pale yellow except inner edge. Abdomen grey-whitish. Legs whitish, anterior and middle pair infuscated. Forewings elongate, narrow, costa moderately arched, apex acute, strongly produced, hindmargin and inner margin continuous, nearly straight ; white or yellowish-white ; a pale yellowish indistinct suffused subcostal streak from base to costa at $\frac{2}{3}$; an orange streak along submedian fold from base to anal angle, well-defined above, suffused beneath ; dorsal space beneath this more or less suffused with pale yellowish : cilia pale greyish-ochreous, towards base tinged with orange, terminal half beneath apex mixed with blackish, costal cilia fuscous except on a white band above apex. Hindwings light grey ; cilia pale greyish-ochreous.

Campbelltown, Tasmania ; in December, nine specimens.

164. *Zell. citrina*, n.sp.

♂♀. 14-16 mm. Head white, centre of crown whitish-yellowish, forehead whitish-orange. Palpi ochreous-whitish. Antennæ grey-whitish, towards base white. Thorax yellowish-white, patagia more or less orange. Abdomen grey-whitish. Legs ochreous-whitish, anterior pair dark fuscous, middle tibiae infuscated. Forewings elongate, narrow, costa moderately arched, apex acute, strongly produced, hindmargin and inner margin continuous, nearly straight ; in ♂ very pale whitish-yellow, unicolorous ; in ♀ orange or ferruginous, costa narrowly white or yellowish-white from base to $\frac{2}{3}$, inner margin rather broadly pale orange or yellowish : cilia pale whitish-ochreous, at apex with a dark grey spot on terminal half, in ♂ basal half orange-tinged beneath apex, in ♀ basal half orange or ferruginous on costa and upper half of hindmargin. Hindwings very pale grey ; cilia whitish-grey-ochreous.

Sydney and Glen Innes (3500 feet), New South Wales; in September and December, common.

165. *Zell. sigillata*, n.sp.

♂♀. 9-11 mm. Head white, forehead yellowish-tinged and sometimes mixed with grey. Palpi, antennæ, thorax, abdomen, and legs white; anterior legs infuscated. Forewings elongate, rather narrow, costa moderately arched, apex acute, produced, hindmargin sinuate, extremely oblique; white, towards apex sometimes faintly yellowish-tinged: cilia white or ochreous-white, with a black basal dot at apex. Hindwings pale grey or whitish-grey; cilia grey-whitish.

Sydney and Shoalhaven, New South Wales; in December and January, six specimens.

34. MACARANGELA, n.g.

Head with dense rough hairs on crown, projecting between antennæ, face smooth; ocelli present; tongue developed. Antennæ 1, in ♂ filiform, simple, basal joint elongate, rather stout, with slight pecten. Labial palpi moderate, porrected, with appressed scales, slightly rough beneath, terminal joint rather longer than second, pointed. Maxillary palpi rudimentary. Anterior tibiæ and tarsi dilated with dense rather rough scales above; posterior tibiæ more or less dilated, with dense rough or rather appressed hairs, tarsi sometimes much shorter than tibiæ. Forewings with vein 1 simple, 2 rather remote from 3, 7 to hindmargin or costa, 11 from before middle. Hindwings 1, ovate-lanceolate, cilia 1; vein 4 absent, 5 and 6 rather approximated.

Probably a development of *Nematobola*; the relationship to *Zelleria*, to which there is considerable superficial resemblance, is perhaps collateral only. The three species are closely allied and very similar.

1. Forewings with orange streak continued to
 extreme apex..... 2.
 Forewings with orange streak not reaching
 extreme apex..... 168. *pyracma*.

2. Upper edge of streak with dark fuscous dot
 at $\frac{2}{3}$ 167. *uranarcha*.
 Upper edge of streak without dark fuscous
 dot..... 166. *leucochrysa*.

166. *Mac. leucochrysa*, n.sp.

♂. 16 mm. Head orange, face and middle of back of crown white. Palpi white. Antennæ white, ringed with fuscous. Thorax white, with an orange stripe on each side of back. Abdomen and legs white, anterior legs orange-tinged above, posterior tibiæ twice as long as femora, ochreous-tinged, hairs moderate, tarsi half as long as tibiæ. Forewings elongate, rather narrow, costa rather strongly arched, apex acutely produced into a long fine point, hindmargin sinuate, extremely oblique; vein 7 to hindmargin, 9 and 10 from a point; snow-white; a moderate bright orange straight longitudinal streak below middle from base to apex; a small suffused orange spot on base of inner margin; cilia white, beneath apex with extension of submedian orange streak, at extreme apex dark fuscous. Hindwings and cilia white.

Sydney, New South Wales: in October, one specimen beaten from *Banksia*.

167. *Mac. uranarcha*, n.sp.

♂. 18 mm. Head orange, face and middle of back of crown white. Palpi white. Antennæ white, annulated with fuscous. Thorax white, with very broad orange stripe on each side of back. Abdomen white. Legs white, anterior pair ochreous-tinged above, posterior tibiæ half as long again as femora, long-haired, tarsi almost as long as tibiæ. Forewings elongate, costa strongly arched, apex acute, produced into a long fine point, hindmargin sinuate, extremely oblique; vein 7 to costa; white; a moderate straight bright orange longitudinal streak from base along submedian fold to hindmargin above anal angle and thence along hindmargin to apex, upper edge marked with a small dark fuscous dot at $\frac{2}{3}$; cilia white, submedian orange streak extending through them to apex, with a few dark fuscous scales at apex. Hindwings whitish; cilia white.

Mount Lofty, South Australia; one specimen received from Mr. O. B. Lower, who took it among *Banksia*, with others. The costa of the forewings is more strongly arched than in either of the other two species, and the stripes of thorax broader; the posterior tibiæ are less developed and the tarsi much more so; it differs also from *M. leucochrysa* in the dark fuscous discal dot.

168. *Mac. pyracma*, n.sp.

♂. 16-17 mm. Head light orange, face and middle of back of crown white. Palpi white. Antennæ white, annulated with fuscous. Thorax white, with a narrow orange stripe on each side of back. Abdomen white. Legs white, anterior pair ochreous-tinged above, posterior tibiæ twice as long as femora, slightly ochreous-tinged, hairs moderate, tarsi half as long as tibiæ. Forewings elongate, rather narrow, costa moderately arched, apex acutely produced into a long fine point, hindmargin sinuate, extremely oblique; vein 7 to costa; white; a straight orange longitudinal streak along submedian fold from base to middle of hindmargin and thence along hindmargin, terminating immediately beneath apex, upper edge marked with a small black dot at $\frac{2}{3}$ and sometimes traces of another beyond middle; a small light orange-yellow suffused spot on base of inner margin: cilia white, beneath apex somewhat fuscous-tinged, with two or three black points at apex, and a row of black points at base along termination of submedian streak. Hindwings prismatic whitish; cilia white.

York, West Australia; three specimens beaten from *Banksia*, in October. Distinguished from both the preceding by the less arched costa of forewings, the submedian streak not extending into cilia nor reaching extreme apex, and especially also by the row of black scales on base of cilia at its termination.

35. *HESTIAULA*, n.g.

Head densely rough-haired, face smooth; ocelli present; tongue absent. Antennæ $1\frac{1}{2}$, basal joint much dilated, concave beneath to form eyecap, with small pecten. Labial palpi rather short, subascending, second joint loosely scaled, terminal joint as long as

second, filiform, pointed. Maxillary palpi long, folded, basal half dilated and flattened. Posterior tibiæ clothed with dense long hairs. Forewings with strong projecting tooth of scales on inner margin near base; vein 1 furcate, 7 and 8 stalked, 7 to costa, 11 from before middle. Hindwings $\frac{3}{4}$, lanceolate, cilia $1\frac{1}{2}$; veins 5 and 6 stalked, 6 to hindmargin.

This curious genus, though apparently belonging to this neighbourhood, presents no close relationship to any other genus in particular, and its exact affinity must be considered doubtful. Allied forms will perhaps be discovered in the northern districts.

169. *Hest. rhodacris*, n.sp.

♀. 13 mm. Head fuscous, face and forehead white. Palpi white. Antennæ white, annulated with fuscous. Thorax fuscous. Abdomen light brownish-ochreous. Legs dark fuscous, banded with ochreous-whitish, posterior tibiæ whitish-ochreous. Forewings elongate, costa moderately arched, apex roundpointed, hindmargin long, rather strongly sinuate, very oblique; brownish-ochreous, sprinkled with fuscous; a cloudy rather dark fuscous streak from middle of inner margin to middle of costa, nearly obsolete on upper half; a cloudy dark fuscous dot in disc at $\frac{1}{3}$; cilia pale brownish-ochreous, on costa light crimson mixed with whitish and a few black points, round apex and on upper half of hindmargin with a thick black median line which is rather strongly sinuate inwards beneath apex, basal area before this and entire cilia on lower half of hindmargin tinged with crimson and mixed with fuscous points. Hindwings blackish-grey; cilia fuscous, becoming more ochreous towards anal angle.

Brisbane, Queensland; one specimen received from Mr. G. H. Raynor.

36. *TONZA*, Walk.

Head with hairs of crown erect, forming dense tuft between antennæ, face smooth; ocelli present; tongue developed. Antennæ somewhat over 1, in ♂ filiform, simple, basal joint moderate, concave beneath, without pecten. Labial palpi moderately long, curved, ascending, slender, with appressed scales, terminal joint

as long as second, pointed. Maxillary palpi short, porrected, filiform. Posterior tibiae smooth-scaled. Forewings with vein 1 simple, 2 and 3 short-stalked from angle of cell, 4 absent, 5 absent, 7 and 8 from a point, 7 to hindmargin, 9 absent, 10 absent, 11 from $\frac{2}{3}$. Hindwings 1, very elongate-ovate, cilia 1; 3 and 5 short-stalked, 4 absent, 8 closely approximated to cell.

A remarkable genus, which has undergone much modification, and is now sufficiently remote from any other known to me. Besides the following, there is a closely allied species in South Africa, and it is probable that the genus may be African in origin, and that its nearest relatives should be sought there.

170. *Tonx. purella*, Walk.

(*Tonxa purella*, Walk. 1011.)

♂♀. 15-16 mm. Head white, face pale yellow. Palpi yellowish-white. Antennae white, base pale yellow. Thorax white, shoulders pale yellow. Abdomen white, apex in ♂ yellowish-tinged. Legs whitish-yellow, anterior tibiae ochreous-tinged. Forewings very elongate, parallel-sided, costa almost straight, slightly sinuate, apex rounded, hindmargin concave, oblique; snow-white, with scattered faint pale grey strigulae; costa suffused with pale yellow from middle to near apex; a faint yellowish subcostal streak from base to middle; a round black almost apical dot, and a smaller one on anal angle: cilia yellowish-white, terminal half on hindmargin dark fuscous becoming lighter towards tips, beneath anal angle wholly white. Hindwings and cilia white.

Rockhampton, Queensland; in November and May, five specimens received from Mr. G. Barnard.

37. NEMATOBOLA, n.g.

Head with dense rough hairs on crown projecting between antennae, face smooth; ocelli present; tongue developed. Antennae 1, in ♂ filiform, simple, basal joint rather dilated and concave beneath to form small eyecap, with strong pecten. Labial palpi moderate, rather drooping, slender, with appressed scales, terminal joint longer than second, pointed. Maxillary palpi rudimentary.

Posterior tibiæ rough-haired. Forewings with vein 1 furcate, 7 to costa, 7 and 8 sometimes stalked, 11 from before middle. Hindwings 1, elongate-ovate, cilia 1; vein 4 absent.

Probably endemic; it is nearly related to *Thereutis*, of which it may be regarded as a development.

- | | |
|--------------------------------------|-------------------------------|
| 1. Forewings with dark dorsal streak | ... 171. <i>isorista</i> . |
| Forewings without dark dorsal streak | .. 2. |
| 2. Forewings with dark median streak | ... 172. <i>orthotricha</i> . |
| Forewings without dark median streak | ... 173. <i>caudescens</i> . |

171. *Nem. isorista*, n.sp.

♂. 13-14 mm. Head white, face fuscous-tinged. Palpi fuscous, internally white. Antennæ dark fuscous, base white. Thorax white, with a central light fuscous stripe. Abdomen grey-whitish. Legs dark fuscous, posterior pair whitish. Forewings elongate, rather narrow, costa moderately arched, apex acute, hindmargin slightly sinuate, extremely oblique; snow-white; markings fuscous mixed with dark fuscous; a moderate streak along costa from near base to near apex, attenuated at extremities; a moderate streak along inner margin from near base to hindmargin above anal angle, extremities attenuated: cilia grey, paler towards tips, round apex suffused with white. Hindwings grey; cilia ochreous-whitish.

York, West Australia; in November, three specimens.

172. *Nem. orthotricha*, n.sp.

♂♀. 14-17 mm. Head white. Palpi fuscous, internally white. Antennæ fuscous, base white. Thorax white, patagia with a fuscous central stripe. Abdomen whitish. Legs fuscous, posterior pair whitish. Forewings elongate, rather narrow, costa moderately arched, apex acute, somewhat produced, hindmargin slightly sinuate, extremely oblique; snow-white; two fuscous longitudinal streaks, mixed with dark fuscous on discal side; first along costa from near base to near apex, attenuated towards base; second below middle from base to apex: cilia whitish-fuscous, more

whitish towards tips, with a white band above apex, and a sharp black basal line along upper half of hindmargin. Hindwings light grey; cilia ochreous-whitish.

Sydney, New South Wales; Georges Bay, Tasmania; Geraldton and Perth, West Australia; from October to January, four specimens. I have also a specimen from Bathurst, New South Wales, which differs only in not showing any trace of the black basal line in cilia; it is probably a variety only.

173. *Nem. candescens*, n.sp.

♂♀. 12-15 mm. Head and thorax white. Palpi dark fuscous, internally white. Antennæ fuscous, base white. Abdomen whitish. Legs dark fuscous, posterior pair whitish. Forewings elongate, rather narrow, costa moderately arched, apex tolerably acute, hindmargin extremely obliquely rounded; snow-white; a rather dark fuscous streak along costa from near base almost or quite to apex, attenuated towards extremities, sometimes irregular posteriorly; a slender sometimes irregular dark fuscous streak along hindmargin from apex to anal angle: cilia ochreous-whitish, round apex with basal half white, terminal half light fuscous. Hindwings light grey or whitish-grey, slightly ochreous-tinged; cilia ochreous-whitish.

Sydney, New South Wales; Quorn, South Australia; from August to October, rather common. Larva (until two-thirds grown) apodal, moniliform, segments very deeply incised, head small, retractile; glossy dark red, sides thinly speckled with pale yellow; second and third segments with an irregular yellow-white dorsal mark; head black, on crown whitish, with a pale line on each side of face; it mines a large irregular blotch beneath upper-surface of leaves of *Persoonia lanceolata* (*Proteaceae*). Afterwards it becomes sixteen-legged, tolerably cylindrical, posteriorly attenuated, with long scattered hairs; above dark blackish-purple tinged with carmine, on sides pale greenish-grey; spots dark grey; head small, pale amber-ochreous, marked with black: in this stage it feeds externally, unprotected, gnawing surface of leaf. The larva feeds in July and August: the sudden transformation in structure

and habits is highly peculiar. The pupa is long, slender, the antennal cases projecting beyond abdomen; enclosed in a dense white cocoon.

38. HARPEDONISTIS, n.g.

Head rough, face smooth; ocelli present; tongue developed. Antennæ $1\frac{1}{4}$, in ♂ filiform, simple, basal joint dilated, concave beneath, with pecten. Labial palpi moderately long, slightly curved, porrected, shortly rough-scaled beneath throughout, terminal joint as long as second, pointed. Maxillary palpi rudimentary. Posterior tibiæ rough-haired. Forewings with vein 1 furcate, 7 and 8 stalked, 7 to costa, 11 from beyond middle. Hindwings 1, elongate-ovate, cilia 1; vein 4 absent.

Closely related to *Nematobola*, of which it is doubtless a development.

174. *Harp. gonometra*, n.sp.

♂♀. 14-15 mm. Head, palpi, antennæ, and thorax light ochreous. Abdomen ochreous-whitish. Legs light ochreous sprinkled with fuscous, posterior pair ochreous-whitish. Forewings elongate, costa rather strongly arched, apex tolerably acute, hindmargin slightly rounded, very oblique; light ochreous, irregularly sprinkled with ochreous-brown; a white outwardly oblique streak from inner margin beyond middle, reaching half across wing, and a similar inwardly oblique streak from anal angle, their extremities almost meeting; first of these preceded by an ochreous-brown suffusion, and space between them wholly suffused with ochreous-brown; a suffused ochreous-brown streak along hindmargin and apical part of costa: cilia whitish-ochreous, mixed with ochreous-brown, basal half white on costa and upper half of hindmargin, marked with a deep black spot at apex. Hindwings and cilia ochreous-grey-whitish.

Warragul, Victoria; two specimens received from Mr. G. H. Raynor.

39. THEREUTIS, n.g.

Head with dense rough hairs on crown projecting between antennæ, face smooth; ocelli present; tongue developed. Antennæ

$1\frac{1}{4}$ - $1\frac{1}{3}$, in ♂ serrate, shortly ciliated ($\frac{2}{3}$), basal joint moderate, with strong pecten. Labial palpi moderate, rather drooping, slender, with appressed scales, terminal joint longer than second, pointed. Maxillary palpi rudimentary. Posterior tibiæ rough-haired. Forewings with vein 1 furcate, 7 and 8 sometimes stalked, 7 to costa, 11 from middle. Hindwings 1, elongate-ovate, cilia 1; cilia of inner margin in ♂ sometimes forming a long expansile pencil; vein 4 absent.

Apparently a very early form, indicating a possible origin for some of the preceding genera.

- | | |
|---|---------------------------|
| 1. Forewings with white costal streak..... | 2. |
| Forewings without white costal streak..... | 3. |
| 2. White streak becoming subcostal posteriorly | 177. <i>schismatica</i> . |
| White streak remaining costal throughout... | 178. <i>chionozyga</i> . |
| 3. Hindwings in ♂ with long inner-marginal pencil of cilia..... | 175. <i>arcana</i> . |
| Hindwings in ♂ without inner-marginal pencil | 176. <i>insidiosa</i> . |

175. *Ther. arcana*, n.sp.

♂. 14 mm. Head ferruginous-fuscous, sides of crown whitish, face grey mixed with blackish and whitish. Palpi whitish, terminal joint fuscous-tinged. Antennæ light fuscous. Thorax fuscous mixed with whitish. Abdomen grey. Legs dark fuscous, posterior pair ochreous-whitish. Forewings elongate, narrow, costa moderately arched, apex roundpointed, hindmargin very obliquely rounded; 7 and 8 stalked; fuscous, irrorated with dark fuscous; dorsal area beneath fold irrorated with whitish; a short oblique whitish mark resting on fold before middle, preceded and followed by suffused blackish spots somewhat mixed with ferruginous: cilia pale fuscous, with indications of a dark fuscous line. Hindwings with cilia of inner margin enlarged to form a long expansile whitish-ochreous pencil; dark fuscous-grey; cilia light ochreous-grey.

Albany, West Australia; in October, one specimen.

176. *Ther. insidiosa*, n.sp.

♂. 9 mm. Head white, mixed with grey. Palpi whitish, externally mixed with dark fuscous. Antennæ whitish-fuscous. Thorax and abdomen light grey. Legs dark fuscous, posterior pair whitish. Forewings elongate, narrow, costa moderately arched, apex roundpointed, hindmargin very obliquely rounded; 7 and 8 stalked; fuscous, densely and suffusedly irrorated throughout with white, with some scattered dark fuscous scales; a blackish ill-defined longitudinal mark in disc before middle, a blackish dot above fold beyond middle, and another in disc at $\frac{3}{4}$: cilia whitish-fuscous. Hindwings grey; cilia whitish-fuscous.

Sydney, New South Wales; in March, one specimen.

177. *Ther. schismatica*, n.sp.

♀. 12-13 mm. Head white, more or less mixed with fuscous. Palpi white, externally fuscous. Antennæ whitish-fuscous. Thorax white. Abdomen grey. Legs dark fuscous, posterior pair whitish. Forewings elongate, narrow, costa moderately arched, apex acute, hindmargin sinuate, very oblique; 7 and 8 separate; fuscous, towards inner margin sprinkled with whitish; a moderate white streak from near base along costa, leaving costa before middle and proceeding as a subcostal streak to costa again at $\frac{1}{3}$, extremities attenuated, beneath edged with a more or less distinct dark fuscous suffusion; a more or less distinct dark fuscous suffused line along submedian fold: cilia whitish-fuscous. Hindwings fuscous-grey; cilia whitish-fuscous.

Sydney, New South Wales; in September, two specimens. Larva 16-legged, rather stout, attenuated at posterior extremity, with scattered short blackish hairs; dull rather deep green, variably suffused with purple, especially towards middle and on sides; subspiracular line whitish, distinct; head greenish-ochreous: it feeds openly on *Styphelia viridis* (*Epacrideae*), eating away the entire substance of leaves from the edge, in August. Pupa in a firm white cocoon amongst leaves. It is no doubt possible that this larva, like that of *Nematobola candescens*, may be a miner when young.

178. *Ther. chionozyga*, n.sp.

♂♀. 11-14 mm. Head white, more or less mixed or suffused with fuscous. Palpi white, terminal joint mixed with fuscous. Antennæ whitish. Thorax white, somewhat mixed with fuscous. Abdomen whitish-grey. Legs whitish, anterior pair dark fuscous. Forewings elongate, narrow, costa moderately arched, apex acute, hindmargin sinuate, very oblique; 7 and 8 separate; ochreous-grey, dorsal half densely irrorated with white; a moderate white costal streak from near base to $\frac{3}{4}$, attenuated towards extremities; sometimes three small round fuscous spots indicated below fold near base, and in disc at $\frac{1}{3}$ and $\frac{1}{2}$, but these are usually absent: cilia light greyish-ochreous mixed or suffused with white. Hindwings grey; cilia whitish-grey.

Bathurst (2500 feet) and Sydney, New South Wales; Georges Bay, Tasmania; Port Lincoln, South Australia; York, West Australia; from September to December, eight specimens.

40. AMPHITHERA, n.g.

Head with dense rough hairs on crown, face smooth; ocelli present; tongue developed. Antennæ $1\frac{1}{2}$, in ♂ serrate, shortly ciliated ($\frac{1}{2}$), basal joint moderate, with pecten. Labial palpi moderately long, curved, porrected, slender, with appressed scales, terminal joint as long as second, pointed. Maxillary palpi rudimentary. Posterior tibiæ rough-haired. Forewings with vein 1 furcate, 7 and 8 stalked, 7 to costa, 11 from middle. Hindwings $1\frac{1}{4}$ - $1\frac{1}{3}$, elongate, trapezoidal, cilia $\frac{1}{3}$ - $\frac{2}{3}$; veins 3 and 4 from a point.

This can only be regarded as a most primitive form of the family, in wing-structure closely approaching the *Plutellidae* and early *Gelechiidae*; the proportionately broad hindwings, especially developed in the female, are quite exceptional in this family. *Thereutis* would appear to have been directly developed from it.

179. *Amph. heteromorpha*, n.sp.

♂ 9-11 mm., ♀ 13-14 mm. Head white mixed or partly suffused with fuscous, in ♀ ochreous-tinged. Palpi dark fuscous, apex whitish. Antennæ whitish, towards base fuscous. Thorax white

or ochreous-whitish, sometimes suffused with fuscous or dark fuscous on back. Abdomen in ♂ whitish, in ♀ grey. Legs dark fuscous, middle pair partly suffused with white, posterior pair whitish. Forewings elongate, rather narrow, costa moderately arched, apex roundpointed, hindmargin sinuate, oblique; brownish-ochreous, in ♂ slightly, in ♀ strongly mixed with dark fuscous; in ♂ an irregular suffused white streak along fold, marked beneath with three ill-defined blackish-fuscous spots or dashes, and apical half of wing mostly suffused with white; in ♀ a white patch occupying costal half of wing from $\frac{2}{5}$ to apex, lower edge marked at $\frac{3}{4}$ of disc with a semicircular indentation, beneath which is a small white spot: cilia whitish, on hindmargin mixed with dark fuscous, forming two or three cloudy lines and an apical bar. Hindwings relatively broader in ♀; in ♂ whitish, cilia whitish; in ♀ rather dark grey, cilia grey.

Sydney and Bulli, New South Wales; Georges Bay, Tasmania; from October to April, not uncommon.

41. CATERISTIS, Meyr.

Head rough on crown, face smooth; ocelli present; tongue short. Antennæ almost 1, in ♂ filiform, simple, basal joint enlarged, with dense pecten of scales forming an eyecap. Labial palpi short, drooping, filiform. Maxillary palpi rudimentary. Posterior tibiæ clothed with long hairs. Forewings with vein 1 simple, 3 absent, 4 absent, 6 and 7 stalked, 7 to costa, 8 absent, 9 absent, 11 from middle. Hindwings $\frac{2}{3}$, lanceolate, cilia 3; vein 3 absent, 4 absent, cell open between 2 and 5, 5 and 6 stalked, 6 to costa, 7 absent.

Probably a degenerate development of *Nematobola*, indicating rather clearly the origin of the other degenerate genera which follow. The single species is common to Australia and New Zealand, but little is known of it at present.

180. *Cat. eustyla*, Meyr.

(*Cateristis eustyla*, Meyr., Trans. N. Zeal. Inst. 1888, 164.)

♂. 10-11 mm. Head and thorax white, face grey. Forewings lanceolate; snow-white; a slender dark fuscous streak along costa

from $\frac{1}{4}$ to $\frac{3}{4}$: cilia light grey, towards base whiter, round apex wholly white or ochreous-white, with a grey dot. Hindwings and cilia light grey.

Hobart, Tasmania; one specimen in January. Also obtained from the South Island of New Zealand.

42. DIPLOTHECTIS, n.g.

Head rough, face smooth; ocelli present; tongue developed. Antennæ $\frac{5}{6}$, in ♂ filiform, simple, basal joint moderate, with large strong pecten. Labial palpi very short, porrected, loosely scaled. Maxillary palpi obsolete. Posterior tibiæ clothed with long very dense hairs. Forewings with vein 1 simple, 3 absent, 4 absent, 6 absent, 7 to costa, 8 absent, 9 absent, 11 from before middle. Hindwings $\frac{2}{3}$, narrow-lanceolate, cilia 4; cell open between 3 and 5, 4 absent, 5 and 6 stalked, 6 to hindmargin.

Although closely related to the neighbouring genera, it is not apparent with which it is most nearly connected. The labial palpi are peculiarly short. The neuration seems to be as I have described, but I have only the one specimen for examination.

181. *Dipl. chionocharca*, n.sp.

♂. 10 mm. Head whitish mixed with fuscous. Palpi whitish. Antennæ grey. Thorax whitish. Abdomen whitish-grey. Legs dark fuscous, posterior pair whitish. Forewings lanceolate; shining bronze; a broad snow-white costal streak from base almost to apex: cilia light grey, on costal streak white. Hindwings grey; cilia light ochreous-grey.

Sydney, New South Wales; in September, one specimen.

43. BEDELLIA, Stt.

Head densely rough-haired, face smooth; ocelli present; tongue short. Antennæ 1, in ♂ filiform, simple, basal joint rather stout, with large dense pecten. Labial palpi short, porrected, slender, pointed. Maxillary palpi obsolete. Posterior tibiæ clothed with long hairs. Forewings with vein 1 simple, 3 from point with 2 or absent, 4 absent, 5 absent, 6 out of 8 or absent, 7 and 8 stalked,

7 to hindmargin, 11 from middle of cell. Hindwings $\frac{1}{2}$, linear-lanceolate, cilia 6; cell open between 2 and 5, 3 absent, 4 absent.

One of the earlier of the degenerate types, but its exact affinity cannot be traced at present. The single Australian species occurs widely in Europe and North America, and may have been introduced here, but it is equally possible that it may be really indigenous; it occurs also in New Zealand, where there is a second species, which is apparently endemic. The naked pupa may be compared with that of *Thudaca*.

182. *Bed. somnulentella*, Z.

(*Bedellia somnulentella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 170; Trans. N. Zeal. Inst. 1888, 164.)

Also taken at Duaringa, Queensland; Bathurst (2300 feet), New South Wales; Warragul, Victoria; Port Lincoln, South Australia; Geraldton, West Australia; from August to November.

44. ARCTOCOMA, Meyr.

Head rough-haired, face smooth; ocelli absent; tongue developed. Antennæ almost 1, in ♂ filiform, simple, basal joint rather dilated, somewhat concave beneath, with pecten. Labial palpi very short, porrected, filiform. Maxillary palpi obsolete. Posterior tibiæ clothed with long hairs. Forewings with vein 1 simple, cell open between 2 and 7, veins 3, 4, 5, 6 absent, 7 to costa, 8 absent, 9 absent, 11 from middle. Hindwings $\frac{1}{2}$, lanceolate, cilia 3; cell open between 2 and 5, 3 absent, 4 absent, 6 to hindmargin.

Probably a more degenerate development of *Bedellia*.

183. *Arct. ursinella*, Meyr.

(*Arctocoma ursinella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 171.)

Also taken at Launceston, Tasmania, in January.

45. BUCCULATRIX, Z.

Head roughly tufted on crown, face smooth; ocelli absent; tongue short. Antennæ $\frac{5}{6}$, in ♂ filiform, simple, basal joint dilated and concave beneath, with dense pecten, forming an eyecap.

Labial palpi absent. Maxillary palpi absent. Posterior tibiæ clothed with long hairs. Forewings with vein 1 simple, 3 sometimes absent, 4 absent, 5 absent, 7 to costa, 8 sometimes absent, 11 from before middle. Hindwings $\frac{1}{2}$ - $\frac{2}{3}$, narrow-lanceolate, cilia 3-5; cell open between 2 and 5, 3 absent, 4 absent.

Probably a development of the *Nematobola* group, but no immediate connection can be made out. The genus is of some extent in the Northern hemisphere, and from its obscurity may have been overlooked elsewhere. The peculiar larval habits may be compared with those of *Nematobola*.

- | | |
|---|----------------------|
| 1. Forewings grey..... | 2. |
| Forewings ochreous..... | 3. |
| 2. Forewings suffusedly streaked with white... 184. | <i>xenaula</i> . |
| Forewings not noticeably mixed with white 185. | <i>ptochastis</i> . |
| 3. Antennæ ringed with white..... | 4. |
| Antennæ not ringed with white..... 188. | <i>asphyctella</i> . |
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| Forewings without pale costal patches..... 186. | <i>eucalypti</i> . |

184. *Bucc. xenaula*, n.sp.

♂♀. 8-9 mm. Head dark fuscous, sides mixed with whitish, forehead white, face white sprinkled with fuscous. Antennæ grey, ringed with darker, basal joint white. Thorax dark fuscous, sprinkled with white. Abdomen prismatic grey, beneath white. Legs dark fuscous, apex of joints and hairs of posterior tibiæ whitish, middle tibiæ suffusedly banded with whitish. Forewings elongate-lanceolate; greyish-fuscous, irregularly mixed with white, forming suffused streaks on margins of dark markings, and sprinkled with dark fuscous; markings formed by a cloudy blackish irroration; a streak along submedian fold from base to near middle; a small spot on costa near base; two oblique streaks from costâ, not reaching half across wing, first before, second beyond middle; an oblique streak from inner margin before middle to submedian streak, sometimes nearly obsolete; an irregular patch on inner margin at $\frac{2}{3}$, extending to fold; a

longitudinal mark before hindmargin in middle: cilia fuscous-whitish, round apex suffused with white and mixed with black points. Hindwings rather dark grey; cilia fuscous-grey.

Adelaide, South Australia; in October, four specimens bred from elongate firm white longitudinally ribbed cocoons found on the bark of *Sterculia* (*Sterculiaceae*) in the Botanical Gardens.

185. *Bucc. ptochastis*, n.sp.

♂♀. 8 mm. Head dark fuscous, sides mixed with whitish, forehead white, face fuscous-white. Antennæ grey, ringed with darker, basal joint white. Thorax grey. Abdomen prismatic grey-whitish, beneath white. Legs dark fuscous, apex of joints and hairs of posterior tibiæ whitish. Forewings elongate-lanceolate; grey; markings very ill-defined, formed by black irroration; an interrupted streak along submedian fold from base to near anal angle; two oblique marks from costa, first before, second beyond middle; a small spot on inner margin at $\frac{3}{4}$; a longitudinal mark before hindmargin in middle: cilia whitish-grey, round apex sprinkled with black points. Hindwings grey; cilia pale grey.

Sydney, New South Wales; York, West Australia; in October, two specimens. It has considerable similarity with the preceding species, but is much more uniform in appearance, owing to the absence of the white suffused streaks and the partial obliteration of the black markings.

186. *Bucc. eucalypti*, Meyr.

(*Bucculatrix eucalypti*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 179.)

187. *Bucc. lassella*, Meyr.

(*Bucculatrix lasella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 180.)

188. *Bucc. asphyctella*, Meyr.

(*Bucculatrix asphyctella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 181.)

Also taken at Deloraine, Tasmania, in November.

46. STEGOMMATA, Meyr.

Head roughly tufted on crown, face smooth; ocelli absent; tongue developed. Antennæ 1 or over 1, in ♂ filiform, simple, basal joint dilated and concave beneath, with strong dense pecten, forming an eyecap. Labial palpi moderate, rather drooping, slender, filiform, terminal joint twice as long as second. Maxillary palpi obsolete. Posterior tibiæ shortly rough-haired. Forewings with vein 1 furcate, 4 absent, 5 absent, 7 to costa, 8 absent, 9 absent, 11 from middle. Hindwings $\frac{1}{2}$, linear-lanceolate, cilia 6; cell open between 2 and 5, 3 absent, 4 absent, 6 to hindmargin.

Probably allied to *Bucculatrix*, but collaterally only, both being derivable from some one earlier form.

1. Forewings with short black streaks in disc 189. *leptomitella*.
Forewings without black streaks in disc.... 2.
2. Forewings with dorsal half suffused with
pale yellow..... 191. *sulfuratella*.
Forewings with dorsal half not pale yellow 190. *hesperias*.

189. *Steg. leptomitella*, Meyr.

(*Stegommata leptomitella*, Meyr., Proc. Linn. Soc. N.S.W. 1880. 172.)

Also taken at Melbourne, Victoria, in October.

190. *Steg. hesperias*, n.sp.

♂♀. 10-11 mm. Head white, crown slightly mixed with dark fuscous. Palpi white. Antennæ white, ringed with fuscous, Thorax white. Abdomen whitish. Legs white, tarsi spotted with dark fuscous. Forewings very elongate, narrow, acutely pointed, apex produced; snow-white; four pale brownish-ochreous oblique streaks from posterior half of costa, reaching about half across wing, fourth little oblique; a series of cloudy indistinct pale brownish-ochreous spots along inner and hind margin, not reaching half across wing; a round black apical dot: cilia whitish, with two fine outwardly oblique blackish dashes above apex, two grey ones below apex, and a grey apical hook. Hindwings grey; cilia grey-whitish.

Albany, West Australia; in September and October, six specimens.

191. *Steg. sulfuratella*, Meyr.

(*Stegommata sulfuratella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 172.)

Also taken at Glen Innes (3500 feet), New South Wales; Launceston, Deloraine, Campbelltown, and Georges Bay, Tasmania; Mount Lofty, South Australia: in November and December. Larval and pupal habits recorded in Proc. Linn. Soc. N.S.W. 1882, 200.

47. CROBYLOPHORA, Meyr.

Head roughly tufted on crown, face smooth; ocelli absent; tongue short. Antennæ $\frac{4}{5}$, in ♂ filiform, simple, basal joint broadly dilated and concave beneath, with dense pecten, forming an eyecap. Labial palpi short, drooping, filiform. Maxillary palpi obsolete. Posterior tibiæ clothed with long hairs. Forewings with vein 1 simple, 4 absent, 5 absent, 7 to costa, 8 absent, 9 absent, 10 absent, 11 from middle. Hindwings under $\frac{1}{2}$, very narrowly lanceolate, cilia 4-6; cell open between 2 and 5, 3 absent, 4 absent.

A development of *Stegommata*.

Forewings with yellowish median streak from

base..... 192. *chrysiidiella*.

Forewings without yellowish median streak from

base..... 193. *daricella*.

192. *Crob. chrysiidiella*, Meyr.

(*Crobylophora chrysiidiella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 178.)

Also taken in June and September.

193. *Crob. daricella*, Meyr.

(*Crobylophora daricella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 178.)

Also taken at Duarina, Queensland, by Mr. G. Barnard, in August and October.

48. OPOSTEGA, Z.

Head rough-haired, back of crown smooth; ocelli absent; tongue short or absent. Antennæ $\frac{4}{5}$, in ♂ filiform, simple, basal joint very greatly enlarged, dilated and concave beneath to form large eyecap, without pecten. Labial palpi short, drooping, filiform. Maxillary palpi long, folded, filiform. Abdomen more or less flattened. Posterior tibiæ and first joint of tarsi with long stiff bristle-like scales, inner middle spur extremely long. Forewings with vein 1 simple, cell open between 2 and 11, veins 3-10 absent; lower surface with large basal denuded patch beneath costa. Hindwings $\frac{1}{3}$ - $\frac{1}{2}$, narrowly lanceolate, beneath with median pecten of stiff scales towards base, cilia 3-5; cell open between 2 and 5, 3 absent, 4 absent.

This is a highly peculiar and very isolated genus, at present known only by a few species from the Northern hemisphere besides the Australian. Although it is convenient to place it at the end of the family, it probably has no near relationship to the genera immediately preceding. The presence of the antennal eyecap, and the degraded neuration have led to its previous association with them, but these characters are illusory; in them the eyecap is formed in large part by the pecten, whilst in *Opostega*, though the eyecap is much larger, it is wholly constituted by the basal joint itself, which is enormously enlarged; and the degradation of the neuration much exceeds that which is found in them. On the other hand, the rough face and long folded maxillary palpi point distinctly to a connection with the groups of *Tinea* or *Erechthias*, especially perhaps the latter; and it is most probable that *Opostega* is a degenerate and very ancient development of that group, the connecting links being perhaps wholly extinct. The broad depressed abdomen, which is a marked character of *Opostega*, is found in *Eurytyla*, one of that group. The structure of the posterior legs and the special structures of the wings appear to be peculiar to *Opostega*, and nothing approaching them occurs in any other genera of the family.

- | | | |
|--|------|--------------------|
| 1. Forewings with dark markings from inner margin..... | 2. | |
| Forewings without dark markings from inner margin..... | 6. | |
| 2. Hindwings white..... | 196. | <i>stiriella</i> . |
| Hindwings not white..... | 3. | |
| 3. Forewings with anterior fascia formed by two triangular spots. | 200. | <i>xenodoxa</i> . |
| Forewings with anterior fascia not formed by triangular spots..... | 4. | |
| 4. Anterior fascia straight..... | 199. | <i>diorthota</i> . |
| Anterior fascia angulated..... | 5. | |
| 5. Forewings with two angulated fasciæ..... | 198. | <i>chalinias</i> . |
| Forewings with one angulated fascia..... | 197. | <i>gephyraea</i> . |
| 6. Forewings with grey subbasal streak in hindmarginal cilia..... | 194. | <i>basilissa</i> . |
| Forewings without grey subbasal streak in hindmarginal cilia..... | 195. | <i>orestias</i> . |

194. *Op. basilissa*, n.sp.

♀. 11-15 mm. Head, palpi, antennæ, thorax, and abdomen white. Legs white, anterior pair and all tarsi more or less infuscated. Forewings elongate-lanceolate, apex produced; snow-white; a light yellow-ochreous streak along upper half of hindmargin to apex: cilia white, with two fine suberect black bars above apex, a small black subbasal spot and blackish hook at apex, and a subbasal grey streak along hindmargin, interrupted in middle. Hindwings light grey; cilia white, sometimes ochreous-tinged.

Deloraine, Tasmania; Perth, West Australia; in October and November, two specimens. The larger of these is quite gigantic for this genus.

195. *Op. orestias*, Meyr.

(*Opostega orestias*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 175.)

196. *Op. stiriella*, Meyr.

(*Opostega stiriella*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 175.)

197. *Op. gephyraea*, Meyr.

(*Opostega gephyraea*, Meyr., Proc. Linn. Soc. N.S.W. 1880, 176.)

Also taken in September and April.

198. *Op. chalinias*, n.sp.

♀. 10 mm. Head and palpi white, back of crown ochreous. Antennæ pale greyish, basal joint white. Thorax ochreous-whitish. Abdomen grey. Legs whitish, anterior pair dark fuscous. Forewings elongate-lanceolate, apex produced; ochreous-white; two narrow acutely angulated golden-fuscous fasciæ, first before middle, very ill-defined, second beyond middle, somewhat interrupted in disc; apex suffused with light golden fuscous: cilia whitish-fuscous, round apex suffused with white on basal half, with a thick dark brown basal line along costa and upper half of hindmargin, a small black subbasal spot at apex connected with a fine suberect black bar above apex, a cloudy suberect fuscous bar beyond this, and a fuscous apical bar. Hindwings dark fuscous; cilia fuscous.

Georges Bay, Tasmania; in January, one specimen.

199. *Op. diorthota*, n.sp.

♂. 12 mm. Head white. Palpi white, externally dark fuscous. Antennæ fuscous-whitish, basal joint white. Thorax light fuscous, mixed with whitish on back. Abdomen grey-whitish. Legs whitish, anterior pair fuscous. Forewings elongate-lanceolate, apex somewhat produced; white; two narrow straight fuscous fasciæ, sprinkled with dark fuscous, first from before middle of costa to middle of inner margin, second from $\frac{1}{3}$ of costa to anal angle: cilia white, beneath apex and on anal angle suffused with light fuscous and sprinkled with dark fuscous, with a light fuscous spot opposite costal extremity of second fascia. Hindwings dark grey; cilia whitish-fuscous; costa fringed with whitish bristles on basal half.

Albany, West Australia; in October, one specimen.

200. *Op. xenodoxa*, n.sp.

♀. 6 mm. Head white. Palpi white, externally dark fuscous. Antennæ light fuscous, basal joint white. Thorax white. Abdomen light grey. Legs dark fuscous, posterior pair whitish. Forewings elongate-lanceolate, apex produced; snow-white; markings rather dark greyish-fuscous, finely edged with black; a short dash along costa near base; a triangular spot on costa before middle, and another on inner margin before middle, their apices touching; an apical patch, suffused with ochreous in disc, its anterior edge running from $\frac{2}{3}$ of costa to anal angle, rather strongly emarginate below middle; a small black apical dot: cilia whitish-grey, round apex and on costa greyer, sprinkled with minute white points in rows, with a small black mark at base of costal cilia at $\frac{5}{6}$. Hindwings pale grey; cilia whitish-grey.

Glen Innes (3500 feet), New South Wales; in December, one specimen.

APPENDIX.

The following species described by Walker as referable to genera of this family were erroneously so assigned: they are quoted here for the sake of completion.

201. *Tinea anticella*, Walk. 483. A synonym of *Achroea grisella*, Hb. (*Galleriadae*), I believe.

202. *Incurvaria basiplaga*, ib. 490. Belongs to *Peltophora* (*Oecophoridae*).

203. *I. proximella*, ib. 490. Also a *Peltophora*.

204. *I. conjunctella*, ib. 491. Belongs to the *Plutellidae*.

205. *I. abditella*, ib. 491. Belongs to *Aeolocosma* (*Glyphipterygidae*).

206. *Tinea comptella*, ib. 1007. Belongs to *Loxostoma* (*Elachistidae*).

207. *T. tortricitella*, ib. Suppl. 1812. Unidentified; perhaps belongs to *Tortricidae*.

208. *T. oecophorella*, ib. 1813. A synonym of *Comarchis aspectatella*, Walk. (*Arctiadae*).

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*REFERENCE LIST OF THE LAND AND FRESH-
WATER MOLLUSCA OF NEW ZEALAND.

BY C. HEDLEY AND H. SUTER.

Many catalogues of the terrestrial and fluviatile Molluscan fauna of New Zealand have appeared. The earliest, in 1843, was a list of 15 species included in Gray's New Zealand Fauna, an appendix to Dieffenbach's "New Zealand"; this was translated into French in Vol. vii. of the *Revue Zoologique*. In the P.Z.S. 1849, pp. 164-169, the same author added 14 more species. The next with which we are acquainted is a list, collected from Pfeiffer's Monographs, of 73 land shells in Dr. Cox's "Exchange List," dated 1868. This was followed in 1873 by two catalogues published by the Colonial Museum, Wellington; the one containing descriptions of the known land shells compiled by Mr. A. W. Scott and Dr. Cox, the other a most excellent critical and synonymic survey of all the species by Dr. von Martens. This preliminary work enabled Prof. Hutton to issue, in 1880, the fuller account of this section contained in his "Manual of the New Zealand Mollusca." The latter author instituted in 1883 "A Revision of the Land Mollusca of New Zealand" (*Trans. N.Z. Inst.* xvi. pp. 186-212),

* The basis of this paper was an article entitled—"Synonymic and Bibliographical Catalogue of the New Zealand Land and Freshwater Mollusca," by H. Suter, communicated by myself to the December Meeting of 1892 and summarised in the monthly Abstract. The exigencies of space required that this article should be curtailed, selected being substituted for complete bibliographical references, &c., &c.; renewed literary search and study also enabled me to amend Mr. Suter's work in various particulars. Finally, having thus re-cast the original memoir and altered the title to suit the circumstances, my name is, at Mr. Suter's request, joined with his as responsible for the following contribution.—C. HEDLEY, Feb. 20, 1893.

which has since remained the standard summary of this fauna. A catalogue based on Hutton's appeared in the *Malakozoologische Blätter* (2), x. pp. 175-183. Dr. Kobelt incidentally enumerated the members of this fauna as known to him in 1880 in the *Jahrbücher der Deutschen Malakozoologischen Gesellschaft*, Vol. vii. pp. 26-28. Another brief list occurs on pp. 256-257 of Fischer's *Manuel de Conchyliologie*.

Great gains to our knowledge of the distribution, anatomy, habits and affinities of the snails of New Zealand have been effected by industrious students and collectors during the past decade. It is here proposed to digest and collate these additions with the sum of previous records, and it is hoped that the inclusion of every noteworthy reference and the revised arrangement of the species may facilitate the study of the subject.

The first reference quoted is always that of the original description. Where the reference paragraph does not terminate in "&c.," the quotations are considered to be exhaustive. More usually space has been saved by leaving out the least useful references, such as are mere reprints or translations of earlier definitions. Thus Gray's paper in the *P.Z.S.* 1849 was copied into the *Ann. Mag. N.H.* (2), vii.; Gould's descriptions in the *Proceedings of the Natural History Society of Boston* were simply reprinted in his "*Expedition Shells*" and "*Otia Conchologica*"; and Pfeiffer's descriptions in the *P.Z.S.* and the *Mal. Blät.* are merely transferred to the respective volumes of the *Monographia Heliceorum* and *Pneumonopomorum Viventium*. In these minor details the present list may be supplemented by consulting von Martens' *Catalogue* and Hutton's *Manual*. Where the original locality is known with any exactness, the collector's name follows in brackets. The dates following the species are those of publication, not, as far as we can ascertain, those on which papers were read nor those of the year for which the periodicals contain the annual work. We expect that Pfeiffer's and Gray's papers in the *P.Z.S.* during the late forties and early fifties were not published until the year following that quoted for each. As, however, it is impossible for

us to ascertain this, we have not felt justified in departing from the usages of our predecessors. Only in the case of evident and accidental mis-spelling, as *antipodanum* for *antipodarum*, or *tennissoni* for *tenisoni*, have we amended the etymology of the original describers. Different authors have rung numerous changes upon the Latin adjective for New Zealand, thus *Charopa* (*Tesseraria*) *novoseelandica*, Pfr., has been spoken of by Hutton as *Pupa neozelanica*, by Küster as *Pupa novoseelandica*, and by Sowerby as *Pupa novazelandica*. Dr. von Martens has suggested that these and other variations be reduced to one common form; he does not himself act on the idea, and we likewise have chosen the straight and narrow road of exact quotation. The genera and subgenera to which authors have referred the same species are very various, thus *Flammulina crebriflammis*, Pfr., has been recorded by Pfeiffer as *Helix crebriflammis*, by Gray as *Nanina crebriflammis*, by Tryon as *Elæa crebriflammis*, by Adams as *Amphidoea crebriflammis*, and by Hutton as *Paryphanta crebriflammis*: we have not burdened our pages with the reiteration of these generic titles, but have given separately what specific names have fallen into synonymy.

We have confined ourselves to the political limits of the province, including the Kermadec, and omitting Lord Howe and Norfolk Islands.

As the New Zealand fauna becomes better known, its insularity stands out more prominently. One by one have been eliminated from our list the foreign genera *Testacella*, *Daulebardia*, *Diplomphalus*, *Vitrina*, *Nanina*, *Patula*, *Hyalina*, *Zonites*, *Succinea*, *Pupa*, *Helix*, *Bulimus*, *Rhabdotus*, *Limax*, *Arion*, *Leptopoma*, *Cyclophorus*, *Physa*, and *Veritina*, falsely imposed on our fauna by the negligence of collectors or the mistakes of authors. Although the islands have now been well searched, genera which might have been expected to occur, since prevalent in neighbouring countries, as *Nanina*, *Partula*, *Succinea*, *Stenogyra*, *Pupa*, *Vaginula*, *Truncatella*, *Helicina*, and *Navicella*, have not yet been detected, while

Diplommatina holds its place upon slender evidence. Moreover, the WHOLE of the species (excluding one or two imperfectly understood fluviatile forms) are now known to be strictly endemic. The supposed community with Northern Australia was based (Trans. N.Z. Inst. xvi. p. 188) on the fictitious existence in New Zealand of *Paryphanta millegani*, Pfr., *Hadra reinga*, Gray, *Cristigibba taranaki*, Gray, and *Rhytida rapida*, Pfeiffer, and on the equally fictitious presence in Australia of *C. kivi*, Gray, *T. ophelia*, Pfr., *C. sicac*, Gould, and *C. coma*, Gray; while the presumption that *Amphidova* extended from Juan Fernandez to New Zealand countenanced the theory of relations with South America (*vide* Manual of Conchology (2), viii. p. 73).

A remark by Crosse has hardly received the attention which it merits. He says (Journ. de Conch. xxviii. p. 37), "It is interesting to notice that the terrestrial and fluviatile molluscan fauna of New Zealand approximates more to that of New Caledonia, in spite of the considerable distance that separates the two countries, than to that of Australia. In both archipelagoes the group of *Placostylus* is well developed and contrasts remarkably with the minute and fragile Helices, most of which are small and thin. The genus *Melanopsis* is common to both, as well as the genus *Diplommatina*."

Those desirous of comparing the fauna of New Zealand with those of the surrounding countries may consult the following catalogues. A list was published of the land shells of Norfolk Island by Mousson, Journ. de Conch. xxi. pp. 110-115; another of the land and freshwater shells of Lord Howe by one of us, Records of the Australian Museum, i. pp. 134-144; of the land and freshwater mollusca of New Caledonia by Gassies, Faune Conchyliologique de la Nouvelle Calédonie, pt. iii. pp. 98-107. Correct lists of the mollusca of the New Hebrides, the Solomons, the Admiralties, New Ireland and New Britain are still desiderata;

perhaps the best are those sketched of the first by Fischer, *Man. de Conch.* p. 251, of the latter by Kobelt, *Nachr. deut. Malak. Gesell.* xix. pp. 6-11. Garrett has published a list of the landshells of Fiji, *P.Z.S.* 1887, pp. 164-189, 284-316; of those of Samoa, *Proc. Acad. N. S. Philad.* 1887, pp. 124-153; of those of the Society Islands, *Journ. Ac. N. S. Philad.* (2) ix. pp. 1-98; of those of the Austral Islands, *Proc. Acad. N. S. Philad.* 1879, pp. 17-30; of those of the Hervey Islands, *Journ. Ac. N. S. Philad.* (2) viii. pp. 381-411; and of those of the Marquesas Islands, *Bull. Soc. Mal. France.* iv. pp. 1-48. To Mousson we owe a catalogue of the land and freshwater shells of Tonga, *Journ. de Conch.* xix. pp. 7-33. A list of the terrestrial and fluviatile mollusca of Papua is given by Tapparone-Canefri in the *Annali Mus. Civ. Genova*, xxiv. pp. 195-199; and a more recent one of the land shells of British New Guinea (including the Louisiades) by one of us, *P.L.S. N.S.W.* (2), vi. pp. 70-115. The fluviatile shells of Australia have been catalogued by Tate and Brazier, *P.L.S. N.S.W.* (1), vi. pp. 554-569; and by Smith, *Linn. Soc. Journ. Zool.* xvi. pp. 255-316. Of the Australian terrestrial shells no later catalogue is extant than Cox's *Monograph of Australian Land Shells*, but some of the separate colonies have been catalogued more recently. We know of no lists dealing with the mollusca of N.S.W. or of W.A.; the land mollusca of Queensland were enumerated by one of us, *Proc. Roy. Soc. Queensland*, v. pp. 47-70; the land and freshwater mollusca of Tropical South Australia by Tate, *Trans. Roy. Soc. S.A.* v. pp. 49-56; the land and freshwater shells of Victoria by the same conchologist, *Trans. Roy. Soc. S.A.* iv. pp. 75, 76; the land shells of South Australia by Angas, *Journ. of Conch.* i. pp. 134, 135; and the land and freshwater shells of Tasmania by Johnston, *Proc. Roy. Soc. Tasmania*, 1890, pp. 142-145.

Class GASTEROPODA.

Subclass ANISOPLEURA.

Order STREPTONEURA.

Suborder HOLOCHLAMYDA.

Family MELANIIDÆ.

MELANOPSIS, Férussac, pat. 1807.

J. J. Férussac, Essai d'une méthode conchyliologique, p. 70.

1 M. TRIFASCIATA, Gray, 1843.

Synonym.—*zelandica*, Gould, 1848, and *ovata*, Dunker, 1862.

References.—Dieffenbach's N.Z. ii. p. 263; Proc. Boston N.H. Soc. ii. p. 225; U.S. Expl. Exped. xii. p. 130, f. 146, a, b; Mal. Blätt. viii. p. 150; Conch. Icon. xii. Melanopsis, pl. i. f. 2a, 2b; Voy. Erebus and Terror, ii. Moll. pl. i. f. 18; Man. N.Z. Moll. p. 78; Trans. N.Z. Inst. xv. p. 123, pl. xiv. f. F (radula); Conch. Cab. (2) i. pt. 24, p. 464, pl. XLIX. ff. 20, 22, &c.

Habitats.—North Island; Waitanga Falls (Dieffenbach), Auckland, Kaneranga, River Thames, Whangarei. South Island; Greymouth, Dunedin, Kenepuru Sound.

2 M. STRANGEI, Reeve, 1860.

Ref.—Conch. Icon. xii. Melanopsis, pl. i. f. 3a, 3b; Voy. Erebus and Terror, ii. Moll. pl. i. f. 22; Conch. Cab. (2) i. pt. 24, p. 465, pl. XLIX. ff. 23, 24; Man. N.Z. Moll. p. 78.

Hab.—North Island.

Note.—Scarcely entitled to specific rank. *Vide* Brot, Matériaux pour servir à l'étude de la famille des Mélaniens, pt. ii. p. 56.

Fam. HYDROBIIDÆ.

POTAMOPYRGUS, Stimpson, 1865.

Stimpson, Am. Journ. Conch. i. p. 53.

3 P. CUMINGIANA, Fischer, sp. 1860.

Syn.—*salleana*, Fischer, 1860; *crosssei*, Frauenfeld, 1864.

Ref.—Journ. de Conch. viii. p. 208, pl. iv. ff. 6, 7; Mal. Blät. viii. p. 151; Conch. Icon. xii. Melania, pl. XLIX. f. 366; Abhandl. Zool. Bot. Gesellsch. Wien, xiv. p. 595; Man. N.Z. Moll. p. 83; Trans. N.Z. Inst. xiv. p. 144, pl. i. ff. A, 1, 2 (shell), f. E (radula).

Hab.—North Island; Lake Takapuna, Auckland, Thames, Forty Mile Bush, Waipua River, Ruamahanga River, Whangarei, Hillyers Creek, Onehunga Springs, Kowau Island, Hunua Range, Waikato, and Lake Pupake. South Island; Lake Te Anau.

4 P. COROLLA, Gould, sp. 1848.

Syn.—*badia*, Gould, 1851; *fischeri*, Dunker, 1862, and *reevei*, Frauenfeld, 1862.

Ref.—Proc. Boston Soc. N.H. ii. p. 223; U.S. Expl. Exped. xii. pp. 126, 129, ff. 149, a, b, 150, a, b; Mal. Blät. viii. p. 152; Smithsonian Miscell. Coll. vii. p. 49 (radula); Abhandl. Zool. Bot. Gesellsch. Wien, xiii. p. 1024, xv. p. 526, pl. VIII.; P.L.S.N.S.W. (1) iii. p. 136, pl. XIII. ff. 2, 3, 5; Man. N.Z. Moll. pp. 82, 83; Trans. N.Z. Inst. xiv. p. 145, ff. B, 1, 2, (shell), f. F (radula); Am. Journ. Conch. i. p. 54 (radula), &c.

Hab.—North and South Islands, Banks Peninsula (Pickering).

5 P. ANTIPODARUM, Gray (emend.),* sp. 1843.

Syn.—*zelandice*, Gray, 1843; *egena*, Gould, 1851; *gracilis*, Gould, 1852; and *spelaea*, Frauenfeld, 1862.

Ref.—Dieffenbach's N.Z. ii. p. 241; Proc. Boston N.H. Soc. iii. p. 75; U.S. Expl. Exped. xii. p. 127, f. 151, a, b; Abhandl. Zool.

* Originally misspelt *antipodanum*, but corrected as above, Revue Zoologique, vii. p. 356.

Bot. Gesellsch. Wien, xiii. p. 1022, xv. p. 526, pl. VIII.; Voy. Erebus and Terror, ii. Moll. p. 3, pl. i. f. 19 (two figures); Man. N.Z. Moll. p. 81; Trans. N.Z. Inst. xiv. p. 145, pl. i. ff. c, 1 (3 figs. shell), 2 (operculum), c (radula), &c.

H a b.—North and South Islands.

6. *P. PUPOIDES*, Hutton, 1882.

Ref.—Trans. N.Z. Inst. xiv. p. 146, pl. i. f. D (shell), f. H (radula).

H a b.—North and South Islands, brackish water only. Avon (Hutton).

Suborder PNEUMONOCHLAMYDA.

Fam. CYCLOPHORIDÆ.

DIPLOMMATINA,* Benson, 1849.

Benson, Ann. Mag. Nat. Hist. (2), iv. p. 193.

7 *D. CHORDATA*, Pfeiffer, 1855.

Ref.—P.Z.S. 1855, p. 105; Man. N.Z. Moll. p. 38; Trans. N.Z. Inst. xvi. p. 210, &c.

H a b.—New Zealand (Strange fide Cuming).

Subgenus PAXILLUS, H. & A. Adams, 1851.

H. & A. Adams, Ann. Mag. Nat. Hist. (2) vii. p. 63.

8 *D. PEREGRINA*, Gould, sp. 1848.

Ref.—Proc. Boston Soc. N.H. ii. p. 198; U.S. Expl. Exped. xii. p. 91, f. 105, a, b; Man. N.Z. Moll. p. 38; Trans. N.Z. Inst. xvi. p. 210, &c.

H a b.—New Zealand (U.S. Expl. Exped.).

Note.—Like the foregoing this species has not been found again.

* The existence in N.Z. of this genus requires confirmation.

LAGOCHEILUS,* Theobald, MS. 1864.

Blanford, Ann. Mag. Nat. Hist. (3) xiii. p. 452.

9 *L. LIGNARIUM*, Pfeiffer, sp. 1857.

Ref.—P.Z.S. 1857, p. 112; Conch. Icon. xiii. Cyclophorus, pl. XIX. f. 94; Man. N.Z. Moll. p. 37; Trans. N.Z. Inst. xvi. p. 210, &c.

H a b.—North Island; Wellington, and Forty Mile Bush. South Island; Wairoa Gorge, Nelson.

10 *L. CYTORA*, Gray, sp. 1849.

Ref.—P.Z.S. 1849, p. 167; Man. N.Z. Moll. p. 37; Trans. N.Z. Inst. xvi. p. 210, &c.

H a b.—North Island; Auckland (Greenwood), Howick, Ohaupo, Pirongia Mt., and Hunua Range.

11 *L. HEDLEYI*, Suter, n.sp.

Note.—This species will be described and figured in the next volume of these Proceedings.

H a b.—North Island; Auckland (Musson), Hunua Range.

12 *L. PANNOSUM*, Hutton, sp. 1883.

Ref.—Trans. N.Z. Inst. xv. p. 140; xvi. pp. 173, 174, 209, pl. x. f. v (operculum and radula).

H a b.—South Island; Greymouth (Helms).

13 *L. CALVUM*, Hutton, sp. 1883.

Ref.—Trans. N.Z. Inst. xv. p. 140; xvi. pp. 174, 209.

H a b.—South Island; Greymouth (Helms).

14 *L. PALLIDUM*, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 477; Trans. N.Z. Inst. xvi. pp. 184, 210.

H a b.—North Island; Auckland (Cheeseman), Pirongia Mt.

* The N.Z. species are included in this genus in accordance with Dr. von Möllendorff's systematic study, ante p. 385.

15 *L. TORQUILLUM*, Suter, n.sp.

This species will be figured and described in the next volume of these Proceedings.

H a b.—North Island; Howick and Hunua Range (Broun).

Fam. CYCLOSTOMATIDÆ.

OMPHALOTROPIS, Pfeiffer, 1852.

Pfeiffer, P.Z.S. 1852, p. 151.

16 *O. VESTITA*, Pfeiffer, 1855.

R e f.—P.Z.S. 1855, p. 106; Man. N.Z. Moll. p. 40; Trans. N.Z. Inst. xv. p. 211, &c.

H a b.—New Zealand (Ex Cuming Coll.)

REALIA, Gray, 1840.

Gray, Syn. Brit. Mus. 1840, p. 91 [= *Liarea*, Gray, 1852, Cat. Phan. p. 217].

17 *R. EGEA*, Gray, 1849.

R e f.—P.Z.S. 1849, p. 167; Conch. Cab. (2) i. pt. 19, p. 303, pl. XL. ff. 17, 18; Man. N.Z. Moll. p. 39; Trans. N.Z. Inst. xvi. p. 211, xxiv. p. 301, pl. XXIII. f. 57 (radula), &c.

H a b.—North Island; Auckland (Greenwood), Wanganui, Forty Mile Bush and Hunua Range.

var. ALBINA, Suter, 1892.

R e f.—Trans. N.Z. Inst. xxiv. p. 275.

H a b.—North Island; Forty Mile Bush.

18 *R. TURRICULATA*, Pfeiffer, 1854.

R e f.—P.Z.S. 1854, p. 304; Man. N.Z. Moll. p. 39; Trans. N.Z. Inst. xvi. pp. 174, 211, pl. XI. f. H (radula), &c.

H a b.—North Island; Kakepuku (Hochstetter), Papakura and Whangarei.

19 R. CARINELLA, Pfeiffer, 1862.

Ref.—Mal. Blät. viii. p. 150; Man. N.Z. Moll. p. 39; Trans. N.Z. Inst. xvi. p. 211, &c.

H a b.—North Island; Drury, Taupiri (Hochstetter), Auckland, Ohaupo and Hunua Range.

20 R. HOCHSTETTERI, Pfeiffer, 1862.

Ref.—Mal. Blät. viii. p. 149; Man. N.Z. Moll. p. 39; Trans. N.Z. Inst. xvi. pp. 174, 211, &c.

H a b.—North Island; Bay of Islands (Hochstetter), Auckland and Whangarei.

Fam. HYDROCENIDÆ.

HYDROCENA, Parreyss, MS. 1843.

Herrmannsen, Ind. Gen. Malac. i. p. 546.

21 H. PURCHASI, Pfeiffer, 1861.

Ref.—Mal. Blät. viii. p. 150; Man. N.Z. Moll. p. 40; Trans. N.Z. Inst. xxiv. p. 301, pl. xxiii. f. 58 (radula), f. h. p. (operculum), &c.

H a b.—North Island; Bay of Islands (Purchas), Whangarei, Auckland, Ohaupo, Forty Mile Bush, Hunua Range and Pirongia Mt. South Island; Greymouth, Wairoa Gorge and Riccarton Bush.

Order EUTHYNEURA.

Suborder PULMONATA.

Group BASOMMATOPHORA.

Fam. LATIIDÆ.*

LATIA, Gray, 1849.

[= *Pelex*, Gould, 1852, Am. Expl. Exped. xii. p. 153.]

Gray, P.Z.S. 149, p. 168.

* Proposed by Hutton, 1882, Trans. N.Z. Inst. xiv. p. 156.

22 *L. NERITOIDES*, Gray, 1849.

Ref.—P.Z.S. 1849, p. 168; Zeits. f. Malak. 1852, p. 182, pl. i. ff. 17, 18; Journ. de Conch. ii. p. 205, pl. vi. ff. 16, 17; Conch. Icon. ix. *Navicella*, pl. viii. ff. 34, a, b; Conch. Cab. (2), i. pt. 4, p. 9, pl. ii. ff. 10-14; Man. N.Z. Moll. p. 29; Trans. N.Z. Inst. xiv. p. 156, pl. iv. f. v (animal), ff. e. p. (radula), &c.

H a b.—North Island; Auckland (Greenwood) and Whangarei.

23 *L. LATERALIS*, Gould, sp. 1852.

Syn.—*petitiana*, Fischer, 1856; *gassiesiana*, Fischer, 1856.

Ref.—U.S. Expl. Exped. xii. p. 153, f. 176, a, b, c, d; Conch. Icon. ix. *Navicella*, pl. viii. ff. 35, a, b; Journ. de Conch. v. pp. 84, 167, pl. iii. ff. 10, 11, pl. vii. ff. 1, 2; Conch. Cab. (2), i. pt. 6, p. 9, pl. v. f. 6; Man. N.Z. Moll. p. 29, &c.

H a b.—North Island; Wangara and Waitangi (Am. Expl. Exped.), Kaiwarra River, near Wellington, Hillyers Creek, near Auckland, and Horokiwi.

Fam. LIMNÆIDÆ.

ANCYLUS, Geoffroy, 1767.

Geoffroy, Coquilles fluv. terr. environs Paris, p. 122.

24 *A. TASMANICUS*, Tenison-Woods, 1876.

Syn.—? *woodsii*, Johnston, 1879; ? *australicus*, Tate, 1880; ? *assimilis*, Petterd, 1884; ? *oblonga*, Petterd, MS.; ? *smithi*, Cox, 1890.

Ref.—P.R.S. Tasmania, 1875, p. 70, 1878, p. 25, 1888, pl. v. ff. 1, 3, 4, 5, 7; Trans. R.S.S. Australia, iii. p. 102, pl. iv. ff. 4, 4a, 4b; Journ. of Conch. iv. pp. 159, 160; Journ. Linn. Soc. Zool. xvi. p. 297, pl. vii. ff. 36, 37; P.L.S.N.S.W. (2) iv. p. 658, pl. xix. ff. 1-3; Journ. de Conch. xxxii. p. 248.

H a b.—South Island; River Avon (Suter).

Note.—Specimens of an *Ancylus* were discovered in N.Z. by one of us, who compared it with Australian and Tasmanian *Ancyli* without distinguishing specific differences. With this shell

should be compared *A. reticulatus*, Gassies, and *A. noumeensis*, Crosse, from New Caledonia.

25 *A. DOHRNIANUS*, Clessin, 1882.

R e f.—Conch. Cab. (2), Bd, i. Abth. vi. p. 54, pl. VIII. f. 8 (two figures).

H a b.—New Zealand.

N o t e.—Unknown to New Zealand naturalists.

LIMNÆA, Lamarck, 1792.

Lamarck, Prodrome d'une nouvelle classification des Coquilles.

26 *L. LEPTOSOMA*, Hutton, 1885.

R e f.—Trans. N.Z. Inst. xvii. p. 55, pl. XII. f. 3.

H a b.—North Island: Wellington (Hutton).

27 *L. TOMENTOSA*, Pfeiffer, sp. 1854.

R e f.—P.Z.S. 1854, p. 297; Conch. Icon. xviii. Succinea, pl. XII. f. 81, a, b; Man. N.Z. Moll. p. 13; Trans. N.Z. Inst. xvii. p. 55, pl. XII. f. 9. (radula).

H a b.—North Island; Auckland (Ex Cuming Coll.), confirmed by Gillies.

28 *L. TENELLA*, Hutton, 1885.‡

R e f.—Trans. N.Z. Inst. xvii. pp. 55, 56, pl. XII. f. 4 (shell), f. 11 (radula).

H a b.—South Island; River Heathcote, near Christchurch (Hutton).

29 *L. PUSILLA*, Hutton, 1885 (emend.).*

R e f.—Trans. N.Z. Inst. xxii. p. 56, pl. XII. f. 5 (shell).

H a b.—North Island; Auckland.

* Printed originally as "pucilla."

30 *L. ALFREDI*, Suter, 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 229, pl. xv. ff. 17, a (shell); xxiv. p. 300, pl. xxiii. f. 55 (jaw), f. 56 (radula).

H a b.—South Island; Hooker Valley (Suter), Ashburton, and Lake at Arthur's Pass.

AMPHIPEPLEA, Nilsson, 1822.

Nilsson, Hist. Moll. Suec. p. 58.

31 *A. ARGUTA*, Hutton, 1885.

R e f.—Trans. N.Z. Inst. xvii. p. 54, pl. xii. f. 1 (two figures, shell and animal), f. 10 (radula).

H a b.—North Island; Auckland, Waikato, and Thames. South Island; Avon (Hutton).

32 *A. AMPULLA*, Hutton, 1885.

R e f.—Trans. N.Z. Inst. xvii. p. 55, pl. xii. f. 2 (shell), f. 8 (radula).

H a b.—North Island; Auckland, and Masterton. South Island; Arthur's Pass (Brown), Lake Lyndon and Christchurch.

var. *GLOBOSA*, Suter, 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 93, pl. xviii. f. 12, a-c (shell and animal).

H a b.—South Island; Tasman Valley (Suter) and Ashburton.

PLANORBIS, Guettard, 1756.

Guettard, Mém. Acad. Sciences de Paris, p. 51.

33 *P. CORINNA*, Gray, 1849.

R e f.—P.Z.S. 1849, p. 167; Conch. Icon. xx. Planorbis, pl. xiv. f. 122, a, b; Man. N.Z. Moll. p. 32; Trans. N.Z. Inst. xvii. p. 57, pl. xii. f. 6.

H a b.—North Island ; Auckland (Greenwood). South Island ; Lake Wakatipu and Christchurch.

BULINUS, Adanson, 1757.

Adanson, Hist. Nat. des Coq. du Senegal. p. 5.

34 B. ANTIPODEUS, Sowerby, sp. 1873.

R e f.—Conch. Icon. xix. Physa, pl. v. f. 37 ; Man. N.Z. Moll. p. 30 ; Trans. N.Z. Inst. xvii. p. 56.

H a b.—North and South Islands, in lakes.

35 B. VARIABILIS, Gray, sp. 1843.

S y n.—*guyonensis*, Tenison - Woods, 1879 ; *novaezelandiae*, Sowerby, 1873.

R e f.—Dieffenbach's New Zealand, ii. p. 248 ; Conch. Icon. xix. Physa, pl. iv. 29a, b ; P.L.S.N.S.W. (1), iii. p. 138, pl. XIII. f. 4 ; Man. N.Z. Moll. p. 31 ; Trans. N.Z. Inst. xiv. pp. 155, 156, pl. iv. f. T (jaw), ff. c, q (radula, as of *gibbosus*), xvii. p. 56, pl. XII. f. 7, &c.

H a b.—North and South Islands, in rivers and ponds.

36 B. TABULATUS, Gould, sp. 1848.

S y n.—*moesta*, H. Adams, 1861 ; *lirata*, Tenison-Woods, 1879,

R e f.—Proc. Boston Soc. N.H. ii. p. 214 ; U.S. Expl. Exped. xii. p. 116, f. 136, a, b ; P.Z.S. 1861, p. 144 ; 1889, pp. 139, 140, f. 4 (radula) ; Conch. Icon. xix. Physa, pl. III. ff. 17, a, b, pl. iv. f. 32 ; P.L.S.N.S.W. (1), iii. p. 138, pl. XIII. f. 6 ; Conch. Cab. (2), i. pt. 17, pp. 294, 299, pl. XLII. f. 4, pl. XLIII. f. 4 ; Man. N.Z. Moll. pp. 30, 31 ; Trans. N.Z. Inst. xiv. p. 156, pl. iv. f. D (radula as of *variabilis*), xvii. p. 57, pl. XII. f. 12 (radula), &c.

H a b.—North and South Islands. A mountain stream, Bay of Islands (Drayton).

N o t e.—With more exactness, *moesta* might be counted as a variety rather than as an absolute synonym of this species.

37 *B. NOVAESEELANDIÆ*, Clessin, sp. 1886.

Syn.—Not (?) *Physa novaezelandiae*, Sowerby, 1873.

Ref.—Conch. Cab. (2), i. pt. 17, p. 372, pl. LIV. f. 7.

Hab.—New Zealand (Morelet).

Note.—Clessin's negligence in choosing a preoccupied name would argue equal carelessness in ascertaining the distinctness or the home of this species.

38 *B. TENISONI*, Clessin, sp. (emend.),* 1886.

Ref.—Conch. Cab. (2), i. pt. 17, p. 371, pl. LII. f. 11.

Hab.—New Zealand (Morelet).

39 *B. COROMANDELICUS*, Dunker, sp. 1862.

Ref.—Mal. Blät. ix. p. 150.

Hab.—Coromandel Coast (Hochstetter).

40 *B. HOCHSTETTERI*, Dunker, sp. 1862.

Ref.—Mal. Blät. ix. p. 150.

Hab.—Sandspit, Massacre Bay, Nelson (Hochstetter).

Note.—These two last species appear to have been overlooked by recent authors. They are omitted from both von Martens' and Hutton's Catalogues of the N.Z. Mollusca, and neither Sowerby nor Clessin include them in their respective monographs of *Physa*. It is, however, a deed of doubtful merit to rescue from obscurity the *Bulini* of European authors.

Group STYLOMMATOPHORA.

Family TESTACELLIDÆ.

SCHIZOGLOSSA, Hedley, 1893.

Hedley, ante, p. 391.

41 *S. NOVOSEELANDICA*, Pfeiffer, sp. 1862.

Ref.—Mal. Blät. viii. p. 146; Man. N.Z. Moll, p. 12; Trans. N.Z. Inst. xvi. p. 208; P.L.S.N.S.W. (2), vii. pp. 387-391, pl. ix.

* Clessin wrote *tennissoni*, but as he evidently alluded to the late Rev. J. Tenison-Woods, the above correction is made.

ff. 1, 2 (animal), f. 3 (shell), f. 4 and pl. x. f. 9 (genitalia), f. 10 (radula), &c.

H a b.—North Island; Kakepuku (Hochstetter), Waikato, Wainuiomata and Stratford.

PARYPHANTA, Albers, 1850.

Albers, die Heliceen (1st Ed.), p. 129.

42 P. BUSBYI, Gray, sp. 1840.

R e f.—Ann. Mag. N.H. (1) vi. p. 317; Hist. Nat. Moll. pl. cii. ff. 19, 20; Conch. Icon. vii. pl. LXXIII. f. 380; Voy. Erebus and Terror, Moll. pl. i. f. 4 (two figures); U.S. Expl. Exped. xii. p. 215; Man. N.Z. Moll. p. 21; P.L.S N.S.W. (2), ii. pl. xx. f. 6 (animal); Trans. N.Z. Inst. xiv. p. 153, pl. iv. ff. A, L (radula); Man. Conch. (2), i. p. 127, pl. xxvi. ff. 23, 24, &c.

H a b.—North Island; Hokianga, Bay of Islands, Whangarei and Little Barrier Island.

43 P. HOCHSTETTERI, Pfeiffer, sp. 1862.

R e f.—Mal. Blät. viii. p. 146; Hochstetter's New Zealand, English Edition, p. 169 (woodcut of shell); Man. N.Z. Moll. p. 22; Trans. N.Z. Inst. xvi. p. 207; Man. Conch. (2), i. p. 127, &c.

H a b.—North Island; Manawatu. South Island; Collingwood (Hochstetter), Picton, Nelson and Westport.

44 P. GILLIESI, Smith, 1880.

R e f.—Ann. Mag. N.H. (5), vi. p. 159; Trans. N.Z. Inst. xvi p. 207; Man. Conch. (2), i. p. 127.

H a b.—South Island; Nelson (Gillies) and Collingwood.

45 P. LIGNARIA, Hutton, 1888.

R e f.—Trans. N.Z. Inst. xx. p. 43.

H a b.—South Island; Nelson (Gaze).

46 *P. URNULA*, Pfeiffer, sp. 1854.

Ref.—P.Z.S. 1854, p. 49; Conch. Icon. vii. pl. CLXXXVII. f. 1306; Man. N.Z. Moll. p. 22; Trans. N.Z. Inst. xvi. p. 208, xxiv. p. 236. pl. xx. f. 1 (radula); Man. Conch. (2), i. p. 128, pl. xxvi. f. 14, &c.

H a b.—North Island; Wellington.

RHYTIDA, Albers, 1860.

Albers, die Heliceen (2nd Ed.), p. 89.

47 *R. GREENWOODI*, Gray, sp. 1849.

Syn.—*gunni*, Gray, MS.

Ref.—P.Z.S. 1849, p. 165; Conch. Icon. vii. pl. LXXXI. f. 434; Man. N.Z. Moll. p. 16; Trans. N.Z. Inst. xvi. pp. 167, 208, pl. x. f. p (radula); Man. Conch. (2), i. p. 126, pl. xxiv. f. 74, &c.

H a b.—North Island; Auckland (Greenwood), Hawke's Bay, Pukekohe and Taupiri Mt.

48 *R. DUNNIE*, Gray, sp. 1840.

Ref.—Ann. Mag. N.H. (1), vi. p. 317; Conch. Icon. vii. pl. LXXX. f. 425; Voy. Erebus and Terror, ii. Moll. pl. i. f. 7 (two figures); Conch. Cab. (2), i. pt. 2, pl. cxxvii. ff. 33-35; Man. N.Z. Moll. p. 16; Trans. N.Z. Inst. xvi. p. 208; Man. Conch. (2), i. p. 126, pl. xxiv. f. 73, &c.

H a b.—North Island; Bay of Islands, Thames, Auckland, Whangarei and Howick.

var. BETA, Pfeiffer, 1853.

Mon. Hel. Viv. iii. p. 160; Man. Conch. (2), i. p. 126.

49 *R. PATULA*, Hutton, 1883.

Ref.—Trans. N.Z. Inst. xv. p. 138, xvi. pp. 167, 208, pl. x. f. q (radula).

H a b.—South Island; Greymouth (Helms), Balclutha and Boatman's.

50 R. CITRINA, Hutton, 1883.

R e f.—Trans. N.Z. Inst. xv. p. 139 ; xvi. pp. 167, 208, pl. x. f. R (radula).

H a b.—South Island ; Greymouth (Helms), Buller River.

51 R. AUSTRALIS, Hutton, 1883.

R e f.—Trans. N.Z. Inst. xv. p. 139 ; xvi. pp. 167, 208, pl. x. f. S (radula).

H a b.—Stewart's Island (T. Kirk).

52. R. MEESONI, Suter, 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 84, pl. xvi. ff. 1, 1a, 1b (shell), f. A (radula).

H a b.—South Island ; Wairoa Gorge, Nelson (Meeson), Kenepuru Sound.

RHENEA, Hutton, nov.gen.*

(= *Elæa*, Hutton, 1884, not of Ziegler, 1833.)

53 R. CORESIA, Gray, sp. 1849.

R e f.—P.Z.S. 1849, p. 166 ; Conch. Icon. vii. pl. cxxxii. f. 807 ; Conch. Cab. (2), i. pt. 2. pl. clv. ff. 23-26 ; Man. N.Z. Moll. p. 24 ; Trans. N.Z. Inst. xvi. pp. 172, 207, pl. xi. f. E (radula) ; Man. Conch. (2), i. p. 130, pl. xxvi. f. 15, &c.

H a b.—North Island ; Auckland (Greenwood), Wellington, Forty Mile Bush, Thames, Whangarei, Hunua Range and Pirongia Mt.

54 R. JEFFREYSIANA, Pfeiffer, sp. 1852.

R e f.—P.Z.S. 1852, p. 148 ; Conch. Icon. vii. pl. cxxx. f. 788 ; Man. N.Z. Moll. p. 24 ; Trans. N.Z. Inst. xvi. pp. 172, 208, pl. xi. f. F (radula) ; Man. Conch. (2), i. p. 129, pl. xxvi. f. 26, &c.

H a b.—North Island ; Auckland, Thames and Hunua Range.

* As the name *Elæa* is preoccupied for a group of *Neritina*, Messrs. Hedley and Suter have allowed me the present opportunity of changing it.—F. W. HUTTON.

Fam. BULIMIDÆ.

PLACOSTYLUS, Beck, 1837.

Beck, Index Moll. p. 57.

55 *P. BOVINUS*, Bruguière, sp. 1792.

Syn.—*shougii*, Lesson, 1830.

Ref.—Encyl. Méthod. i. p. 345; Voy. de la Coquille, Zool. i. p. 321, pl. vii. ff. 4, 5; U.S. Expl. Exped. xii. p. 79, ff. 85, a, b (animal); Conch. Icon. v. Bulimus, pl. xxiv. f. 159; Man. N.Z. Moll. p. 14; Trans. N.Z. Inst. xiii. p. 200, xiv. p. 152, pl. III. f. D (radula), f. O (jaw); xvi. p. 190, pl. IX. f. B (radula); Conch. Cab. (2), i. pt. 13a, p. 36, pl. IX. f. 1, &c.

H a b.—North Island; North Cape, Cape Maria, Bay of Islands and Wangaroa.

var. *NOVOSEELANDICUS*, Pfeiffer, 1862.

Ref.—Mal. Blät. viii. p. 149; Man. N.Z. Moll. p. 14; Trans. N.Z. Inst. xvi. p. 190, &c.

H a b.—North Island; Whangaruru, Bay of Islands (Hochstetter) and Whangarei.

var. *CANDIDUS*, Crosse, 1864.

Ref.—Journ. de Conch. xii. p. 125; Trans. N.Z. Inst. xvi. p. 190.

H a b.—North Island; Cape Maria.

56 *P. (?) ANTIPODARUM*,* Gray, sp. 1843.

Ref.—Dieffenbach's New Zealand, ii. p. 247; Voy. Erebus and Terror, ii. Moll. p. 3, pl. I. f. 5; Man. N.Z. Moll. p. 15; Trans. N.Z. Inst. xvi. p. 190, &c.

H a b.—North Island; Kaitaia (Dieffenbach), North Cape, Bream Head, Manawatu, Auckland and Waitatiora.

* Kobelt considers, I believe rightly, that this represents the young of *P. bovinus*.—C. H.

CARTHEA,* Hutton, 1883.

Hutton, Trans. N.Z. Inst. xvi. p. 189.

57 C. KIVI, Gray, sp. 1843.

Syn.—*irradiata*, Gould, 1848; *radiaria*, Pfr. 1854.

Ref.—Dieffenbach's New Zealand, ii. p. 262; Proc. Boston N.H.S. ii. p. 178; P.Z.S. 1854, p. 55; U.S. Expl. Exped. xii. p. 34, pl. v. ff. 65, a, b, c; Mon. Austr. Land Shells, p. 35, pl. xx. ff. 10, 10a, 10b; Conch. Icon. vii. pl. cxxx. f. 794, pl. CLXXXIX. f. 1322; Voy. Erebus and Terror, ii. Moll. pl. i. f. 1 (two figures); Man. N.Z. Moll. p. 20; Trans. N.Z. Inst. xvi. pp. 170, 189, pl. ix. f. A (radula), pl. xi. f. 1 (3 figs. jaw); Man. Conch. (2), iii. p. 37, pl. XXI. ff. 8-10, &c.

H a b.—North Island: Auckland, Hokianga, Great Omaha, Titirangi, Napier, Wellington, Thames, Ohaupo, Whangarei, Hunua Range, Pirongia Mt. and Taupiri.

N o t e.—This species has been wrongly ascribed to Australia; it is allied to *H. flosculus*, Cox, from Norfolk Island. After comparison of the types in the British Museum, Mr. Smith writes to us that *radiaria*, Pfr., is identical with *kivi*, Gray, and that the locality attached to the former is most doubtful.

Fam. ZONITIDÆ.

HELICARION, Férussac, fil. 1822.

A. E. Férussac, Tableau system. des anim. Moll. p. 31.

58 H. ULTIMUS, Mousson, sp. 1873.

Syn.—*kermadecensis*, Smith, 1873.

Ref.—Journ. de Conch. xxi. p. 110, pl. VII. f. 1 (2 figs.); Ann. Mag. N.H. (4), xi. p. 288; Trans. N.Z. Inst. xvi. p. 204; Man. Conch. (2), i. p. 158, pl. xxxv. ff. 9, 10, &c.

H a b.—Kermadecs; Raoul. North Island; Hobson's Glen, Auckland.

N o t e.—Mousson's name has absolutely no priority over Smith's, both having been published in April of the same year.

* A genus of doubtful affinities, provisionally referred to this family.

Since, however, Mousson's description was illustrated by excellent figures, while Smith's species was unfigured, no one can doubt the justice of adopting the nomenclature of the former in preference to that of the latter.

OTOCONCHA, Hutton, 1884.

Hutton, Trans. N.Z. Inst. xvi. p. 199.

59 O. DIMIDIATA,* Pfeiffer, sp. 1852.

R e f.—P.Z.S. 1852, p. 56; Conch. Icon. xii. Vitrina, pl. x. f. 72; Man. N.Z. Moll. p. 12; Trans. N.Z. Inst. xvi. pp. 166, 199, pl. ix. f. Y (radula), pl. xi. f. o (jaw), xxiii. p. 94; Man. Conch. (2), i. p. 181, pl. XLII. f. 22, &c.

H a b.—North Island: Auckland, Thames, Hawke's Bay, Wellington, and Forty Mile Bush. South Island: Boatman's and Dyer's Pass.

MICROCYSTIS, Beck, 1837.

Beck, Index Moll. p. 2.

60 M. KERMADECI, Pfeiffer, sp. (emend.†), 1856.

R e f.—P.Z.S. 1856, p. 326; Journ. de Conch. xxi. p. 111, &c
H a b.—Kermadecs; Raoul (Lt. Chimmo).

TROCHONANINA, Mousson, 1869.

Mousson, Journ. de Conch. xvii. p. 330.

61 T. EXPOSITA, Mousson, 1873.

R e f.—Journ. de Conch. xxi. p. 111, pl. vii. f. 2 (two figures); Man. Conch. (2), ii. p. 47, pl. XXIII. f. 60.

H a b.—Kermadecs; Raoul.

* I am of the opinion that this mollusc belongs to the genus *Vitrinoides*, Semper; the anatomy of the Philippine and the New Zealand species should be compared.—H. S.

† Originally misspelt *kermandeci*.

PHACUSSA, Hutton, 1883.

Hutton, Trans. N.Z. Inst. xv. p. 138.

62 P. HYPOPOLIA, Pfeiffer, sp. 1852.

Ref.—P.Z.S. 1852, p. 148; Conch. Icon. vii. pl. cxxx, f. 787; Conch. Cab. (2), i. pt. 2, p. 496, pl. clxi. ff. 18, 20; Man. N.Z. Moll. p. 6; Trans. N.Z. Inst. xvi. p. 205, xxiv. p. 286, pl. xx. ff. 2, 3 (jaw), f. 4 (radula); Man. Conch. (2) ii. pp. 181, 212, pl. liv. f. 15, &c.

H a b.—North Island; Hawke's Bay and Wellington. South Island; Bealey, Dunedin, Hooker Valley and Boatman's.

63 P. HELMSI, Hutton, sp. 1883.

Ref.—Trans. N.Z. Inst. xv. pp. 137, 138, xvi. pp. 172, 205. pl. x. f. i (radula), pl. xi. f. w (jaw).

H a b.—South Island; Greymouth (Helms).

var. MACULATA, Hutton, 1884.

Ref.—Trans. N.Z. Inst. xvi. p. 205.

H a b.—South Island; Greymouth (Helms).

64. P. FULMINATA, Hutton, sp. 1883.

Ref.—Trans. N.Z. Inst. xv. p. 138; xvi. pp. 173, 206, pl. x. f. j (radula).

H a b.—Stewart Island (T. Kirk).

THALASSOHELIX, Pilsbry, 1892.

Pilsbry, Nautilus, vi. (Sept. 1892), No. 5, p. 56.

65. T. ZICZAC, Gould, sp. 1848.

S y n.—*portia*, Gray, 1849; *kappa*, Pfeiffer, 1852; *collyrula*, Reeve, 1852.

Ref.—Proc. Boston Soc. Nat. Hist. ii. p. 166; U.S. Expl. Exped. xii. p. 41, ff. 44a, 44b, 44c; P.Z.S. 1849, p. 165, 1852, p. 58; Conch. Icon. vii. pl. cxxxi. f. 806, pl. cxxxii. f. 811; Conch. Cab. (2), i. pt. 2, p. 455, pl. cliv. ff. 15-18, 25-26; Mon. Aust. Land Shells, p. 18, pl. xix. ff. 11, 11a; Man. N.Z. Moll. pp. 7, 10;

Trans. N.Z. Inst. xvi. pp. 165, 200, 201, 203, pl. ix. f. T (radula); Man. Conch. (2), i. p. 252, pl. lx. ff. 70, 72, ii. pp. 210, 213, pl. lxii. ff. 35-37, 56, pl. lxiii. ff. 60-62, viii. p. 69, &c.

H a b.—North Island; a crater near Taiaimi (Pickering), Auckland, Thames, Pahautanui and Hunua Range.

N o t e.—Erroneously reported from Australia.

66. T. IGNIFLUA, Reeve, sp. 1852.

S y n.—*lambda*, Pfeiffer, 1852 (? 1853).

R e f.—Conch. Icon. vii. pl. cxxviii. f. 774; P.Z.S. 1852, p. 57; Man. N.Z. Moll. p. 11; Trans. N.Z. Inst. xiv. p. 151, pl. iii. f. M (jaw), c (radula), pl. iv. f. I (radula), xvi. pp. 165, 203, pl. x. f. H (radula); Man. Conch. (2), i. p. 129, pl. xxvi. f. 25, &c.

H a b.—North Island; Napier. South Island; Rangitira Bush, Temuka, Oxford, Dunedin, Hamilton, Burke's Pass, Dyer's Pass, and Riccarton Bush.

* var. OBNUBILA, Reeve, 1852.

S y n.—*sigma*, Pfeiffer, MS.

R e f.—Conch. Icon. vii. pl. cxxx. f. 792; Mon. Hel. Viv. iv. p. 98; Man. N.Z. Moll. p. 9, &c.

H a b.—New Zealand.

N o t e.—This species with Nos. 90, 94, 145, 147, 158, 164, 166 and 167 were published by Reeve in October, 1852. Pfeiffer's descriptions probably did not appear till the following year. Since in 1853 Pfeiffer was unable to quote with precision in the Mon. Hel. Viv. iii. his own species contained in the P.Z.S. 1852, it is reasonable to suppose that that volume was not then printed.

67 T. PROPINQUA, Hutton, sp. 1883.

R e f.—Trans. N.Z. Inst. xv. p. 137, xvi. pp. 169, 203, pl. x. f. G (radula), pl. xi. f. V (jaw); Man. Conch. (2), viii. p. 72, pl. xxii. ff. 55-57 (shell).

H a b.—North Island; Auckland, Hawke's Bay, Dannevirke. South Island; Weka Pass (Chilton), Southland.

* I differ from my colleague in his valuation of *obnubila*, and regard it not as a variety but as an absolute synonym of *igniflua*.—H. S.

68 *T. ZELANDIÆ*, Gray, sp. 1843.

R e f.—Dieffenbach's New Zealand, ii. p. 247; Conch. Icon. vii. pl. cxxix. f. 780; Man. N.Z. Moll. p. 19; Trans. N.Z. Inst. xvi. pp. 169, 203, pl. x. f. e. (radula); Man. Conch. (2), ii. p. 214, pl. LXIII. ff. 63, 64, &c.

H a b.—North Island; Auckland, Wellington, Wanganui, Napier, Thames, Whangarei, Howick, Hunua Range, and Pirongia Mt.

var. *ANTIPODA*, Hombron and Jacquinot, 1854.

R e f.—Voy. Pôle Sud, Zool. v. p. 18, pl. vi. ff. 13-16; Man. N.Z. Moll. p. 19; Trans. N.Z. Inst. xvi. pp. 169, 204, pl. x. f. F (radula); Man. Conch. (2), ii. p. 214, pl. LXIII. ff. 65-67, &c.

H a b.—South Island; Greymouth. Chatham Islands. Auckland Islands (Homb. and Jacq.).

69 *T. (?) AUCLANDICA*, Le Guillou, sp. 1842 (emend.*).

R e f.—Revue Zoologique, v. p. 140; Man. N.Z. Moll. p. 19; Trans. N.Z. Inst. xvi. p. 204, &c.

H a b.—Auckland Islands (Le Guillou).

GERONTIA, Hutton, 1883.

Hutton, Trans. N.Z. Inst. xv. p. 135.

70 *G. PANTHERINA*, Hutton, 1883.

R e f.—Trans. N.Z. Inst. xv. p. 135, xvi. pp. 166, 200, pl. ix. f. I (radula), pl. xi. f. R (jaw); Man. Conch. (2), viii. p. 65, ix. pl. III. ff. 1-3 (shell).

H a b.—South Island; Greymouth (Helms), and Boatman's.

71 *G. CORDELIA*, Hutton, 1883.

R e f.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 178, 200; Man. Conch. (2), viii. p. 66, pl. XXII. ff. 34-36 (shell).

H a b.—North Island; Auckland (Cheeseman).

* Originally written "auklandica."

ALLODISCUS, Pilsbry, 1892.

[= *Psyra*, Hutton, 1884, not of Stal. 1876.]

Pilsbry, Nautilus, vi. (Sept. 1892), No. v. p. 56.

72 A. DIMORPHUS, Pfeiffer, sp. 1852.

Ref.—P.Z.S. 1852, p. 148; Conch. Icon. vii. pl. cxxviii. f. 775; Man. N.Z. Moll. p. 6; Trans. N.Z. Inst. xvi. pp. 161, 201, pl. ix. f. v (radula); Man. Conch. (2), ii. p. 211, pl. lxii. f. 39, &c.

H a b.—North Island; Auckland, Thames, Wellington, Ohaupo and Forty Mile Bush.

73 A. VENULATUS, Pfeiffer, sp. 1857.

Ref.—P.Z.S. 1857, p. 108; Man. N.Z. Moll. p. 10; Trans. N.Z. Inst. xvi. pp. 165, 201, pl. xi. f. v (jaw), &c.

H a b.—South Island; Western slope of Mt. Cook, Greymouth, and Boatman's.

74 A. CASSANDRA, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 181, 201; Man. Conch. (2), viii. p. 66, pl. xxii. ff. 37-39. (shell).

H a b.—North Island; Napier.

75 A. TULLIA, Gray, sp. 1849.

Ref.—P.Z.S. 1849, p. 165; Conch. Icon. vii. pl. ccvii. f. 1460; Man. N.Z. Moll. p. 5; Trans. N.Z. Inst. xvi. p. 201, xxiv. p. 291, pl. xxi. f. 18 (jaw), f. 19 (radula); Man. Conch. (2), ii. p. 211, pl. lxii. f. 40, &c.

H a b.—North Island; Auckland (Greenwood), Wellington, Forty Mile Bush, Ohaupo, Pirongia Mt., Hawke's Bay. South Island; Greymouth, Oxford, Canterbury, Riccarton Bush, Hooker Valley and Albury.

76 A. PLANULATUS, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 477; Trans. N.Z. Inst. xvi. pp. 181, 202, pl. ix. f. j (radula); Man. Conch. (2), viii. p. 67, ix. pl. iii. ff. 4-6 (shell).

H a b.—North Island ; Auckland (Cheeseman), Thames, Forty Mile Bush and Hawke's Bay. South Island ; Greymouth, Boatman's, St. Helens, and Amuri.

77 A. ADRIANA, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 476 ; Trans. N.Z. Inst. xvi. pp. 175, 201 ; Man. Conch. (2), viii. p. 67.

H a b.—North Island ; Napier, Forty Mile Bush and Pirongia Mt. South Island ; Banks' Peninsula (Broun).

78 A. MIRANDUS, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 476 ; Trans. N.Z. Inst. xvi. pp. 180, 181, 202, pl. ix. f. w (radula), pl. xi. f. s (jaw) ; Man. Conch. (2), viii. p. 68, pl. xxii. ff. 40-42 (shell).

H a b.—North Island ; Forty Mile Bush, Pirongia Mt., Hunua Range and Hawke's Bay. South Island ; Greymouth (Helms), Queenstown, Boatman's and Bealey.

79 A. GODETI, Suter, sp. 1891.

Ref.—Trans. N.Z. Inst. xxiii. p. 90, pl. xvii. ff. 8, 8a, 8b (shell), f. o (jaw), f. p (radula) ; Man. Conch. (2), viii. p. 68, pl. xxii. ff. 43-45.

H a b.—South Island ; Hooker Valley (Suter).

80 A. WAIROAENSIS, Suter, n.sp.

This species will be figured and described in the next volume of these Proceedings.

H a b.—South Island ; Wairoa Gorge, Nelson.

81 A. URQUHARTI, Suter, n.sp.

This novelty will be published with the foregoing.

H a b.—North Island ; Pirongia Mt. (Urquhart) and Hunua Range.

PYRRHA, Hutton, 1884.

Hutton, Trans. N.Z. Inst. xvi. p. 200.

82 *P. CRESSIDA*, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 178, 200, pl. ix. f. x (radula), pl. xi. f. n (jaw); Man. Conch. (2), viii. p. 72, ix. pl. iii. ff. 17-19 (shell).

H a b.—North Island; Wellington. South Island; Southland (Thomson), Preservation Inlet, Haast River and Greymouth. Stewart Island.

THERASIA, Hutton, 1883.

Hutton, N.Z. Journ. Sci. i. p. 477.

83 *T. CELINDE*, Gray, sp. 1849.

Ref.—P.Z.S. 1849, p. 164; Conch. Icon. vii. pl. cxxxi. f. 799; Man. N.Z. Moll. p. 6; Trans. N.Z. Inst. xvi. pp. 162, 202, pl. ix. f. o (radula), pl. xi. f. u (jaw); Man. Conch. (2), ii. p. 211, pl. LXII. f. 41, &c.

H a b.—North Island; Auckland (Greenwood), Thames, Whangarei, Ohaupo, Hunua Range and Pirongia Mt.

84 *T. VALERIA*, Hutton, 1883.

Ref.—N.Z. Journ. Sci. i. p. 477; Trans. N.Z. Inst. xiv. p. 151, pl. III. f. B (radula, as of *P. hypopolia*), xvi. pp. 183, 202, pl. ix. f. n (radula); Man. Conch. (2), viii. p. 69, pl. xxii. ff. 46-48 (shell).

H a b.—South Island; Dunedin (Hutton), Akaroa, Dyer's Pass and Riccarton Bush.

85. *T. OPHELIA*, Pfeiffer, sp. 1854.

Ref.—P.Z.S. 1854, p. 146; Conch. Icon. vii. pl. cxci. f. 1345; Mon. Aust. Land Shells, p. 34, pl. ix. f. 4; Man. N.Z. Moll. p. 18; Trans. N.Z. Inst. xvi. p. 202; Man. Conch. (2), ii. p. 211, pl. LXII. f. 42, &c.

H a b.—North Island; Bay of Islands, and Auckland. South Island; Dunedin, Dyer's Pass, Waipara, Lake Guyon, Castle Rock, Southland, Waitaki and Hurunui.

N o t e.—Erroneously reported from Australia.

86 *T. TAMORA*, Hutton, 1883.

Ref.—N.Z. Journ. Sci. i. p. 477; Trans. N.Z. Inst. xvi. pp. 182, 202; Man. Conch. (2), viii. p. 70, pl. xxii. ff. 49-51.

H a b.—North Island; Auckland (Cheeseman), Thames, Whangarei, Ohaupo, Forty Mile Bush, Hunua Range, Pirongia Mt. and Hawke's Bay.

87 *T. THAISA*, Hutton, 1883.

Ref.—N.Z. Journ. Sci. i. p. 477; Trans. N.Z. Inst. xvi. pp. 182, 202, pl. ix. f. M (radula), pl. xi. f. T (jaw); Man. Conch. (2), viii. p. 70, ix. pl. iii. ff. 14-16 (shell).

H a b.—North Island; Auckland, Napier, Wellington, Forty Mile Bush and Whangarei. South Island; Southland (Thomson), Waipara, Waitaki, Queenstown, Lake Guyon, Dunedin, Wairoa Gorge, Nelson, Mt. Linton and Castle Rock.

88 *T. DECIDUA*, Pfeiffer, sp. 1857.

Ref.—P.Z.S. 1857, p. 108; Man. N.Z. Moll. p. 6; Trans. N.Z. Inst. xvi. p. 203, xxiv. p. 291, pl. xxi. f. 16 (jaw), f. 17 (radula); Man. Conch. (2), viii. p. 71, pl. xxii. ff. 52-54 (shell), &c.

H a b.—North Island; Auckland, Thames, Wangaruru and Wellington. South Island; Hooker Valley, St. Helens, Amuri and Wairoa Gorge, Nelson.

89 *T. TRAVERSI*, E. A. Smith, sp. 1884.

Ref.—P.Z.S. 1884, p. 274, pl. xxiii. ff. 16, a, b; Man. Conch. (2), ii. p. 214, pl. lxiii. ff. 68-70, viii. p. 71.

H a b.—North Island; Wairarapa (Travers), Forty Mile Bush, Ohaupo and Pirongia Mt.

Note.—The dentition of this species, which has been examined by one of us and which will be described at an early date, associates it with members of *Therasia*.

PHENACOHELIX, Suter, 1892.

Suter, Trans. N.Z. Inst. xxiv. p. 270.

90 *P. PILULA*, Reeve, sp. 1852.

Syn.—*iota*, Pfeiffer, 1852 (? 1853).

R e f.—Conch. Icon. vii. pl. cxxxii. f. 809 ; P.Z.S. 1852, p. 57 ; Man. N.Z. Moll. p. 6 ; Trans. N.Z. Inst. xvi. pp. 161, 194, pl. ix. f. κ (radula), pl. xi. f. μ (jaw) ; Man. Conch. (2), ii. p. 212, pl. LXII. f. 43, &c.

H a b.—North Island ; Auckland, Hawke's Bay, Wanganui, Wellington, Thames, Forty Mile Bush, Whangarei, Ohaupo, Hunua Range, Heretaunga, Pirongia and Taupiri Mounts. South Island ; West Coast, Bealey, Queenstown, Lake Guyon, Owaka, Dyer's Pass, Eyreton, Canterbury and Riccarton Bush.

91 *P. GRANUM*, Pfeiffer, sp. 1857.

R e f.—P.Z.S. 1857, p. 107 ; Man. N.Z. Moll. p. 20 ; Trans. N.Z. Inst. xvi. pp. 170, 194, pl. ix. f. L (radula),* &c.

H a b.—North Island ; Taupiri Mt., Hunua Range and Waimarama.

92 *P. CHORDATA*, Pfeiffer, sp. 1862.

R e f.—Mal. Blät. viii. p. 147 ; Man. N.Z. Moll. p. 5 ; Trans. N.Z. Inst. xvi. p. 194, &c.

H a b.—North Island ; Forty Mile Bush, Whangarei and Auckland.

SUTERIA, Pilsbry, 1892.

[= *Patulopsis*, Suter, 1891, not of Strebel, 1879.]

Pilsbry, Nautilus, vi. (Sept. 1892), No. 5, p. 56.

93 *S. IDE*, Gray, sp. 1849.

R e f.—P.Z.S. 1849, p. 166 ; Conch. Icon. vii. pl. cxxx. f. 789 ; Conch. Cab. (2), i. pt. 2, p. 460, pl. clv. ff. 34-36 ; Man. N.Z. Moll. p. 9 ; Trans. N.Z. Inst. xvi. pp. 164, 200, pl. ix. f. σ (radula) ; Man. Conch. (2), ii. p. 210, pl. LXII. ff. 32, 34, &c.

H a b.—North Island ; Auckland (Greenwood), Napier, Wellington, Forty Mile Bush, Thames, Titirangi, Pirongia Mt., Hunua Range and Heretaunga. South Island ; Greymouth, Wairoa Gorge, Nelson and Boatman's.

* The description of the animal and dentition here quoted refer, in my opinion, to the South Island variety of *P. pilula*. I have seen no specimens of what I consider to be *P. granum* from the South Island.—H. S.

FLAMMULINA, von Martens, 1873.

Von Martens, Critical List of N.Z. Mollusca, p. 12.

94 F. COMPRESSIVOLUTA, Reeve, sp. 1852.

Syn.—*omega*, Pfeiffer, 1852 (? 1853).

Ref.—Conch. Icon. vii. pl. cxxx. f. 791; P.Z.S. 1852, p. 56; Man. N.Z. Moll. p. 10; Trans. N.Z. Inst. xvi. p. 198, xxiv. p. 288, pl. xx. f. 8 (jaw), f. 9 (radula); Man. Conch. (2), i. p. 128; pl. xxvi. f. 28, &c.

Hab.—North Island; Hawke's Bay, Wellington, Forty Mile Bush and Heretaunga.

95 F. CORNEA, Hutton, sp. 1883.

Ref.—Trans. N.Z. Inst. xv. p. 136, xvi. pp. 171, 198, pl. x. f. A (radula); Man. Conch. (2), viii. p. 75, pl. xxii. ff. 64-66 (shell).

Hab.—North Island; Auckland (Cheeseman), Thames and Orakei.

96 F. ZEBRA, Le Guillou, sp. 1842.

Syn.—*phlogophora*, Pfeiffer, 1849; *flammigera*, Pfeiffer, 1852; and *multilimbata*, Hombron and Jacquinot, 1854.

Ref.—Revue Zoologique, v. p. 136; P.Z.S. 1849, p. 127, 1852, p. 147; Conch. Cab. (2), i. pt. 2, p. 456, pl. clv. ff. 1-4; Voy. Pôle Sud, Zool. v. p. 16, pl. vi. ff. 5-8; Conch. Icon. vii. pl. cxxx. f. 790; Man. N.Z. Moll. pp. 12, 22; Trans. N.Z. Inst. xvi. pp. 17, 198, pl. ix. f. z (radula), pl. xi. f. P (jaw); Man. Conch. (2), i. p. 128, pl. xxvi. f. 10, &c.

Hab.—North Island; Wellington, Forty Mile Bush and Pirongia Mt. South Island; Greymouth, Oxford, Banks' Peninsula, Akaroa, Riccarton Bush and Boatman's. Auckland Islands (Le Guillou).

97 F. JACQUENETTA, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 179, 180, 198, pl. x. f. c. (radula); Man. Conch. (2), viii. pl. 76, pl. xxii. ff. 70-72 (shell).

Hab.—South Island; Greymouth (Helms).

98 F. PERDITA, Hutton, sp. 1883.

R e f.—N.Z. Journ. Sci. i. p. 476 ; Trans. N.Z. Inst. xvi. p. 179, 198, pl. xi. f. c (radula), f. q (jaw) ; Man. Conch. (2), viii. p. 76, pl. xxii. ff. 73-75 (shell).

H a b.—North Island ; Auckland (Cheeseman), Wanganui, Wellington, Thames, Whangarei, Ohaupo, Hunua Range and Pirongia Mt. South Island ; Greymouth, Wairoa Gorge, Nelson and Akaroa.

99 F. CREBRIFLAMMIS, Pfeiffer, sp. 1852.

S y n.—*infundibulum*, Hombron and Jacquinot, 1854.

R e f.—P.Z.S. 1852, p. 148 ; Conch. Icon. vii. pl. cxxxi. f. 805 ; Voy. Pôle Sud, Zool. v. p. 20, pl. vi. ff. 25-28 ; Conch. Cab. (2), i. pt. 2. p. 456, pl. clv. ff. 5-8 ; Man. N.Z. Moll. p. 24 ; Trans. N.Z. Inst. xvi. pp. 171, 199, pl. xi. f. g (radula) ; Man. Conch. (2), i. p. 130, pl. xxvi. f. 9, &c.

H a b.—North Island ; (?) Waikato. South Island ; Greymouth, Wairoa Gorge, Nelson, Riccarton Bush and Akaroa.

100 F. CORNEO-FULVA, Pfeiffer, sp. 1862.

R e f.—Mal. Blät. viii. p. 148 ; Nov. Conch. iii. pl. lxxviii. ff. 11-13 ; Man. N.Z. Moll. p. 12 ; Trans. N.Z. Inst. xxiv. p. 287, pl. xx. f. 5, 5a, 5b (shell), f. 6 (jaw), f. 7 (radula) ; Man. Conch. (2), viii. p. 76, pl. xxii. ff. 67-69, &c.

H a b.—North Island ; Bay of Islands (Hochstetter). South Island ; Nerger Range, Canterbury.

101 F. NOVARE, Pfeiffer, sp. 1862.

R e f.—Mal. Blät. viii. p. 148 ; Man. N.Z. Moll. p. 13 ; Trans. N.Z. Inst. xvi. p. 205, &c.

H a b.—North Island ; Bay of Islands (Hochstetter), Lake St. John, Auckland.

102 F. CHIRON, Gray, sp. 1849.

R e f.—P.Z.S. 1849, p. 166 ; Conch. Icon. vii. pl. cxxxi. f. 797 ; Man. N.Z. Moll. p. 23 ; Trans. N.Z. Inst. xvi. pp. 171, 199, pl. x.

f. B (radula), xxiv. p. 289, pl. xx. f. 10, 10a, 10b (shell), f. 11 (jaw), f. 12 (radula); Man. Conch. (2), i. p. 129, pl. xxvi. f. 19, &c.

H a b.—North Island; Auckland (Greenwood), Wellington, Forty Mile Bush, Thames and Hunua Range.

Subgenus CALYMNA, Hutton, 1884.

Hutton, Trans. N.Z. Inst. xvi. p. 199.

103 F. COSTULATA, Hutton, sp. 1883.

R e f.—Trans. N.Z. Inst. xv. p. 136, xvi. pp. 171, 199, pl. x. f. D (radula); Man. Conch. (2), viii. p. 73, ix. pl. III. ff. 20-22 (shell).

H a b.—North Island; Auckland (Cheeseman), Thames, Ohaupo and Hawke's Bay.

104 F. LAVINIA, Hutton, sp. 1883.

R e f.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 180, 199; Man. Conch. (2), viii. p. 74.

H a b.—North Island; Palmerston North (T. W. Kirk).

105 F. OLIVACEA, Suter, sp. 1892.

R e f.—Trans. N.Z. Inst. xxiv. p. 290, pl. XXI. ff. 13, 13a, 13b (shell), f. 14 (jaw), f. 15 (radula); Man. Conch. (2), viii. p. 75, pl. XXII. ff. 61-63.

H a b.—North Island; Hillyer's Creek near Auckland (Musson).

106 F. FEREDAYI, Suter, sp. 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 91, pl. XVIII. ff. 10, 10a, 10b (shell), f. Q (jaw), f. R (radula); Man. Conch. (2), viii. p. 74 pl. XXII. ff. 58-60.

H a b.—North Island; Forty Mile Bush (Suter) and Hunua Range.

var. GLACIALIS, Suter, 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 92.

H a b.—South Island; Hooker Valley (Suter).

LAOMA, Gray, 1849.

Gray, P.Z.S. 1849, p. 167.

107 L. LEIMONIAS, Gray, 1849.

Ref.—P.Z.S. 1849, p. 167; Conch. Icon. vii. pl. cxxxiii. f. 820; Man. N.Z. Moll. p. 21; Trans. N.Z. Inst. xvi. p. 195; Man. Conch. (2), iii. p. 68, pl. xiii. f. 55, &c.

H a b.—North Island; Auckland (Greenwood), Howick, Hunua Range, Thames, Ohaupo, Pirongia Mt. and Hawke's Bay.

108 L. POECILOSTICTA, Pfeiffer, sp. (emend.*) 1852.

Ref.—P.Z.S. 1852, p. 147; Conch. Icon. vii. pl. cxxii. f. 815; Conch. Cab. (2), i. pt. 2. p. 470, pl. clvi. ff. 11-13; Man. N.Z. Moll. p. 17; Trans. N.Z. Inst. xvi. pp. 168, 195; Man. Conch. (2), iii. p. 68, pl. xiii. f. 56, &c.

H a b.—North Island; Auckland, Thames, Whangarei, Hunua Range, Pirongia Mt., Taupiri Mt., Napier and Wellington.

Note.—*L. poecilosticta* is an almost exact miniature of *Nanina insculpta*, Pfr., from Norfolk Island.

109 L. MARINA, Hutton, sp. 1883.

Syn.—*nerissa*, Hutton, 1883 (juv.).

Ref.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 176, 196, xxiv. pp. 283, 284 (cut of armature of aperture), 298 pl. xxiii. f. 41 (jaw), f. 42 (radula); Man. Conch. (2), viii. p. 57, pl. xxiii. ff. 17-20 (shell), &c.

H a b.—North Island; Auckland (Cheeseman), Forty Mile Bush, Thames, Hunua Range, Pirongia Mt. and Hawke's Bay.

110 L. PIRONGIAENSIS, Suter, n.sp.

Will be introduced in the next volume of these Proceedings.

H a b.—North Island; Pirongia Mt. (Urquhart).

* Misprinted "poecilocostata" in P.Z.S. 1852, p. 149, but written "poecilosticta" in the Mon. Hel. Viv. iii. p. 59 (probably the first published description), and formally corrected, Mon. Hel. Viv. iv. p. 36.

Subgenus PHRIXGNATHUS, Hutton, 1883.

Hutton, Trans. N.Z. Inst. xv. p. 136.

111 L. MARIAE, Gray, sp. 1843.

Syn.—*umbraculum*, Pfeiffer, 1852.

Ref.—Dieffenbach's New Zealand, ii. p. 262; P.Z.S. 1852, p. 147; Conch. Icon. vii. pl. cxxxi. f. 804; Conch. Cab. (2), i. pt. 2, p. 462, pl. clv. ff. 40-42; Voy. Erebus and Terror, ii. Moll. pl. 1. f. 2 (two figures); Man. N.Z. Moll. p. 25; Trans. N.Z. Inst. xvi. pp. 172, 196, pl. ix. f. R (radula); Man. Conch. (2), iii. p. 37, pl. xxi. f. 11, &c.

Hab.—North Island; Auckland, Wellington, Forty Mile Bush, Thames, Whangarei, Ohaupo, Hunua Range, Pirongia Mt. and Heretaunga.

112 L. CONELLA, Pfeiffer, sp. 1862.

Ref.—Mal. Blät. viii. p. 147; Man. N.Z. Moll. p. 17; Trans. N.Z. Inst. xvi. pp. 168, 196; Man. Conch. (2), viii. p. 58, pl. xxiii. f. 16 (shell), &c.

Hab.—North Island; Kakepuku (Hochstetter), Auckland, Thames, Ohaupo, Forty Mile Bush, Horokiwi, Wellington, Hunua Range, Heretaunga and Waimarama.

113. L. ARIEL, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 177, 196; Man. Conch. (2), viii. p. 59.

Hab.—North Island; Auckland (Cheeseman), Wanganui, Whangarei, Pirongia Mt. and Ohaupo.

114 L. MARGINATA, Hutton, sp. 1883.

Ref.—Trans. N.Z. Inst. xv. p. 137, xvi. pp. 168, 196, pl. ix. f. s (radula); Man. Conch. (2), viii. p. 60, pl. xxiii. ff. 94-96 (shell).

Hab.—South Island; Greymouth (Helms).

115 *L. CELIA*, Hutton, sp. 1883.

R e f.—N.Z. Journ. Sci. i. p. 476 ; Trans. N.Z. Inst. xiv. p. 153, pl. III. f. F (radula), f. N (jaw), pl. IV. f. N (radula as of *H. fatua*), xvi. pp. 176, 197 ; Man. Conch. (2), viii. p. 60, ix. pl. I. f. 10 (shell).

H a b.—North Island ; Wanganui, Horokiwi, Forty Mile Bush, Hunua Range, Howick and Thames. South Island ; Dunedin (Hutton), Milford Sound, Greymouth, Temuka, Boatman's and Akaroa. Stewart Island.

116 *L. REGULARIS*, Pfeiffer, sp. 1854.

R e f.—P.Z.S. 1854, p. 50 ; Conch. Icon. vii. pl. CLXXXII. f. 1259 ; Man. N.Z. Moll. p. 17 ; Trans. N.Z. Inst. xvi. pp. 168, 197, pl. XI. f. D (radula) ; Man. Conch. (2), iii. p. 37, pl. XXI. f. 12, &c.

H a b.—North Island ; Thames and Forty Mile Bush. South Island ; Greymouth and Riccarton Bush.

117 *L. ERIGONE*, Gray, sp. 1849.

S y n.—*heldiana*, Pfeiffer, 1852.

R e f.—P.Z.S. 1849, p. 165 ; Conch. Icon. vii. pl. CXXXIII. f. 817 ; Man. N.Z. Moll. pp. 17, 18 ; Trans. N.Z. Inst. xvi. p. 197 ; Man. Conch. (2), iii. p. 37, pl. XXI. f. 13, &c.

H a b.—North Island ; Auckland (Greenwood), Howick, Hunua Range, Thames, Ohaupo, Pirongia Mt., and Hawke's Bay.

118 *L. MICRORETICULATA*, Suter, sp. 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 227, pl. xv. ff. 13, 13a, 13b (shell) ; Man. Conch. (2), viii. p. 63, pl. XXIII. ff. 13-15.

H a b.—North Island ; Forty Mile Bush (Suter), Hunua Range and Pirongia Mt. South Island ; Dunedin, Hooker Valley and Boatman's.

119 *L. PUMILA*, Hutton, sp. 1883.

R e f.—Trans. N.Z. Inst. xv. p. 134, xvi. pp. 166, 195, pl. IX. f. Q (radula) ; Man. Conch. (2), viii. p. 63, pl. XXIII. ff. 97-99.

H a b.—North Island ; Auckland and Hawke's Bay. South Island ; Christchurch (Armstrong), Eyreton and Dunedin.

120 L. RARICOSTATA, Suter, sp. 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 226, pl. xiv. ff. 9, 9a, 9b (shell) ; Man. Conch. (2), viii. p. 100, pl. xix. ff. 22-24.

H a b.—North Island ; Forty Mile Bush (Suter) and Hawke's Bay. South Island ; Dunedin.

121 L. ALLOCHROIDA, Suter, sp. 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 228, pl. xv. ff. 14, 14a, 14b, 14c (shell) ; Man. Conch. (2), viii. p. 63, pl. xxii. ff. 3, 4, 5, 6.

H a b.—North Island ; Forty Mile Bush (Suter), Hunua Range, Pirongia Mt. and Hawke's Bay. South Island ; Hooker Valley.

var. SERICATA, Suter, 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 228, pl. xv. ff. 15, 15a, 15b (shell) ; Man. Conch. (2), viii. p. 64, pl. xxiii. ff. 7-9.

H a b.—North Island ; Forty Mile Bush (Suter), Pirongia Mt.

var. LATEUMBILICATA, Suter, 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 228, pl. xv. ff. 16, 16a, 16b (shell) ; Man. Conch. (2), viii. p. 64, pl. xv. ff. 10-12.

H a b.—North Island ; Forty Mile Bush (Suter), Ohaupo and Hawke's Bay.

122 L. CAMPBELLICA, Filhol, sp. 1880.

R e f.—Bull. Soc. Philomatique, iv. p. 126 ; Trans. N.Z. Inst. xvi. p. 195.

H a b.—Campbell Island (Filhol).

123 L. PHRYNIA, Hutton, sp. 1883.

R e f.—N.Z. Journ. Sci. i. p. 476 ; Trans. N.Z. Inst. xvi. pp. 177, 197 ; Man. Conch. (2), viii. p. 61, pl. xxiii. ff. 88-90 (shell).

H a b.—North Island ; Wanganui (T. W. Kirk), Whangarei, Pirongia Mt. and Hawke's Bay.

124 *L. FATUA*, Pfeiffer, sp. 1857.

Ref.—P.Z.S. 1857, p. 107; Man. N.Z. Moll. p. 19; Trans. N.Z. Inst. xvi. p. 197, &c.

H a b.—North Island; Taupiri (Hochstetter), Auckland.

125 *L. GLABRIUSCULA*, Pfeiffer, sp. 1851.

Ref.—P.Z.S. 1851, p. 262; Conch. Icon. vii. pl. cxxxiii. f. 822; Conch. Cab. (2), i. pt. 2, p. 470, pl. clvi. ff. 14-16; Man. N.Z. Moll. p. 23; Trans. N.Z. Inst. xvi. p. 197, xxiv. p. 297, pl. xxii. f. 38 (jaw), f. 39 (radula); Man. Conch. (2), iii. p. 37, pl. xxi. f. 14, &c.

H a b.—North Island; Ohaupo, Whangarei, Auckland, Pirongia Mt. and Hawke's Bay.

126 *L. SCIADIUM*, Pfeiffer, sp. 1857.

Ref.—P.Z.S. 1857, p. 108; Man. N.Z. Moll. p. 19; Trans. N.Z. Inst. xvi. p. 197, &c.

H a b.—North Island; Auckland and Seventy Mile Bush.

127 *L. TITANIA*, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 177, 198; Man. Conch. (2), viii. p. 62, pl. xxiii. ff. 82-84 (shell).

H a b.—South Island; Dunedin (Hutton).

128 *L. HAASTI*, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 476; Trans. N.Z. Inst. xvi. pp. 177, 198; Man. Conch. (2), viii. p. 62, pl. xxiii. ff. 91-93 (shell).

H a b.—South Island; Mt. Somers (Haast), Akaroa, St. Helens, Amuri, Riccarton Bush and Albury Rocks.

129 *L. ACANTHINULOPSIS*, Suter, sp. 1891.

Ref.—Trans. N.Z. Inst. xxiii. p. 92, pl. xviii. ff. 11, 11a, 11b (shell), f. s (jaw), f. t (radula); Man. Conch. (2), viii. p. 61, pl. xxiii. ff. 100, 1, 2.

H a b.—South Island; Hooker Valley (Suter).

130 *L. TRANSITANS*, Suter, sp. 1892.

R e f.—Trans. N.Z. Inst. xxiv. p. 297, pl. xxii. ff. 40, 40a, 40b (shell); Man. Conch. (2), viii. p. 59, pl. xxiii. ff. 85-87.

H a b.—North Island; Whangarei (Musson) and Hunua Range.

**ENDODONTA*, Albers, 1850.

Albers, die Heliceen (1st Ed.), p. 89.

131 *E. VARICOSA*, Pfeiffer, sp. 1852.

S y n.—*timandra*, Hutton, 1883.

R e f.—P.Z.S. 1852, p. 148; Conch. Icon. vii. pl. cxxxiii. f. 824; Man. N.Z. Moll. p. 7; N.Z. Journ. Sci. 1883, p. 475; Trans. N.Z. Inst. xvi. pp. 175, 192, xxiv. p. 293, pl. xxii. f. 28 (jaw), f. 29 (radula); Man. Conch. (2), iii. p. 23, pl. iii. f. 10, viii. p. 85, pl. xxiv. ff. 21-23, &c.

H a b.—North Island; Auckland, Thames, Whangarei, Forty Mile Bush, Hunua Range, Pirongia Mount, Hawke's Bay and Wellington. South Island; Akaroa and Riccarton Bush.

N o t e.—The radula figured for this species shows a most extraordinary abnormality of the central and lateral teeth. A description and figure of the normal radula will be given in the P.L.S.N.S.W. (2), viii.

132 *E. JESSICA*, Hutton, sp. 1883.

R e f.—N.Z. Journ. Sci. i. p. 475; Trans. N.Z. Inst. xvi. pp. 174, 192; Man. Conch. (2), viii. p. 85, pl. xxiv. ff. 24-27 (shell).

H a b.—South Island; Bealey (Haast), Kenepuru Sound.

133 *E. CRYPTOIDENS*, Suter, sp. 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 89, pl. xvii. ff. 7, 7a, 7b, 7c (shell), f. M (jaw), f. N (radula); Man. Conch. (2), viii. p. 85, pl. xxiv. ff. 28-31.

H a b.—South Island; Hooker Valley (Suter).

* Under *Endodontia*, Pilsbry would classify (Proc. Acad. N.S. Philad. 1892, p. 402) *Eschrolonius*, *Charopa*, *Gerontia*, *Therasia*, *Flammulina*, *Pyrria*, *Phenacohelix*, *Allodiscus*, *Suteria*, *Thalassohelix* and *Phacussa* as subgenera.

Subgenus *PTYCHODON*, Ancey, 1891.

[= *Huttonella*, Suter, 1890, not of Pfeiffer, 1855; = *Maoriana*, Suter, 1891, Trans. N.Z. Inst. xxiii. p. 96 (published May, 1891).]

C. F. Ancey, The British Naturalist, pt. 4, April, 1891, p. 65.

134 E. *LEIODA*, Hutton, sp. 1883.

Ref.—Trans. N.Z. Inst. xv. p. 135, xvi. pp. 166, 195, pl. ix. f. P (radula); Man. Conch. (2), viii. p. 87, pl. xxiv. ff. 32-35 (shell).

H a b.—South Island; Greymouth (Helms).

135 E. *PSEUDOLEIODA*, Suter, sp. 1890.

Ref.—Trans. N.Z. Inst. xxii. p. 221, pl. xiv. ff. 1, 1a, 1b, 1c (shell), xxiv. p. 298, pl. xxiii. f. 43 (jaw), f. 44 (radula); Man. Conch. (2), viii. p. 88, pl. xxiv. ff. 40-43.

H a b.—North Island; Forty Mile Bush (Suter), Ohaupo, Whangarei, Auckland, Pirongia Mt., Heretaunga and Waimarama.

136. E. *WAIRARAPA*, Suter, sp. 1890.

Ref.—Trans. N.Z. Inst. xxii. p. 222, pl. xiv. 2, 2a, 2b, 2c (shell); xxiv. p. 298, pl. xxiii. f. 45 (radula); Man. Conch. (2), viii. p. 88, pl. xxiv. ff. 36-39.

H a b. — North Island; Forty Mile Bush (Suter) and Waimarama. South Island; Greymouth.

137 E. *HECTORI*, Suter, sp. 1890.

S y n.—*magdalencæ*, Ancey, 1891.

Ref.—Trans. N.Z. Inst. xxii. p. 222, pl. xiv. ff. 3, 3a, 3b, 3c (shell); xxiv. p. 299, pl. xxiii. f. 46 (jaw), f. 47 (radula); British Naturalist, Ap. 1891, p. 65; Man. Conch. (2), viii. p. 89, pl. xxiv. ff. 44-47.

H a b.—North Island; Forty Mile Bush (Suter), Auckland, Ohaupo and Whangarei.

138 E. *MICROUNDULATA*, Suter, sp. 1890.

Ref.—Trans. N.Z. Inst. xxii. p. 223, pl. xiv. ff. 4, 4a, 4b, 4c, 4d (shell); xxiv. p. 299, pl. xxiii. f. 49 (jaw), f. 50 (radula); Man. Conch. (2), viii. p. 89, pl. xxiv. ff. 52-56.

H a b.—North Island; Forty Mile Bush (Suter) and Waimarama. South Island; Greymouth.

139 E. AORANGI, Suter, sp. 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 223, pl. xiv. ff. 5, 5a, 5b, 5c (shell); xxiv. p. 300, pl. xxiii. f. 51 (jaw), f. 52 (radula); Man. Conch. (2), viii. p. 90, pl. xxiv. ff. 48-51.

H a b.—South Island, Hooker Valley (Suter).

140 E. HUNUAENSIS, Suter, n.sp.

This addition to the fauna will be figured and described in the next volume of these Proceedings.

H a b.—North Island, Hunua Range (Broun), Taupiri Mt. and Waimarama.

CHAROPA, Albers, 1860.

[= *Simplicaria*, Mousson, MS., Suter, Trans. N.Z. Inst. xxiii. p. 90.]

Albers, die Heliceen (2nd Ed.), p. 87.

141 C. COMA, Gray, sp. 1843.

R e f.—Dieffenbach's New Zealand, ii. p. 263; Conch. Icon. vii. pl. cxxx. f. 796, pl. cxxxi. f. 800; Conch. Cab. (2), i. pt. 2, p. 461, pl. cliv. ff. 37-39; Mon. Austr. L. Shells, p. 21, pl. xvii. f. 4; Voy. Erebus and Terror, ii. Moll. pl. i. f. 3 (two figures); Man. N.Z. Moll. p. 8; Trans. N.Z. Inst. xvi. pp. 162, 191, pl. ix. f. c (radula), pl. xi. f. κ (jaw); Man. Conch. (2), iii. p. 22, ix. pl. iv. ff. 1-3 (shell), &c.

H a b.—North Island; generally distributed. South Island; Lake Guyon, Greymouth, Bealey and Boatman's.

N o t e.—Erroneously attributed to Tasmania.

var. BETA, Pfeiffer, 1853.

R e f.—Mon. Hel. Viv. iii. p. 99; Conch. Cab. (2), i. pt. 2, p. 461.

H a b.—?

var. *GLOBOSA*, Suter, 1892.

R e f.—Trans. N.Z. Inst. xxiv. p. 273 ; Man. Conch. (2), viii. p. 96.

H a b.—North Island ; Forty Mile Bush (Suter).

142 *C. PSEUDOCOMA*, Suter, n.sp.

The shell, animal and dentition of this species will be described and figured in the following volume of these Proceedings.

H a b.—South Island ; Akaroa, Port Hills, Littleton, Dyer's Pass, and Riccarton Bush (Suter).

143 *C. MODICELLA*, Fér., var. *VICINALIS*, Mousson, 1873.

R e f.—Journ. de Conch. xxi. p. 112 ; Man. Conch. (2), iii. p. 39.

H a b.—Kermadecs ; Raoul.

N o t e —Perhaps, says Mousson, a distinct species.

144 *C. LUCETTA*, Hutton, sp. 1884.

S y n.—*stokesi*, Smith, 1884.

R e f.—Trans. N.Z. Inst. xvi. pp. 162, 192, pl. xi. f. A (radula) ; P.Z.S. 1884, p. 275, pl. xxiii. ff. 17, 17a, 17b (shell) ; Man. Conch. (2), iii. pp. 22, 262, pl. iii. ff. 7-9, pl. xxii. ff. 48-50.

H a b.—North Island ; Hawke's Bay (Colenso), Wellington and Forty Mile Bush. South Island ; Greymouth and Nelson.

N o t e.—Hutton's name was published in May ; Smith's on October 1st, 1884.

145 *C. BUCCINELLA*, Reeve, sp. 1852.

S y n.—*gamma*, Pfeiffer, 1852 (? 1853).

R e f.—Conch. Icon. vii. pl. cxxxiii. f. 821 ; P.Z.S. 1852, p. 57 ; Man. N.Z. Moll. p. 8 ; Trans. N.Z. Inst. xvi. pp. 163, 192, pl. ix. f. D (radula) ; Man. Conch. (2), iii. p. 23, pl. iii. f. 11, &c.

H a b.—North Island ; Auckland, Hawke's Bay, Thames, Forty Mile Bush, Ohaupo, Hunua Range and Pirongia Mt. South Island ; Dunedin, Greymouth, Oxford and Hooker Valley. Auckland Islands.

146 *C. ANGUICULUS*, Reeve, sp. 1852.

Syn.—*theta*, Pfeiffer, MS.

Ref.—Conch. Icon. vii. pl. cxxxI. f. 802; Mon. Hel. Viv. iii. p. 634; Man. N.Z. Moll. p. 9; Trans. N.Z. Inst. xvi. p. 192, xxiv. p. 292, pl. XXI. f. 22 (jaw), f. 23 (radula); Man. Conch. (2), iii. p. 23, pl. III. f. 13, &c.

Hab.—North Island; Forty Mile Bush and Howick. South Island; Hooker Valley, Riccarton Bush and Boatman's.

147 *C. CORNICULUM*, Reeve, sp. 1852.

Syn.—*eta*, Pfeiffer, 1852 (? 1853).

Ref.—Conch. Icon. vii. pl. cxxxIII. f. 826; P.Z.S. 1852, p. 57; Man. N.Z. Moll. p. 9; Trans. N.Z. Inst. xvi. p. 164, pl. IX. f. F (radula); Man. Conch. (2), iii. p. 24, pl. III. f. 12, &c.

Hab.—North Island; Auckland, Hawke's Bay, Thames, Wellington, Forty Mile Bush, Howick, Whangarei and Ohaupo. South Island; Oxford, Christchurch and Eyreton.

var. *MACULATA*, Suter, 1891.

Ref.—Trans. N.Z. Inst. xxiii. p. 89; Man. Conch. (2), viii. p. 96.

Hab.—North Island; Ohaupo, Auckland and Hunua Range. South Island; Hooker Valley (Suter) and Akaroa.

148 *C. BIANCA*, Hutton, sp. 1883.

Ref.—N.Z. Journ. Sci. i. p. 475; Trans. N.Z. Inst. xvi. pp. 175, 192, xxiv. p. 292, pl. XXI. f. 20 (jaw), f. 21 (radula); Man. Conch. (2), viii. p. 97, pl. xxxvii. ff. 41, 42 (shell).

Hab.—North Island; Auckland, Horokiwi, Thames, Forty Mile Bush and Hawke's Bay. South Island; Greymouth (Helms), Bealey, Hooker Valley, Akaroa and Riccarton Bush.

var. *MONTANA*, Suter, 1890.

Ref.—Trans. N.Z. Inst. xxiii. p. 88, pl. xvii. f. K (jaw), f. L (radula); Man. Conch. (2) viii. p. 97.

Hab.—South Island; Hooker Valley (Suter).

149 *C. TAPIRINA*, Hutton, sp. 1883.

R e f.—Trans. N.Z. Inst. xiv. p. 150, pl. III. f. A (radula), f. L (jaw), pl. IV. f. G (radula as of *coma*), xv. p. 134, xvi. pp. 165, 193, pl. IX. f. G (radula); Man. Conch. (2), iii. p. 23, viii. p. 97, ix. pl. IV. ff. 4-6 (shell).

H a b.—North Island; Auckland, Hawke's Bay, Masterton, Wellington, Thames, Forty Mile Bush, and Hunua Range. South Island; Dunedin (Hutton), Queenstown, Greymouth, Temuka, Owaka and Wairoa Gorge, Nelson.

150 *C. MUTABILIS*, Suter, sp. 1890.

R e f.—Trans. N.Z. Inst. xxiii. p. 84, pl. XVI. ff. 2, 2a, 2b (shell), B (jaw), c (radula); Man. Conch. (2), viii. p. 101, pl. XIX. ff. 25-27.

H a b.—South Island; Hooker Valley (Suter) and Castle Rock, Southland.

151. *C. STERKIANA*, Suter, sp. 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 85, pl. XVI. ff. 3, 3a, 3b (shell), f. D (jaw), f. E (radula); Man. Conch. (2). viii. p. 101, pl. XIX. ff. 28-30.

H a b.—South Island; Hooker Valley (Suter).

var. *MAJOR*, Suter, 1892.

R e f.—Trans. N.Z. Inst. xxiv. p. 295.

H a b.—South Island; Owaka (Bryant).

var. *REEFTONENSIS*, Suter, 1892.

R e f.—Trans. N.Z. Inst. xxiv. p. 294; Man. Conch. (2), viii. p. 102.

H a b.—South Island; Boatman's near Reefton (Cavell).

152 *C. BROUNI*, Suter, sp. 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 86, pl. XVI. ff. 4, 4a, 4b (shell), f. F (jaw), f. G (radula); Man. Conch. (2), viii. p. 102, pl. XIX. ff. 31-33.

H a b.—South Island; Hooker Valley (Suter) and Riccarton Bush.

153 C. SERPENTINULA, Suter, sp. 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 87, pl. xvi. ff. 5, 5a, 5b (shell), f. II (jaw), f. J (radula); Man. Conch. (2), viii. p. 103, pl. XIX. ff. 34-36.

H a b.—South Island; Hooker Valley (Suter) and St. Helens.

154 C. TAU, Pfeiffer, sp. 1862.

S y n.—*sylvia*, Hutton, 1883.

R e f.—Mal. Blätt. viii. p. 148; Man. N.Z. Moll. p. 8; N.Z. Journ. Sci. i. p. 467; Trans. N.Z. Inst. xvi. pp. 175, 193, xxiv. p. 293, pl. XXI. f. 24 (jaw), f. 25 (radula); Man. Conch. (2), viii. p. 98, &c.

H a b.—North Island; Auckland, Horokiwi, Forty Mile Bush, Howick, Hunua Range, Whangarei, Pirongia Mt. and Hawke's Bay. South Island; Bealey and Riccarton Bush.

155 C. VARIECOSTATA, Suter, sp. 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 225, pl. XIV. ff. 8, 8a, 8b, 8c (shell); Man. Conch. (2), viii. p. 100, pl. XIX. ff. 19-21.

H a b.—North Island; Forty Mile Bush (Suter).

156 C. EREMITA, Suter, sp. 1891.

R e f.—Trans. N.Z. Inst. xxiii. p. 87, pl. xvii. ff. 6, 6a, 6b (shell); Man. Conch. (2), viii. p. 103, pl. XIX. ff. 37-39.

H a b.—South Island; Hooker Valley (Suter).

157 C. COLENSOI, Suter, sp. 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 225, pl. XIV. ff. 7, 7a, 7b (shell), xxiv. pl. XXI. f. 26 (jaw), f. 27 (radula); Man. Conch. (2), viii. p. 99, pl. XIX. ff. 16-18.

H a b.—North Island; Forty Mile Bush (Suter), Heretaunga and Waimarama.

158 C. INFECTA, Reeve, sp. 1852.

S y n.—*ceta*, Pfeiffer, 1852 (? 1853).

Ref.—Conch. Icon. vii. pl. cxxxii. f. 808; P.Z.S. 1852, p. 58; Conch. Cab. (2), i. pt. 2, pl. clv. ff. 27-30; Man. N.Z. Moll. p. 9; Trans. N.Z. Inst. xvi. pp. 164, 193, pl. ix. f. H (radula); Man. Conch. (2), iii. p. 23, pl. iii. f. 14.

H a b.—North Island; Hawke's Bay, Forty Mile Bush, Whangarei and Ohaupo. South Island; Greymouth, Oxford, Bealey and Riccarton Bush.

var. IRREGULARIS, Suter, 1890.

Ref.—Trans. N.Z. Inst. xxii. p. 224, pl. xiv. ff. 6, 6a, 6b (shell); Man. Conch. (2), viii. p. 98, pl. xix. ff. 13-15.

H a b.—North Island; Forty Mile Bush (Suter).

var. ALPESTRIS, Suter, 1891.

Ref.—Trans. N.Z. Inst. xxiii. p. 88; Man. Conch. (2) viii. p. 99.

H a b.—South Island; Hooker Valley (Suter).

159 C. BICONCAVA, Pfeiffer, sp. 1852.

Ref.—P.Z.S. 1852, p. 149; Conch. Icon. vii. pl. cxxxii. f. 810; Conch. Cab. (2), i. pt. 2, pl. clv. ff. 43-47; Man. N.Z. Moll. p. 11; Trans. N.Z. Inst. xvi. p. 193; xxiv. p. 295, pl. xxii. f. 30 (jaw), f. 31 (teeth); Man. Conch. (2), i. p. 130, pl. xxiv. f. 75, &c.

H a b.—North Island; Thames, Wellington, Forty Mile Bush and Heretaunga.

160 C. SUBANTIALBA, Suter, sp. 1890.

Ref.—Trans. N.Z. Inst. xxii. p. 226, pl. xv. ff. 10, 10a, 10b (shell), xxiv. p. 295, pl. xxii. f. 32 (jaw), f. 33 (radula); Man. Conch. (2), viii. p. 104, pl. xix. ff. 40-42.

H a b.—North Island; Forty Mile Bush (Suter), Auckland, Hunua Range and Waimarama.

161 C. MOUSSONI, Suter, sp. 1890.

Ref.—Trans. N.Z. Inst. xxii. p. 227, pl. xv. ff. 12, 12a, 12b (shell); Man. Conch. (2), viii. p. 105, pl. xix. ff. 46-48.

H a b.—North Island; Forty Mile Bush (Suter).

162 *C. HUTTONI*, Suter, sp. 1890.

R e f.—Trans. N.Z. Inst. xxii. p. 226, pl. xv. ff. 11, 11a, 11b (shell); Man. Conch. (2), viii. p. 104, pl. xix. ff. 43-45.

H a b.—North Island; Forty Mile Bush (Suter) and Pirongia Mt.

163 *C. EGESTA*, Gray, sp. 1849.

R e f.—P.Z.S. 1849, p. 166; Conch. Icon. vii. pl. cxxxii. f. 798; Conch. Cab. (2), i. pt. 2, p. 458, pl. clv. ff. 18-20; Man. N.Z. Moll. p. 8; Trans. N.Z. Inst. xvi. p. 193; Man. Conch. (2), iii. p. 23, pl. iii. f. 15, &c.

H a b.—North Island; Auckland (Greenwood) and Orakei.

164 *C. CAPUT-SPINULÆ*, Reeve, sp. 1852.

S y n.—*epsilon*, Pfeiffer, 1852 (? 1853).

R e f.—Conch. Icon. vii. pl. cxxxiii. f. 818; P.Z.S. 1852, p. 57; Man. N.Z. Moll. p. 23; Trans. N.Z. Inst. xvi. p. 194; Man. Conch. (2), iii. p. 102, pl. xx. f. 53, &c.

H a b.—North Island; Auckland, Horokiwi, Thames, Whangarei, Hunua Range, Pirongia Mt. and Waimarama. South Island; Riccarton Bush, Dyer's Pass and Akaroa.

165 *C. SEGREGATA*, Suter, n.sp.

This recent acquisition will appear in next year's Proceedings.

H a b.—North Island; Waimarama (Hamilton).

Subgenus *AESCHRODOMUS*, Pilsbry, 1892.

[= *Thera*, Hutton, 1884, not of Stephens, 1831.]

Pilsbry, Nautilus, vi. (Sept. 1892), No. v. p. 55, footnote.

166 *C. STIPULATA*, Reeve, sp. 1852.

S y n.—*alpha*, Pfeiffer, 1852 (? 1853).

R e f.—Conch. Icon. vii. pl. cxxxii. f. 813; P.Z.S. 1852, p. 58; Man. N.Z. Moll. p. 18; Trans. N.Z. Inst. xvi. pp. 168, 193. pl. xi. f. B (radula), f. L (jaw), xxiv. p. 296, pl. xxii. f. 34 (jaw), f. 35 (radula); Man. Conch. (2), iii. p. 94, pl. xix. f. 1, &c.

H a b.—North Island; Auckland, Petane, near Napier and Thames. South Island; Greymouth, Temuka, Dunedin, Queenstown and Owaka.

167 C. BARBATULA, Reeve, sp. 1852.

S y n.—*beta*, Pfeiffer, 1852 (? 1853).

R e f.—Conch. Icon. vii. pl. cxxxii. f. 814; P.Z.S. 1852, p. 58; Conch. Cab. (2), i. pt. 2, p. 462, pl. clv. ff. 53-56; Man. N.Z. Moll. p. 18; Trans. N.Z. Inst. xvi. p. 193, xxiv. pp. 285, 296, pl. xxii. f. 36 (jaw), f. 37 (radula); Man. Conch. (2), iii. p. 95, pl. xix. f. 2, &c.

H a b.—South Island; Dunedin.

Subgenus TESSERARIA, Böttger, 1881.

Böttger, von Martens' Conch. Mittheil. i. p. 63.

168 C. NOVOSEELANDICA, Pfeiffer, sp. 1852.

R e f.—P.Z.S. 1852, p. 149; Conch. Icon. xx. Pupa, pl. xiv. f. 126; Conch. Cab. (2), i. pt. 15, p. 135, pl. xvii. ff. 18, 19; Man. N.Z. Moll. p. 15; Conch. Mittheil. i. p. 69; Trans. N.Z. Inst. xvi. p. 191, xxiv. p. 300, pl. xxiii. f. 53 (jaw), f. 54 (radula), &c.

H a b.—North Island; Hawke's Bay, Forty Mile Bush and Auckland.

Fam. HELICITERIDÆ.

TORNATELLINA, Beck.

Beck, Index Molluscorum, p. 80.

169 T. NOVOSEELANDICA, Pfeiffer, sp. 1852.

R e f.—P.Z.S. 1852, p. 149, 1849, p. 167; Conch. Cab. (2), i. pt. 15, p. 149, pl. xviii. ff. 10, 11 (shell); Man. N.Z. Moll. p. 14; Trans. N.Z. Inst. xvi. p. 191, &c.

H a b.—North Island; Auckland (Greenwood), Thames, Hunua Range and Waimarama.

Fam. JANELLIDÆ.

JANELLA,* Gray, 1850.

[= *Athoracophorus*, Gould, 1852; = *Konophora*, Hutton, 1878; = *Pseudaneitea*, Cockerell, 1891; = *Neojanella*, Cockerell, 1891; but not *Janella*, Grateloup, 1838.]

Gray, Mrs. Gray's Figures of Molluscos Animals, iv. p. 112.

170 J. BITENTACULATA, Quoy and Gaimard, sp. 1832.

Syn.—*antipodarum*, Gray, 1853; *dubia*, Cockerell, 1891.

Ref.—Voy. Astrolabe, Zool. ii. p. 148, pl. XIII. ff. 1-3 (animal); Am. Expl. Exped. xii. p. 2, ff. 6, 6a, 6b, 6c (animal); Zeits. Wiss. Zool. xv. p. 446, pl. XXIV. ff. 1-2 (animal), 3-5 (anatomy); Trans. Linn. Soc. xxii. p. 381, pl. LXVI. ff. 1-4 (animal), ff. 6-11 (radula); Trans. N.Z. Inst. xiv. pp. 158-160, pl. v. ff. 12-16 (radula, &c.), xvi. pp. 173, 206, pl. x. f. m (radula); P.Z.S. 1853, p. 112; 1891, p. 217; Ann. Mag. Nat. Hist. (2), xii. p. 414, &c.

Hab.—North Island; a crater near Taiaimi, Auckland, Thames, Forty Mile Bush, Heretaunga and Wellington. South Island; Tasman Bay (Quoy), Greymouth and Boatman's.

171 J. PAPILLATA, Hutton, 1879.

Syn.—*verrucosa*, von Martens, 1889.

Ref.—Trans. N.Z. Inst. xi. p. 332, xiv. p. 159, pl. v. ff. 10, 11 (radula), xvi. p. 206; Man. N.Z. Moll. p. 27; Nova Acta, Kaiserl. Leop. Karol. deutschen Akad. Naturf. liv. p. 77, pl. iv. f. 11, 11a, 11b, 11c (animal), f. 12 (jaw), f. 14 (genitalia).

Hab.—North Island; Wellington (Hutton), Forty Mile Bush and Heretaunga. South Island; Dunedin and Riccarton Bush. Chatham Island.

var. NIGRICANS, von Martens, 1889.

Ref.—Nova Acta, &c. liv. p. 77.

Hab.—Auckland Island (Krone).

* Adherents of the formula, "once a synonym always a synonym," will replace *Janella* by *Athoracophorus*.

var. FASCIATA, von Martens, 1889 (emend.*).

R e f.—Nova Acta, &c. liv. p. 79.

H a b.—Auckland Island (Krone).

172 J. MARMOREA, Hutton, sp. 1879.

S y n.—*marmorata*, von Martens, 1889.

R e f.—Trans. N.Z. Inst. xi. p. 332, xiv. p. 158, pl. v. f. 1 (animal), ff. 2-9 (radula, genitalia &c.), xvi. pp. 173, 206, pl. x. f. n, pl. xi. f. x (jaw); Man. N.Z. Moll. p. 27; Nova Acta, &c. liv. p. 71, pl. iv. f. 3 (animal), ff. 5-6 (radula), f. 10 (genitalia).

H a b.—South Island; Dunedin (Bourne) and Greymouth, Auckland Island.

Class PELECYPODA.

Fam. UNIONIDÆ.

UNIO, Philipsson, 1788.

Philipsson, Dissert. Hist. Nat. Nov. Test. Genera, p. 16.

173 U. MENZIESI, Gray, 1843.

R e f.—Dieffenbach's New Zealand, ii. p. 257; Conch. Icon. xvi. Unio, pl. xxix. f. 152; Hanley's Photographic Conchology, pl. II. f. 1; Man. N.Z. Moll. p. 160; Trans. N.Z. Inst. xiv. p. 148, pl. II. ff. a, b, c, d (shell and animal), &c.

H a b.—North and South Islands.

174 U. AUCKLANDICUS, Gray, 1843.

R e f.—Dieffenbach's New Zealand, ii. p. 257; Conch. Icon. xvi. Unio, pl. xxix. f. 156; Man. N.Z. Moll. p. 161, &c.

H a b.—North and South Islands.

175 U. ZELEBORI, Dunker, 1866.

R e f.—Abhandl. Zool. Bot. Gesell. Wien, xvi. p. 915; Reise Novara, Moll. p. 15, pl. II. f. 28; Man. N.Z. Moll. p. 161.

H a b.—North and South Islands.

* So corrected by the author from "*fuscata*." Vide Trans. N.Z. Inst. 1892. An enumeration of the Janellidæ.

176 U. HOCHSTETTERI, Dunker, 1862.

Ref.—Mal. Blät. viii. p. 153; Conch. Icon. xvi. Unio, pl. LXXXVI. sp. 463; Man. N.Z. Moll. p. 161.

H a b.—North Island; River Waikato (Hochstetter), Lakes Taupo and Rotorua.

177 U. LUTULENTUS, Gould, 1851.

Ref.—Proc Boston Soc. Nat. Hist. iii. p. 295; U.S. Expl. Exped. xii. p. 428, f. 542, a, b, c; Conch. Icon. xvi. Unio, pl. xxv. f. 122, pl. LXXIV. f. 386; Man. N.Z. Moll. p. 161, &c.

H a b.—North and South Islands.

178 U. WAIKARENSE, Colenso, 1845.

Ref.—Tasmanian Journ. Nat. Sci. ii. pt. 9, April, 1845, p. 250 footnote; N.Z. Journ. Sci. i. p. 170; Trans. N.Z. Inst. xiv. p. 169.

H a b.—North Island; Lake Waikare (Colenso).

179 U. DEPAUPERATUS, Hutton, 1883.

Ref.—N.Z. Journ. Sci. i. p. 478; Trans. N.Z. Inst. xvi. p. 216.

H a b.—North Island; Lake Takapuna.

180 U. RUGATUS, Hutton, 1883.

Ref.—N. Z. Journ. Sci. i. p. 478; Trans. N.Z. Inst. xvi. p. 216.

H a b.—North Island; Kopuaranga River. South Island; Lake Pearson (Enys).

181 U. MUTABILIS, Lea, 1860.

Syn.—? *depressus*, Lamarck, 1818.

Ref.—Proc. Acad. Nat. Sci. Philad. iii. p. 152; Obs. Genus Unio, vii. p. 66, pl. xxxviii. f. 127 (3 figures); Conch. Icon. xvi. Unio, pl. xxiv. f. 112; Linn. Soc. Journ. Zool. xvi. p. 308, &c.

H a b.—New Zealand (fide H. Cuming).

Note—Lea states that he founded this species upon four specimens: one from New Zealand, contributed by Cuming, upon

which the figure and description were based, another of unknown origin, and two furnished by Dr. Newcomb, of which the first came from Brisbane Water, N.S.W., and the second from the Murray River. Cuming's unsupported testimony is not sufficient reason for including a species in any fauna.

Fam. CYRENIDÆ.

SPHAERIUM, Scopoli, 1777.

Scopoli, *Intr. Hist. Nat.* p. 397.

182 *S. NOVÆZELANDIÆ*, Deshayes, 1853.

Ref.—*Cat. Conchif. Brit. Museum*, p. 272; *P.Z.S.* 1854, p. 342; *Conch. Icon.* xx. *Sphaerium*, pl. iv. f. 37; *Man. N.Z. Moll.* p. 154; *Trans. N.Z. Inst.* xiv. p. 149.

H a b.—North and South Islands.

PISIDIUM, C. Pfeiffer, 1821.

C. Pfeiffer, *Nat. Deutschl. Moll.* p. 17.

183 *P. LENTICULA*, Dunker, sp. 1862.

Ref.—*Mal. Blät.* viii. p. 153; *Man. N.Z. Moll.* p. 154; *Trans. N.Z. Inst.* xiv. p. 149, pl. II. ff. E, a, b.

H a b.—North and South Islands.

184 *P. NOVÆZELANDIÆ*, Prime, 1862.

Ref.—*P.Z.S.* 1862, p. 3; *Ann. Lyceum Nat. Hist. New York*, 1867, p. 91 (woodcut in the text); *Man. N.Z. Moll.* p. 155; *Trans. N.Z. Inst.* xiv. p. 150.

H a b.—North and South Islands.

APPENDIX I.

LAND AND FRESHWATER SHELLS ERRONEOUSLY ASCRIBED TO
NEW ZEALAND.

Helix coniformis, Fér., *H. cornugiganteum*, Chemn., *H. diemenensis*, Cox, *H. falconeri*, Reeve, *H. guttula*, Pfr., *H. grayi*, Pfr.,

H. hystrix, Migh., *H. incei*, Pfr., *H. inversicolor*, Fér., (= *Trochomorpha hermia*, Hutton), *H. nouleti*, Le Guil., *H. omicron*, Pfr., *H. pachystyla*, Pfr., *H. rapida*, Pfr., *H. reinga*, Gray, *H. rubricata*, Gould, *H. subrugata*, Pfr., *H. sultana*, Morl., *H. taranaki*, Gray, *H. tiara*, Migh., *H. vitrea*, Fér., *Placostylus miltocheilus*, Reeve, *Limnæa wilsoni*, Tryon, *Bulinus pyramidatus*, Sowerby, *B. gibbosus*, Gould, *B. cumingi*, H. Ad., *Cyclotus macgillivrayi*, Pfr., (= *C. charmian*, Hutt.), *Neritina zelandica*, Recluz, *N. fluviatilis*, L., and *Batissa violacea*, Lk.

APPENDIX II.

LIST OF THE INTRODUCED LAND AND FRESHWATER SHELLS OF
NEW ZEALAND.

Testacella maugei, Fér., (= *T. vagans*, Hutton), *Paryphanta millegani*, Pfr.,* *Limax agrestis*, L., (= *L. molestus*, Hutton), *L. maximus*, L., *L. flavus*, L., *Amalia antipoda*, Pfr., *A. emarginata*, Hutt., *A. fuliginosa*, Gould, *A. gagates*, Drap., *Hyalina cellaria*, Müll., *H. alliaris*, Miller, *H. crystallina*, Müll., *Arion ater*, Linn., *A. subfusca*, Drap., (= *A. incommodus*, Hutt.), *A. hortensis*, Fér., *Helix caperata*, Mont., *H. hortensis*, Müll., *H. aspersa*, L., *Corasia tricolor*, Pfr., *Cochlostyla daphnis*, Brod., and *Limnæa stagnalis*, Linn.

* Probably *P. urnula* was mistaken for this.

SOME NEW SOUTH WALES PLANTS ILLUSTRATED.

BY R. T. BAKER, ASSISTANT CURATOR, TECHNOLOGICAL MUSEUM,
SYDNEY.

(Plate XIII.)

No. iv. ACACIA PRUINOSA, A. Cunn. B.Fl. ii. 413.

The description of this species given in the Flora Australiensis (Vol. ii. p. 413), which concludes with the statement "Pod not seen," may be supplemented as follows:—

Pod flat, straight, 4-6 inches long, varying from $\frac{1}{4}$ - $\frac{1}{2}$ inch wide. Seeds longitudinal, funicle dilated into a fleshy oblique lateral aril, short, filiform below the seed.

Hab.—Near Sydney and Liverpool Plains (Fl. Austr.); Gosford.

EXPLANATION OF PLATE.

(Plate XIII.)

Acacia pruinosa, A. Cunn.

- Fig. 1.—Pod (nat. size).
 Fig. 2.—Seed with arillus ($\times 2$).
 Fig. 3.—Bracts (enlarged).
 Fig. 4.—Expanded flower (enlarged).
 Fig. 5.—Unexpanded flower (enlarged).
 Fig. 6.—Pistil (enlarged).
 Fig. 7.—Back and front views of a stamen (enlarged).
 Fig. 8.—Pollen grain (enlarged).
 Fig. 9.—Portion of a phyllode (enlarged).

NOTES AND EXHIBITS.

Mr. Maiden sent for exhibition fruiting specimens of *Acacia vestita*, Ker.,—a species which has rarely been found in fruit— from the southern coastal district of New South Wales.

Mr. Rainbow exhibited drawings of the spiders described in his paper.

Mr. Baker showed specimens of *Acacia pruinosa* in illustration of his paper.

Mr. Fletcher exhibited specimens of the female galls of a new and remarkable species of *Brachyscelis*, which would be described by Mr. Olliff at an early date.

WEDNESDAY, MARCH 29TH, 1893.

ANNUAL GENERAL MEETING.

The President, Professor Haswell, M.A., D.Sc., in the Chair.

Messrs. L. Stephenson, R. Murdoch, A. H. S. Lucas, and Captain Hynes were introduced as visitors.

The minutes of the last Annual Meeting were read and confirmed.

PRESIDENT'S ADDRESS.

During the fourteen months which have elapsed since the last Annual General Meeting the Society may be said to have had a season of steady work and substantial progress. The ordinary meetings have been well attended, and I think I may say that the papers contributed have on the average attained a very high level of excellence. In respect of bulk, notwithstanding a considerable drain resulting from the simultaneous publication of the Macleay Memorial Volume, the "Proceedings" of the year will be up to the average: three parts have already been issued and the fourth is in preparation.

During the year ten new members have been elected: eleven have been lost by death or retirement, leaving a total of about 137 ordinary members on the roll of the Society.

It is my painful duty to have to record the loss which the Society has sustained during the past year by the deaths of six ordinary members—the Rev. R. Collie, F.L.S., the Rev. William Woolls, Ph.D., F.L.S., the Hon. Alex. Dodds, M.L.C., Layman M. Harrison, J. N. Macintosh and W. Neill.

The Rev. R. Collie, a native of Aberdeenshire, came to New South Wales in 1876, and was elected minister of the Free Church of Scotland at Newtown, in which charge he continued until his

death last year. He was an enthusiastic student of our native flora, to our knowledge of which he made various contributions. He was for five years a member of this Society and took a considerable interest in its meetings. He bequeathed to it his extensive herbarium of dried plants, and over a hundred books on various branches of natural history, many of them valuable and useful additions to the Society's library.

The Rev. Dr. William Woolls, long a member and latterly a Vice-President, was well known for his extensive and accurate knowledge of Australian Botany. Born in 1814 at Winchester, he came out to this colony as a lad of 17, and shortly afterwards obtained a mastership in the King's School, Parramatta. Afterwards he came to Sydney and engaged in journalistic work and private tuition till he was offered a classical mastership at the Sydney College. Later he returned to Parramatta, where he opened a private school. In 1873, at the age of 59, he took holy orders in the Church of England, and held for ten years the incumbency and rural deanery of Richmond. For many years he gave much of his leisure to the study of botany, and he rendered valuable assistance to Bentham and Mueller in collecting specimens to be made use of in the elaborating of their "*Flora Australiensis*." He obtained the degree of Ph.D. from the University of Goettingen for his thesis on the Plants of Parramatta. He was the author of two volumes of essays on scientific and other subjects, and of several botanical papers, some of which have been published in the "Proceedings" of this Society.

Of the loss sustained by biological science in the death of the veteran comparative anatomist, Sir Richard Owen (whom this Society honoured itself by electing an honorary member many years ago), it is scarcely needful for me to speak at length on the present occasion. A worthy estimate of Owen's scientific work and its bearing on the progress of science in Australia would, even were I competent to undertake it, require an Address or a series of Addresses to itself. Let me, however, recall to you the fact that in the rich record of Owen's half-century of scientific work not a few of the most notable achievements have been epoch-

making discoveries in the natural history of Australia and New Zealand. The Australian mammals and the extinct birds of New Zealand are the themes of a large proportion of the long list of his contributions to natural science, and the recorder of the history of discovery in Australian zoology must always refer to the name of Owen as one of the greatest contributors to our knowledge. With Sydney, Owen was specially connected by his life-long friendship and correspondence with our veteran naturalist—Dr. George Bennett.

MACLEAY MEMORIAL VOLUME.

At the last Annual Meeting I had the honour to bring before you the proposal that a Macleay Memorial Volume, containing a series of original contributions to science, should be published in honour of Sir William Macleay's memory and in recognition of his eminent services to the cause of science. The proposal met with your approval, and steps were at once taken to have the scheme carried into effect. A Publication Committee, consisting of Hon. Dr. Norton, Mr. Etheridge and myself, with Mr. Fletcher, was appointed by the Council and has held frequent meetings during the year. The appeals which were made to the members of the Society and to the general public for contributions towards the cost of the Memorial have resulted altogether in the sum of about £240 being obtained, which, though somewhat disappointing, when we consider the extent of the liberality which we desire to commemorate, has been sufficient to justify us in proceeding with the work. This has now approached very near completion, under the able editorship of Mr. Fletcher, and the time has arrived when it has become necessary to come to a definite understanding with regard to this Volume and the relations which it is to bear to the Society.

The contents of the Volume, of which a copy comprising all except the Preface and Introduction and two papers, which are not yet in type, is placed on the table, will be as follows:—

Frontispiece. Portrait of Sir William Macleay, reproduced by Freeman from a photograph by the platinotype process.

I. Preface, setting forth briefly the design and objects of the Memorial, with a list of the names of the Subscribers.

II. Biographical Memoir of Sir William Macleay, written by Mr. Fletcher.

III. Contributions to a knowledge of *Ceratodus*. Part I. The Blood-vessels. By Professor W. Baldwin Spencer, 34 pp.

IV. On the Pliocene Mollusca of New Zealand. By Professor F. W. Hutton, F.R.S., 57 pp.

V. A monograph of the Temnocephalæ. By Professor W. A. Haswell, 60 pp.

VI. On an apparently new type of the Platyhelminthes (Trematoda?). By Professor W. A. Haswell, 5 pp.

VII. On the muscular anatomy of *Palinurus Edwardsii*, Hutton. By Professor T. Jeffery Parker, F.R.S., and Josephine Gordon Rich, 18 pp.

VIII. On the anatomy of the muzzle of *Ornithorhynchus*. By Professor J. T. Wilson and Dr. C. J. Martin, 10 pp.

IX. On rod-like tactile organs in the muzzle of *Ornithorhynchus*. By Professor J. T. Wilson and Dr. C. J. Martin, 11 pp.

X. On *Parmacochlea Fischeri*, Smith. By C. J. Hedley, 3 pp.

XI. On the geographical relations of the floras of Norfolk and Lord Howe Islands. By Professor Ralph Tate, 16 pp.

XII. On an undescribed *Acacia* from New South Wales. By Baron Sir Ferdinand von Mueller, F.R.S., 4 pp.

XIII. Description of a new *Hakea* from Eastern New South Wales. By Baron Sir Ferdinand von Mueller, F.R.S., and J. H. Maiden, F.L.S., 2 pp.

XIV. A description of some of the implements and weapons of the Alligator Tribe, Port Essington, N.A. By R. Etheridge, junr., about 20 pp.

The work will be illustrated by thirty-five plates, which have, in the majority of cases, been lithographed by R. Wendel, and printed by Messrs. Troedel, and are, as I consider, very satisfactorily executed.

NEW RULES.

In August of last year a sub-committee, consisting of the Hon. Dr. Norton, Mr. Fletcher, and myself, was appointed in order to draw up a new set of Rules for the Society. A draft of these was submitted to the Council and passed with a few modifications. At a general meeting called for the purpose on December 21st these proposed new Rules were discussed, some amendments introduced, and the Rules as amended were finally adopted at a general meeting held on the 29th December.

One of the chief new provisions is the institution of a recess in the monthly meetings of the Society during the months of December, January, and February. This is a reform which was greatly needed; and, though the number of monthly meetings will thus be reduced, I have little doubt that the Society will actually gain as regards the total value and interest of the work done.

It has also been decided to do away with the office of Hon. Secretary—an office which, with the present Permanent Secretary, meant nothing, and involved no work. The number of Members of Council not office-bearers has been raised to twelve, and a quorum of not less than five has been fixed for the minimum for the transaction of business.

It has been decided also to raise the entrance-fee for all ordinary members to two guineas, and to make the subscription for all after 1893 one guinea. A few new Rules relating to minor matters, and a few modifications of the formerly existing Rules, have been introduced; but none of these are of sufficient importance to call for remark at present. Copies of these new Rules with an amended list of members will shortly be in your hands.

Résumé OF RECENT WORK.

Since it has been customary for the President of the Royal Society of New South Wales to give annually a general account of the scientific work done within the Colony during the year, and since this will shortly be ably done by my friend Professor Warren,

I decided to make the subject of this, my second Presidential Address to this Society, an account of any important additions to biological knowledge that had been made in other countries in the course of the last twelve months or so. But before I had made much progress with this, I found that any attempt at a comprehensive review of the history of Biology during the period would be entirely out of the question: it would demand, among other things, a more complete command of the literature of the subject than is attainable in Australia, it would require more time than I had left for it, and it would take one far beyond all reasonable limits for an address of this kind. I have, therefore, thought it better to confine myself to two subjects, viz., "Recent views on the structure of protoplasm and the significance of the various parts of the cell"; and "Recent work on the Marsupials and Monotremes," the former as being one of the questions of the day with biologists in general, the latter as being of special interest to those of us who have the fortune to be resident in Australia.

RECENT VIEWS ON THE STRUCTURE OF PROTOPLASM AND THE SIGNIFICANCE OF THE VARIOUS PARTS OF THE CELL.

Stimulated in part, without doubt, by the publications of the great German theorist Weismann and his disciples and critics or opponents, research and discussion on cell-structure and the various phases of cell-division has been fairly active during the last year or two. Attention has been attracted to the importance of determining more definitely the meaning and functions of the various parts of the cell; and some definite progress has undoubtedly been made of late in our knowledge of the relative importance in connection with nutrition, movement, regeneration of lost parts and reproduction, of the different parts of the animal and plant cell. The position of predominance not long ago accorded to the nucleus by almost all biologists has, in the view of many, become less assured. Formerly the nucleus was regarded as the physiologically essential part of the cell, the cytoplasm or protoplasm of the body of the cell serving mainly as a storehouse of nutriment

and a field in which the activities of the nucleus could be exercised, not capable of initiating any important changes, and taking only a passive part in cell-multiplication and reproduction. Certain changes which take place in the cell-protoplasm during these processes were usually supposed to be brought about more or less mechanically as a result of the changes that take place in the nucleus itself. The appearance of the bodies termed "attraction-spheres" and "centrosomes" first discovered by E. van Beneden,* with the nuclear spindle, was regarded as a phenomenon quite subordinate in importance to the division of the chromatin substance of the nucleus itself. But since it has been shown that the centrosomes and attraction-spheres become prominent before the chromosomes actually undergo division, and particularly since it has been found that the attraction-spheres and central corpuscles are capable of determination in cells which do not multiply mitotically,† it has seemed probable to the majority of the investigators of cell-structure that in these bodies we may have to recognise independent centres of activity within the cell apart from the nucleus. Moreover the behaviour of these bodies during mitotic cell-division appears to indicate in no uncertain manner that they have a part of importance to play in the process. The fibrillæ of the spindle appear to go out from the centrosomes to become connected with the chromosomes, and it seems to be by a movement of contraction of these fibrils that the two sets of divided chromosomes are drawn apart towards the poles of the spindle. Flemming in a recent address‡ expresses himself in the following terms with reference to the importance of these bodies:—"Wir haben die Aussicht dass an die Kenntniss dieser

* "Recherches sur la maturation de l'œuf, la fécondation et la division cellulaire" (1883); and Van Beneden et Neyt, "Nouvelles recherches sur la fécondation et la division mitosique." *Mém. Acad. Roy. Belg.* 1887.

† First by Flemming ("Attraktionsphären und Centralkörper in Gewebszellen und Wanderzellen," *Anat. Anz.* VI. 1891); afterwards confirmed by Heidenhain ("Ueber die Centralkörperchen und Attraktionsphären der Zellen," *Anat. Anz.* VI. (1891).

‡ "Ueber Zelltheilung," *Verhandl. d. Deutsch. Anat. Gesellsch.* 1891.

neugefundenen Organe der Zelle, Sphäre und Centrankörper sich noch viel weitere Aufschlüsse über das Zellenleben anknüpfen werden; und wenn man jetzt nahe am Ende dieses Jahrhunderts wagen will, ein wenig in das folgende hineinzuprophezieren, so dürfte sich sagen lassen dass wahrscheinlich um 1933, wenn nicht viel früher, die Entdeckung der Sphären und Centrankörper durch van Beneden in der Geschichte der Biologie einen ebenso denkwürdigen Platz, vielleicht einen wichtigeren einnehmen wird, als die Entdeckung des Zellkernes vom Jahre 1833."

A similar view of the importance of these structures is taken by Guignard* as a result of his study of their occurrence and history in the cells of plants. "Au total la partie fondamentale dans l'étude morphologique de la fécondation paraît résolue; le phénomène n'est pas, comme on avait cru pouvoir admettre jusqu'ici de nature purement nucléaire; il ne consiste pas simplement dans l'union de deux noyaux d'origine sexuelle différente, mais aussi dans la fusion de deux corps protoplasmiques dont les éléments essentiels sont les sphères directrices de la cellule mâle et la cellule femelle." †

This generally accepted view of the importance of the centrosomes has been recently opposed by Bürger. (‡) He expounds and defends the view that the centrosomes and attraction-spheres are not organs of the cell, but are structures of no special significance, the appearance of which is due to the attraction exerted on one another by the microsomata or granules of the protoplasm. These would, he holds, be drawn in towards a centre by the supposed attractive force, but would become so closely crowded at a certain point that their further passage towards the centre would be prevented, and we should have a clear central space without microsomata surrounded by a compact zone of these bodies. The fact that the centrosomes are stained more darkly

* "Sur l'existence des 'sphères attractives' dans les cellules végétales." C.R., T. 112.

† Annales des sciences naturelles, Botanique, 1891.

‡ "Was sind die Attraktionsphäre und ihre Centrankörper?" Anat. Anzeiger, VII. (1892).

than the ordinary substance of the cell he explains by the supposition that, by the pressure exerted by the zone of microsomes attracted towards the centre, the protoplasm of this central part is in a more condensed condition than in other parts of the cell.

Some objections to this view of the matter have been well expressed by Fick.* It seems assailable on many grounds. In the first place, it assumes the operation of a force for the existence of which there is no evidence. This attraction between the microsomes is not a molecular force—the microsomes being bodies of (comparatively speaking) large size. What then is it? But, even if we admit the operation of this force, it seems to me very unlikely that it would act in the manner supposed. The effect of such an attraction would inevitably be the formation of groups having a compact central part. If the arrangement round a central space occurred it would be an unstable condition, and very readily disturbed. In such a hollow sphere of microsomata, kept in equilibrium by mutual pressure, moreover, there would not, it appears to me, be any pressure exerted on the protoplasm of the central space sufficient to increase its density.

But the strongest evidence against this ingenious theory is afforded by the observations that have been made, in the case of cells of many different kinds, on the history of these bodies, and their evident relations to the process of nuclear division. For why should mere hollow spheres of granules of no functional importance within the cell, but drawn together by some unknown form of force, divide as the centrosomes are seen to do with perfect regularity at a certain stage in the process of division of the cell?

There is then good reason for the view that the centrosomes and attraction-spheres, with the spindle fibres that proceed from them, are of importance in the phenomenon of cell-division; and according to Rabl and other recent writers they form the actual vital centres of the cell.

* "Bemerkungen zu O. Bürger's Erklärungsversuch der Attraktions-sphären." *Anat. Anz.* VII. (1892).

The significance of these bodies in the phenomena of impregnation has been universally recognised since the publication of Fol's* brilliant observations, and Guignard's more recent discoveries have proved that they play a precisely analogous part in the fertilisation of flowering plants.† They have been found to occur in the ova of a variety of animals from the earliest stages of their development, and they have also been detected in the male sexual cells, and recently in the spermatozoa themselves. Thus the view that, as the spermatozoon is little more than a nucleus, the nucleus must be all-important in reproduction and inheritance has been gradually losing ground; with the entry of the spermatozoon there appears within the ovum not only the male pronucleus, but also a male centrosome which is in all probability derived from the cytoplasmic part of the spermatozoon; and this would appear to take part equally with the male pronucleus in bringing about fertilisation. Guignard's general conclusion from his observation of the behaviour of these bodies in the fertilisation of plants is that fecundation consists "not only in the copulation of two nuclei of different sexual origin, but also in the fusion of two protoplasts likewise of different origin represented essentially by the attraction-spheres of the male and female cells."

On the other hand a good many observations and experiments on the Protozoa seem to point to the importance of the nucleus in that group in connection with the regeneration of lost parts. But here we meet with apparent contradictions, for while Balbiani‡ states that regeneration takes place in *Stentor* only in the case of portions that contain a part of the nucleus, Gruber§ finds that when spontaneous fission has been once initiated, if a transverse section be made so that none of the nucleus remains in the

* "Die 'Centrenquadrille,' eine neue Episode aus der Befruchtungsgeschichte." *Anat. Anz.* VI. (1891).

† "Sur la nature morphologique du phénomène de la fécondation." *Comptes Rendus*, T. 112, p. 1320.

‡ *Annales de Micrographie*, iv. (1892). Abstract in the *Journal of the Royal Micros. Soc.* Dec. 1892.

§ "Ueber künstliche Theilung bei Infusorien." *Biol. Centralbl.* iv. and v.

anterior portion, the latter, though devoid of nuclear substance, will form a complete animal. If we accept both of these sets of observations as correct they lead to the important result that, while under normal circumstances regeneration does not take place in the absence of a nucleus, yet, when spontaneous fission is about to take place, something of unknown nature is formed or separated which, though not a nucleus, is capable after artificial fission of giving rise to a new nucleus in the non-nucleated part. This observation of Gruber's in fact throws a serious difficulty in the way of the unreserved acceptance of the general principle laid down by him in the earlier of the two papers referred to:—"Zellplasma kann anscheinend immer nur seinesgleichen, nie aber Kernplasma hervorbringen; das letztere ist mit anderen Worten kein Umwandlungsprodukt des erstern, und damit müsste auch die Möglichkeit freier Kernbildung ausgeschlossen sein." For here appears to be a case in which nuclear substance *is* formed from cell-protoplasm.

So far as recorded observations go it is the chromatin substance, not of the nucleus itself, but of the relatively insignificant *para-nucleus*, that is of importance in the conjugation of the Infusoria, and it has not been shown that any centrosomes take part in the process. But little of importance seems to have been added to our knowledge of this part of the subject since the date of Maupas' remarkable observations.

During the maturation of the ovum and the genesis of the sperm-cell it was observed some years ago in the case of *Ascaris* by Hertwig*, and more recently in the case of a hemipterous insect by Henking†, that there is a reduction of the number of chromosomes by a half. Though it is difficult to decide in the present state of our knowledge what deductions to draw from this remarkable fact, the investigations of Guignard, leading to the result that a precisely corresponding reduction takes place in the case of plants, seem to prove that it has a deep morphological or physiological significance.

* Arch. f. Mikro. Anat. 1890.

† Zeitschr. f. wiss. Zool. 1891.

Some difference of opinion still exists with regard to the derivation of the spindle—whether it is formed from the achromatin network of the nucleus or from matter which passes in from the extra-nuclear cytoplasm; but the preponderance of evidence and of authority would appear to be in favour of the latter view—at least as regards the greater part of the spindle.

Some cases which have been observed in the Protozoa seem at first sight to point in an opposite direction; in these instances the nuclear membrane does not disappear on division, and the spindle fibres appear within it; but there is nothing to show that these spindle fibres, growing out from the centrosomes, do not perforate the nuclear membrane and thus reach the interior of the nucleus.

These complicated changes in the chromosomes, centrosomes, and attraction-spheres that accompany cell-division are, as is well known, not always observable when a cell divides. Besides the complex mitotic cell-division, we find in many instances a simple or *amitotic* form, in which the nucleus simply becomes constricted into two parts, which separate from one another as the cell divides. Now, as this amitotic form of nuclear division is found to be constant in certain kinds of cells under certain conditions, the question naturally arises—To what is this due? Why should one set of cells divide constantly in one way and others in another? What special purpose is served by the more complex kind of division, and what are the conditions which render it unnecessary? Various attempts to answer this question have been made in the course of the past year.

Flemming regards as admissible the conception that only the mitotic form of nuclear division leads to physiological increase and regeneration of cells, while the amitotic fragmentation of the nucleus, with or without the division of the cells, represents either a degeneration or an aberration, or perhaps in many cases aids in the cellular metabolism by increase in the periphery of the nucleus.

Ziegler* expresses somewhat similar views. To these he was led first by the study of the periblast of bony fishes, in which

* "Die biologische Bedeutung der amitotischen (direkten) Kerntheilung im Thierreich." Biol. Centralbl. 1891.

during segmentation the nuclei divide with caryokinesis, while later, when the cells have definitely assumed the function of taking up the nutrient matter of the yolk, division is always direct.

In general Ziegler concludes that fragmentation (which term he uses as the equivalent of direct nuclear division), takes place in the case of cells which do not divide any more, or in protoplasm-masses which have been produced by imperfect cell-division. Its appearance is dependent on the fact that the cell is becoming specialised—adapted to a particular function. The nuclei are degenerate inasmuch as the cell is capable of no further division, and, as a result, cannot take part morphologically in the further building up of the embryo, or in the phenomena of re-generation. The appearance of amitotic nuclear division, according to Ziegler, always indicates the end of the series of divisions. It is very unlikely that nuclei which once come to divide amitotically will ever again divide with mitosis. As a rule, he holds, the amitotic nuclear division is not followed by cell-division.

The nuclei which divide amitotically are always characterised by their specially large size, and in cells with such meganuclei there always goes on a particularly active process of secretion or assimilation.

Ziegler adduces a number of cases of amitotic cell-division in both vertebrates and invertebrates which, he maintains, tend to bear out his view.

Löwit* dissents altogether from Ziegler's view that direct division of nuclei indicates the termination of the series of divisions, and states that in the blood-cells of the crayfish and the leucocyte elements of the rabbit's lymph he has observed amitotic cell-division leading to a true new formation of cells. He distinguishes between a process of *fragmentation* which is degenerative, and a process of direct nuclear division which is not.

* "Ueber amitotische Kerntheilung." Biol. Centralbl. 1891.

Verson* and Frenzel† also adduce particular cases of direct nuclear division which, as they maintain, are incapable of being explained in accordance with Ziegler's view.

Bütschli‡ has reiterated and reinforced in the course of the last year the arguments in favour of his view of the nature of protoplasm. By his experiments with certain "emulsions," first described by him several years ago, he claimed to have effected something towards elucidating the real nature of living protoplasm, and also towards explaining as purely physical and chemical some of the phenomena characteristic of living protoplasm, and commonly set down as manifestations of purely vital forces.

Bütschli's method of experimenting is now well known. With thickened olive oil is mixed finely powdered carbonate of potash. When a drop of this mixture is placed on a slide and covered with a cover-glass, under which water is run, it exhibits, when examined under the microscope, remarkable streaming movements resulting in change of shape and of position, so that it bears some resemblance to a gigantic living *Amœba*. The drop has a vesicular or frothy character owing to its consisting of numerous minute vesicles containing soapy substance separated by thin layers of oil.

We have here a very complex system of contending surface tensions, a system in which very slight influences acting from the outside, such as currents in the surrounding water, may alter the balance of the whole; some of the superficial vesicles burst; this disturbs the balance of the tensions in the neighbouring parts, and the disturbance passes through the drop, with the result that a streaming movement is brought about, and a resulting change of shape.

It is contended that the movements of living protoplasm are in some cases so like those of this artificial representative that the former is probably similar as regards its general physical condition

* Biol. Centralbl. 1891, p. 556.

† "Zur Bedeutung der amitotischen (direkten) Kerntheilung." Biol. Centralbl. 1891.

‡ "Untersuchungen über mikroskopische Schäume und das Protoplasma."

to the latter. The structure of protoplasm is vesicular or frothy, and its movements are due to purely mechanical forces similar to those that operate in bringing about the movements in our drop of frothy emulsion.

That the probability of this is established as regards some forms of protoplasm and some protoplasmic movements can hardly be doubted. But there is danger lest we imagine that this conclusion carries more with it than it really does. It is important to know that some of the movements of protoplasm can be explained in this way; but in accepting this explanation we must guard against the idea that we are thereby making an important step in the direction of destroying the conception of vitality as distinguished from a peculiarly subtle and complex combination of chemical and physical forces. The only conclusion that the vitalist will admit to be capable of being legitimately drawn from such experiments is that some of the movements of living protoplasm may not be vital.

That protoplasm is in many cases of a vesicular, alveolar, or, as Prof. Bütschli prefers to call it, foamy, nature will be granted readily enough by all who have given attention to the subject. But that all that we observe of structure in the cell—whether of the lowest organisms or of the highest—is brought about merely by this vesicular arrangement, is not to be so readily conceded. When we come to take special cases and to attempt to interpret them in accordance with this theory, we soon come to meet with many difficulties. That some part of what we often take for reticulate and fibrous structure may really be due to the vesicular nature of the protoplasm is probable enough; it may also be conceded that some of the striations observable in the cell may have resulted from regular streaming movements of the protoplasm leaving rows of vesicles; but a wide difference exists between admitting this and subscribing to the view that all cytoplasmic structure is capable of this explanation.

For in examining specialised cells of a size to render their study favourable for the interpretation of minute structure, we find appearances which, as it seems to me, are not capable of being

interpreted in the manner proposed: appearances which, being constant for the same cell under varying methods of treatment, cannot be produced by the action of re-agents.* If such a cell is watched while some fixing agent of a favourable character is applied to it, the new features which come out appear, not like something brought about by precipitation or streaming of vesicles, in which case some trace of the movements would surely be capable of detection, but very much in the same way as the features of a landscape come gradually into view at dawn. No part of the structure seems to be manufactured before our eyes; it merely gradually emerges into view. Thus we get regularly arranged systems of lines which, if they are not networks of fibrils, are certainly very unlike division-walls between series of vesicles, and arrangements of definite granules which are equally impossible of interpretation in accordance with Bütschli's theory. We find, moreover, in the cytoplasm certain bodies of a definite nature which are observed to go through certain well-defined series of changes, some of which entail movements of a restricted and definite character. How are we to explain the phenomena of karyokinesis in the absence of any fibrils or other guiding and contracting elements within the cell?

This view of the matter has been forcibly put by Flemming:—
 "Ich befinde mich in Einklang mit Kupffer in der Meinung dass wir in der That guten Grund haben hier wirkliche wenn auch natürlich nicht starre sondern vital veränderliche Bauverhältnisse anzunehmen, nicht aber, wie andere meinen, eine emulsionartige Masse, in der Strömungen und Körnchenaufreihungen kommen und schwinden."†

Moreover the definiteness of form observable in most unicellular animals, and most cells of multicellular, seems to require some other internal structure than mere vesicles. In the absence in many cases of an external stiff enclosing layer, how are we to

* Apathy in a paper "Ueber die Schaumstruktur hauptsächlich bei Muskel- und Nervenfasern" (Biol. Centralbl. 11, 1891) denies that such alveolar or frothy structure exists in nerve or muscle fibres.

† "Ueber Zelltheilung," Verhandl. der deutsch. Anat. Gesellsch. 1891.

account for a return to a certain shape after the undergoing of active or passive changes of form?

When the vesicular theory of cell-structure is applied to the nucleus it meets with still greater difficulties. Flemming* has lately protested against the view that the appearances in nuclei described by himself and others are due to post-mortem changes. In the living condition, in very many cases the nucleus appears quite clear and devoid of structure, except that perhaps a nucleolus may be distinguishable. The internal structure only becomes visible gradually if no re-agents are employed, more suddenly under the action of acetic acid. The structure becomes visible only post-mortem, but is not to be regarded on that account as artificial. Under the action of acetic acid the granules and threads start into view in a manner which proves that they cannot be formed by movement and re-arrangement of the nuclear substance. And in some nuclei these structures are visible in the living condition of the cell without the use of re-agents.

But the difficulties in the way of accepting Bütschli's conclusions as sufficient become most manifest when we consider the case of the ovum. It is difficult to be satisfied with a view of cell-structure which would lead to the conclusion that the difference between the ovum of an Echinoderm and that of a Mammal is merely a difference in the chemical composition of the protoplasm, and, structurally, in the size and disposition of the bubbles or vesicles. To account for the differences in the developmental history we need something, call it what you may—physiological molecule, micella, idioblast—between the chemical molecule and the vesicle, something the special properties of which determine the direction of the development.

Altmann† has recently published a short paper which may be regarded as a supplement to his work "Die Elementärorganismen und ihre Beziehungen zu den Zellen," issued two years ago. He

* "Ueber Unsichtbarkeit lebendiger Kernstrukturen." *Anat. Anzeiger*, 1892.

† "Ein Beitrag zur Granulalehre." *Verhandl. Anat. Gesellsch.* 1892, pp. 220-223.

here gives an account of a method specially adapted for bringing out distinctly the intergranular network of the nucleus. As a result of the employment of this method of preparation he claims to have demonstrated that the coarser trabecular networks of various authors exist only as local thickenings of this intergranular network; the wide spaces between the trabeculae, however, do not exist, but are taken up by granules and the fine intergranular network of the nucleus. This intergranular network of the resting nucleus shows the same colour-reaction as the so-called chromatin substance of the dividing nucleus.

Similar networks are, as is well known, common in the cytoplasm, and these, as Altmann has already shown, are composed of rows of fine granules. The larger granules in the meshes are derived from the small granules of the network. Altmann reiterates his view that the really fundamental structures in the cell are the granules and not the network. Probably the network in the resting nucleus is not capable of being distinctly analysed into rows of granules only because of the excessive smallness of the latter; the changes which the network undergoes in cell-division seem to indicate the probability of such an analysis.

RECENT WORK ON MARSUPIALS AND MONOTREMES.

At the beginning of last year Cope* published a paper in which he expressed doubts of the Marsupial nature of Stirling's *Notoryctes typhlops*, and suggested certain affinities with *Chrysochloris*, the Golden Mole, an Insectivore.

He pointed out that mammae had not been detected in the pouch, and drew the inference that the early parturition of the Marsupials does not hold good in *Notoryctes*. The two osseous nodules in the tendon of the external oblique muscles, he maintains, resemble the fibro-cartilage found in a corresponding position in some dogs rather than true marsupial bones. The inflection of the angle of the mandible is not greater, he points out, than that

* "On the habits and affinities of the new Australian Mammal, *Notoryctes typhlops*." *American Naturalist*, February, 1892.

seen in some Glires and Insectivora. The form of the skull seems to indicate a brain like that of *Chrysochloris*, and with apparently larger cerebral hemispheres than is usual in the Marsupials.

Among other characteristics in which *Notoryctes* approaches the Insectivora and differs from the Marsupials he refers to the imperforate palate, the presence of a patella, and the arrangement and number of the incisor teeth, which are neither diprotodont nor polyprotodont, but resemble those of ordinary mammals in being three on each side both above and below.

He then points out what he regards as special resemblances to the *Chrysochloridae*, and adds:—"Such an aggregate of resemblances to the *Chrysochloridae* signifies, it appears to me, zoological affinity. Whether *Notoryctes* will ultimately be found to enter the Marsupialia or not, it must be a descendant out of the same stock as that which gave origin to the *Chrysochloridae*. But I suspect the brain, female generative organs, and foetal characteristics will turn out to resemble those of *Chrysochloris*, as do its other characters, and in that case *Notoryctes* will enter the *Insectivora*."

In the preceding October Stirling had read an additional paper on *Notoryctes*,* in which two small mammae with "exceedingly minute nipple-like projections" are described as situated in the pouch. The vagina also appears to have a median septum; but the account given of the female generative organs is, owing to the condition of the specimen, by no means entirely satisfactory, and more remains to be done in this direction.

Gadow† has also published the results at which he has arrived by an examination of *Notoryctes*, especially as regards the skeleton and the teeth; and, as was to be expected, pronounces unequivocally for its marsupial affinities. He expresses the opinion, however, that if we had only the skeleton without the teeth, and if it had been found in America, there would have been strong reasons for

* "Further notes on the habits and anatomy of *Notoryctes typhlops*." Trans. Roy. Soc. of South Australia, 1891, pp. 283-291, pl. xii.

† "On the systematic position of *Notoryctes typhlops*." Proc. Zool. Soc. 1892, p. 361.

putting *Notoryctes* down as an Edentate. He gives the following as the complete dental formula :—i. $\frac{3}{3}$, c. $\frac{1}{1}$, pm. $\frac{2}{2}$, m. $\frac{4}{4} = \frac{10}{10}$.

As a result of comparison with the various families of Marsupials he arrives at the conclusion that the Notoryctidae are a family of Polyprotodont Marsupials more nearly related to the *Dasyuridae* than to the *Peramelidae*.

In Owen's memoir "On the structure of the Brain in Marsupial Animals," published in 1837, he states that the marsupial brain is devoid of the corpus callosum or great commissural band between the two cerebral hemispheres so highly developed in the placental mammals. The study of the brains of the Platypus and Echidna by Eydoux and Laurent, and later by Owen, led to a similar result with regard to the Monotremes. These statements were uncontroverted, and accordingly became incorporated in all the text-books of comparative anatomy, until in 1865, Flower published a paper in which he maintained that a true corpus callosum is present in the Marsupials and the Monotremes, though in a rudimentary form. Last year Johnson Symington read a paper on this subject before Section D of the British Association* in which he shows that what was regarded by Flower as representing the corpus callosum in the brains of Marsupials and Monotremes, is, as shown by the distribution of its fibres, in reality a commissure connecting the hippocampi majores and gyri dentati. So that, as Flower† has himself acknowledged the correctness of this view, we come back to Owen's original opinion that a corpus callosum does not exist as such either in the Marsupials or the Monotremes.

Sir William Turner‡ has investigated the external anatomy of the brain of *Ornithorhynchus*. A comparison with that of *Echidna* shows that the latter possesses a higher organisation; its bulk, as is well known, is much greater, its cerebral convolutions more

* "The Cerebral Commissures in the Marsupialia and Monotremata." *Journal of Anat. and Phys.* Vol. XXVII. (1892).

† Report of a meeting held in connection with a proposed memorial to Sir Richard Owen. "Nature," 1892.

‡ *Journal of Anatomy and Physiology*, XXVI. (1892).

numerous and complicated ; its olfactory region is larger ; and its cerebellum is both larger and more minutely divided by fissures.

Symington has investigated the organ of Jacobson in *Ornithorhynchus** and in the kangaroo and rock-wallaby,† the result being, briefly, that, whereas in the two latter there is not any wide difference from what is observable in the Eutheria, in the former, as in *Echidna*, the organ is very extensively developed, running further forward than in the *Eutheria*, and with a complete tube of cartilage from which a well-developed turbinated process passes inwards.

Kükenthal's‡ researches on the dentition of *Didelphys* are of great interest and importance, as his general results are most probably applicable to all Marsupials, and have, moreover, an important bearing on the question of the evolutionary history of the Mammalia. Kükenthal finds that in the Marsupial, as in Mammals in general, there are two rows of tooth-rudiments, an inner and an outer, developed from the primitive dental fold. In the higher Mammalia the inner set give rise to the permanent, the outer to the milk dentition. In the Marsupial one tooth alone—the last premolar—is developed from the former of these sets of rudiments, while all the remaining teeth are formed from the latter. Hence the conclusion follows that all the teeth of Marsupials, with the exception of the last premolar, are the equivalents of the milk dentition of the higher Mammals.

Thomas§ admits the justness of this deduction, but points out that if the Marsupials are, as Kükenthal supposes, primitively diphyodont, and have become almost completely monophyodont by a process of suppression of the teeth of the set corresponding to the permanent series of the higher Mammalia, it becomes somewhat difficult to explain the case of *Triconodon*, one of the earliest of known Mammals, in which there is only one tooth with a

* Proceedings Zoological Society, 1892.

† Journal of Anatomy and Physiology, XXVI. (1892).

‡ Anatomischer Anzeiger, 1891 ; Annals and Magazine of Natural History, 1892.

§ Annals and Magazine of Natural History, 1892.

vertical successor, and that the very tooth which has a vertical successor in the case of the Marsupials of the present day.

Röse* gives an account of the results of a study of the development of the teeth in the Marsupials, in which he states that, as regards the general mode of development, there is little difference between that group and other Mammals. He finds that, as is generally accepted, it is for the most part only the last premolar that is formed from the accessory ridge; that is to say, that tooth alone belongs to what corresponds to the permanent set of other Mammals; but the same in all probability holds good of the last incisors of *Perameles* as well as *Macropus* and *Phalangista*. This last premolar either simply pushes itself into a gap in the first row of teeth—none of the latter becoming absorbed (as in *Didelphys*, *Phalangista Cookii*, *Perameles Doreyanus*, *Betideus bidens*, *Myrmecobius*), or takes the place of the last premolar of the first set which becomes absorbed (*Phalangista* sp., *Macropus lugens*, *M. giganteus*, *Phascogale penicillata* and the fossil *Triacanthodon serrula*).

With the exception of the last premolar, and perhaps the last incisors, the permanent teeth of the Marsupials seem, as previously pointed out by Kükenthal, to be the equivalents not of the permanent teeth of other Mammals but of the milk or deciduous set.

Throughout the Vertebrate series, he points out, from the Selachii to the Mammalia, there is a tendency to the evolution of the dentary system taking the direction of a reduction in the number of rows and series and an advance in the specialisation of the individual tooth. The Marsupials, in which the second dentition has been reduced almost to a vanishing point, thus appear to have advanced beyond the placental Mammals on the former of these lines of tooth evolution; but this can hardly be regarded as a higher development, since the loss of the second dentition can only be looked upon as an advance when the teeth of the single series grow throughout life from persistent pulps—a condition

* "Ueber die Zähnenentwicklung der Beuteltiere." 'Anat. Anzeiger, 1892.'

which occurs in the Marsupials only in the case of the Wombats.

There seems to be little doubt that the ancestors of both the placental Mammals and the Marsupials were Diphyodont, possessing two series of teeth, and that the Marsupials have attained to a practically monophyodont condition by the almost complete suppression in all of them of the teeth of the second set ; while among the higher Mammals such a suppression, which, as Kükenthal maintains, is never complete, is to be observed only in certain exceptional groups.

On the motion of Mr. Brazier a cordial vote of thanks was accorded to the President for his interesting Address.

In the unavoidable absence of the Hon. Treasurer the President read the financial statement, which showed that on December 31st last there was a credit balance in the Bank of £175 10s. 2d. in addition to the sum of £41 19s. held on account of the Macleay Memorial Volume. The Treasurer also reported a considerable amount due to the Society arising out of subscriptions in arrear.

On the motion of Mr. Maiden it was unanimously resolved :—
“That the Members of the Society, having heard with sincere regret of the death of the Rev. Dr. Woolls, desire to record their warm appreciation of his enthusiastic and untiring efforts to promote and popularise the study of Australian botany ; and that the sympathy of this Meeting be respectfully tendered to Mrs. Woolls.”

On the motion of Mr. Garland it was unanimously resolved :—
“That this Meeting desires to record its approval of the arrangements, financial and otherwise, made by the Council for carrying out the recommendations of the last Annual Meeting respecting the Macleay Memorial Volume.”

The following gentlemen were elected

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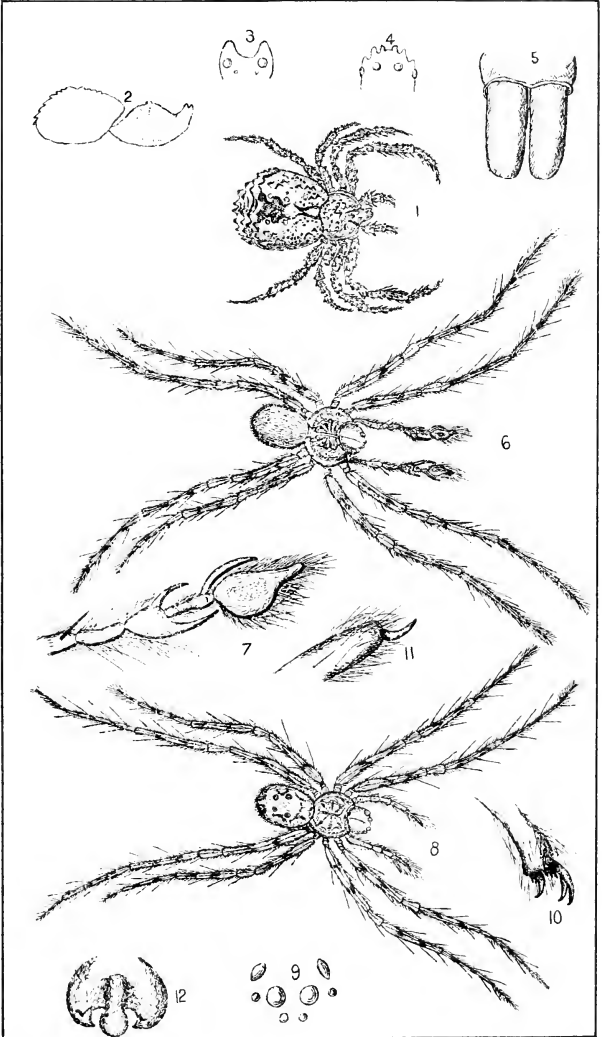
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