

TRANSACTIONS AND PROCEEDINGS

OF THE

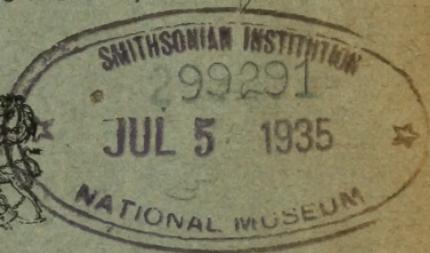
ROYAL SOCIETY of SOUTH AUSTRALIA

(INCORPORATED).

VOL. XXXVI.

[WITH FRONTISPIECE, SIXTEEN PLATES, AND NINE FIGURES IN
THE TEXT.]

EDITED BY WALTER HOWCHIN, F.G.S.



PRICE, TEN SHILLINGS.

Adelaide :

RIGBY, LIMITED, 74, KING WILLIAM STREET.
DECEMBER, 1912.

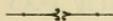
Parcels for transmission to the Royal Society of South Australia from Europe and America should be addressed "per Rigby, Ltd., care Messrs. Thos. Meadows & Co., 34, Milk Street, Cheapside, London."

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(INCORPORATED).

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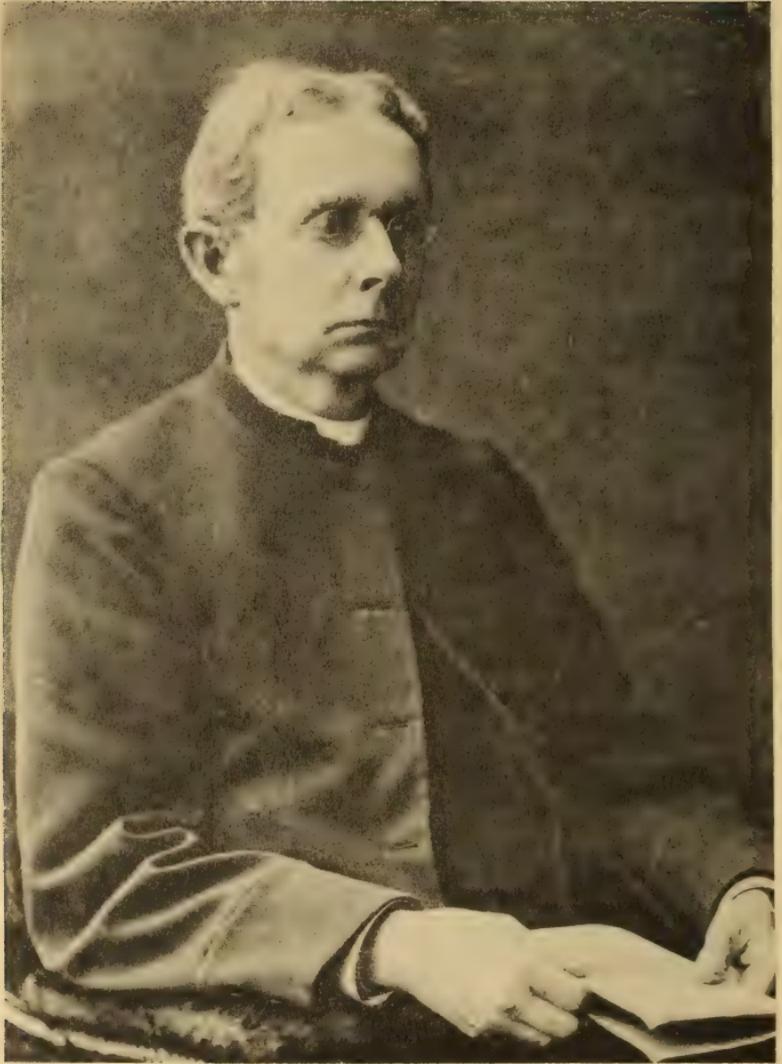
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REV. CANON BLACKBURN, B.A.

THE LATE REV. CANON THOMAS BLACKBURN, B.A.,
AND HIS ENTOMOLOGICAL WORK.

(With portrait.)

By ARTHUR M. LEA.

[Read October 10, 1912.]

There passed away at Woodville, near Adelaide, on May 28, 1912, a quiet and unassuming naturalist in the person of Thomas Blackburn; and with him Australia lost one of its best entomologists. Although formerly well known in England, and later doing good work in Honolulu, it was nevertheless in Australia that most of his work was done.

He was born at Islington, near Liverpool, on March 16, 1844. Matriculated at London University in 1866 and took his B.A. degree in 1868. For a time he was in the Imperial Civil Service, having gained first place in a competitive examination for a position in the Department of the Secretary for Inland Revenue, but he soon left it for the Church of England. He was ordained a Deacon by the Bishop of Manchester in May, 1869, and the following May as a Priest. He had charge of the Parish of Greenhithe, 1870-76. Thence he was transferred to Honolulu, where he remained for six years as Senior Priest and Chaplain to the Bishop. He then came to Australia and took charge as Rector of St. Thomas', at Port Lincoln, in 1882. In 1886 he was appointed Rector of St. Margaret's, at Woodville—a position he retained for the remainder of his life. A few years ago he was also appointed Honorary Canon of St. Peter's Cathedral in Adelaide.

He was twice married. First, in August, 1870, to Jessie Anne Wood, daughter of C. W. Wood, Q.C., of Wandsworth, England, by whom he had three sons: Gavin Wordsworth, now at Vancouver; Charles Bickerton, now in Sydney; and Edward Forth William, now at Wagin, in Western Australia. His first wife died in May, 1885. In September, 1886, he married Margaret Harriette Stewart Browne, daughter of John Stewart Browne, S.M., of Port Lincoln, by whom he had three sons and a daughter: John Stewart, Harry Kenneth Baines, Margaret Browne, and Arthur Seaforth. His second wife died in 1904, but all their children are now resident at Woodville.

For the greater portion of his life he enjoyed good health, but severe rheumatism and other constitutional weaknesses marred some of his later years and interfered considerably with both his parish and entomological work. The Sunday preceding his death he was preparing to conduct morning service at his church when he was stricken down with paralysis, from which he never recovered, passing quietly away a week afterwards.

He was essentially a busy man, and devoted the best of his time and efforts to his parish duties. As a consequence he was seldom able to start entomological work till about 9 p.m., and such work on hot summer nights must have been very trying.

In Honolulu he published two works; the first, entitled "Visions of the King," a book of sermons, and the second, entitled "True and False Issues between Christianity and Science," the substance of a course of lectures that he delivered in Honolulu.

He also wrote two musical cantatas, the first entitled "The Story of the Crucifixion," and the second, "The Story of Calvary." In his spare time, and when travelling, he also composed some poetical pieces, mostly of a religious nature.

I applied to Dr. D. Sharp for some particulars of his early life in England, and, in reply, he wrote:—"He began very young. Fifty years ago he came into notice. The first note published appears to be one in conjunction with his brother, J. B. Blackburn—a list offering various Lepidoptera in exchange for *Noctuidina*, to which they had then resolved to limit their collection. This note appeared in 'The Entomologists' Weekly Intelligencer,' November 24, 1860. In 1861 'The Weekly Intelligencer' was abandoned by its hitherto editor, H. J. Stainton, and after an interval of nine months the two Blackburns published and edited 'The Weekly Entomologist,' the first number of which appeared in August, 1862. It was continued for two years, and then gave place to the present 'Entomologists' Monthly Magazine,' of which Mr. Blackburn was one of the original editors. In 1862 he appears to have been Secretary of the Bowdon and Altrincham Entomological Society. His first note on Coleoptera appeared in 'The Weekly Entomologist' of January, 1863, and was a list of captures of Coleoptera during 1862. At this period his entomological work was chiefly of a minor character, but he published a great many notes."

When only a boy he received encouragement from Mr. C. O. Waterhouse, of the British Museum, and it was pos-

sibly through his influence that his attention was diverted from the Lepidoptera to the Coleoptera.

When in England he contributed many notes to entomological publications, and especially to "The Weekly Entomologist." About half of the leaders of that rather short-lived publication were from his pen. The leaders were not published with their writers' names, but in his own bound copy of that publication the author's initials are marked in pencil, some of his own being on such diverse subjects as "Union is Strength," "Wanted, Entomologists!" "Discoveries," "Notes from Lacordaire," "Mites," "The Natural History of the Tineina," "Nunquam Moriemur Inusti."

He was then nineteen years of age! After his transfer to Honolulu he also wrote a few notes on insects. But in Australia, except for a paper read before a meeting of the Australasian Association for the Advancement of Science held in Adelaide, he confined himself to descriptive work.

He began his work on Lepidoptera in England, but soon afterwards took up the Coleoptera. After his transfer to Honolulu he collected insects of all Orders, and many of these he worked out, either alone or in collaboration with Messrs. Cameron and Kirby and Dr. Sharp. He also sent numerous specimens from the Hawaiian Islands to various specialists, who published the results, and in this way it was from his work alone that the insect fauna of that interesting group of islands became very well known in comparison to what it was before. After landing in Australia, however, he practically dropped all work on insects other than beetles, such specimens of a general kind that came in his way he simply handed over to the South Australian Museum.

As previously stated, Mr. Blackburn arrived in Australia in 1882, and his first paper was contributed to the Royal Society of South Australia in 1887. In 1888 he contributed his first paper to the Linnean Society of New South Wales, to which Society he was elected a Corresponding Member in the same year. For some years also he belonged to the Australasian Association for the Advancement of Science, and for many years he was Honorary Curator in Entomology to the South Australian Museum.

His descriptions were drawn up with great care, the diagnosis being in Latin, followed by comparative notes in English.

In his early years in Australia he made large collections in the Port Lincoln district, and after his transfer to Woodville he collected in that neighbourhood, and also made special collecting trips to Oodnadatta and other districts in South Australia.

Of late years he usually made an annual trip to one of the other States, New South Wales and Victoria being often visited. But the specimens obtained on these trips represented a comparatively small fraction of the total he examined. He had all the beetles of the South Australian Museum at his disposal, and thousands of these bear labels in his writing. He examined all the beetles taken on the Elder Expedition,⁽¹⁾ the Horn Expedition, Mr. Zietz's trip to Lake Callabonna, etc. For many years specimens were sent to him at such an accelerating rate that he found he could not spare time to attend to all of them, and in consequence of late years his entomological correspondence was considerably curtailed.

In his early years in Australia some of his finest species were sent by the late Sir William Macleay, by the late Mr. George Masters, and the late Mr. A. S. Ollif. Mr. French sent him many fine *Buprestidæ*, *Cerambycidæ*, and other showy insects to be named. He obtained a fine lot of Western Australian insects in exchange with Mr. Meyrick for some Lepidoptera from the Hawaiian Islands. Mr. Bailey, the Queensland Botanist, sent him many specimens. Messrs. Koebele and Perkins also gave him many specimens from New South Wales and Queensland, especially from the north. From the late Dr. Bovill he obtained many species from the Northern Territory. Mr. Aug. Simson contributed largely from Tasmania. Mr. T. G. Sloane, Mr. H. H. D. Griffith, the late Professor Tate, his own children, and myself gave him species from various parts of Australia, but probably every worker at Australian Coleoptera during the past twenty-five years sent him specimens at one time or another.

He was a systematist, pure and simple, taking no interest, or, at any rate, very little, in the life histories of the insects themselves; although in his earlier days he appeared to have been interested in the transformation of Lepidoptera.

He worked at most families of beetles at various times, both from interest in them and from working through collections taken during various expeditions; but of late years he had almost confined himself to the *Scarabæidæ*, a family that had always been first favourite with him. He was, however, preparing to work through the *Elateridæ*, and was arranging his collection of that family when his call came.

Groups that would have presented insurmountable difficulties to many entomologists he attacked conscientiously; thus the largest and most difficult genus of all Australian

(1) A Mountain in Central Australia discovered during the Elder Expedition was named after him.

beetles—*Paropsis*—was well worked out; so also was the next most difficult—*Heteronyx*. To the latter genus he returned again and again; but of *Paropsis* he told the present writer that he never wished to look at it again. Other large and difficult genera such as *Lacon*, *Monocrepidius*, *Liparetrus*, *Amarygmus*, *Chalcopterus*, *Monolepta*, and many others, were worked through, in most cases tables being given to render the species more readily identifiable.

Following is a list of his entomological publications, totalling 3,696 pages, not including short notes:—

In Entomologists' Monthly Magazine:—

Vol. 13—Four Species of *Helophorus* New to Britain, pp. 39, 40. Insect Notes from the Sandwich Islands, pp. 227, 228.

Vol. 14—Characters of a New Genus and Descriptions of two New Species of *Cossonida* from the Sandwich Islands, pp. 4, 5. Characters of a New Genus and Descriptions of New Species of *Geodephaga* from the Sandwich Islands, pp. 142-148.

Vol. 15—Characters of New Genera and Descriptions of New Species of *Geodephaga* from the Hawaiian Islands: Part 1, pp. 119-123; Part 2, pp. 156-158; Part 3, pp. 104-109 (Vol. 16); Part 4, pp. 226-229 (Vol. 17); Part 5, pp. 62-64 (Vol. 18).

Vol. 17—Notes on Species of *Aculeate Hymenoptera* Occurring in the Hawaiian Islands (Blackburn and Kirby), pp. 85-89. Descriptions of Four New Species of *Cossonida* from the Hawaiian Islands, pp. 199-201.

Vol. 19—Descriptions of the Larvæ of Hawaiian Lepidoptera, pp. 55, 56.

Vol. 21—Notes on Some Hawaiian *Carabidæ*, pp. 25, 26. *In the Scottish Naturalist*:—

Outline Descriptions of British Coleoptera (Reprinted in pamphlet form, 1875, pp. 1-71).

In Annales de la Société Entomologique de Belgique:—

Some Observations on the Genus *Oodemus* of the Family *Cossonidæ*, 1878, pp. 73, 74.

In Annals and Magazine of Natural History:—

Notes on Hawaiian Neuroptera, with Descriptions of New Species, 1884, pp. 412-421.

In The Scientific Transactions of the Royal Dublin Society:—

Memoirs on the Coleoptera of the Hawaiian Islands (Blackburn and Sharp), 1885, pp. 119-300, plates iv. and v.

In Memoirs of the Manchester Literary and Philosophical Society:—

The Hymenoptera of the Hawaiian Islands (Blackburn and Cameron), 1885-86, pp. 194-295.

In Transactions of the Royal Society of South Australia:—

Notes on Australian Coleoptera with Descriptions of New Species: No. 1—1887, pp. 12-30; No. 2—1887, pp. 36-51.

Further Notes on Australian Coleoptera, with Descriptions of New Species: No. 3—1887, pp. 52-71; No. 4—1887, pp. 177-287; No. 5⁽²⁾—1888, pp. 176-214; No. 6—1889, No. vi., pp. 134-148.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species:—No. 7—1890, Part vii., pp. 82-93; No. 8—1890, Part viii., pp. 121-160; No. 9—1891, Part ix., pp. 65-153; No. 10—1891, Part x., pp. 292-345; No. 11—1892, Part xi., pp. 20-73; No. 12—1892, Part xii., pp. 207-261; No. 13—1893, Part xiii., pp. 130-140; No. 14—1893, Part xiv., pp. 294-315; No. 15—1894, Part xv., pp. 139-168; No. 16—1894, Part xvi., pp. 200-240; No. 17—1895, Part xvii., pp. 27-60; No. 18—1895, Part xviii., pp. 201-258; No. 19—1896, Part xix., pp. 35-109; No. 20—1896, Part xx., pp. 233-259; No. 21—1897, Part xxi., pp. 28-39; No. 22—1897, Part xxii., pp. 88-98; No. 23—1898, Part xxiii., pp. 18-64; No. 24—1898, Part xxiv., pp. 221-233; No. 25—1899, Part xxv., pp. 22-101; No. 26—1900, Part xxvi., pp. 35-68; No. 27—1900, Part xxvii., pp. 113-169; No. 28—1901, Part xxviii., pp. 15-44; No. 29—1901, Part xxix., pp. 99-131; No. 30—1902, Part xxx., pp. 16-30; No. 31—1902, Part xxxi., pp. 288-321; No. 32—1903, Part xxxii., pp. 91-182; No. 33—1903, Part xxxiii., pp. 261-309; No. 34—1904, Part xxxiv., pp. 281-297; No. 35—1905, Part xxxv., pp. 270-332; No. 36—1906, Part xxxvi., pp. 263-324; No. 37—1907, Part xxxvii., pp. 231-299; No. 38—1908, Part xxxviii., pp. 362-386; No. 39—1909, Part xxxix., pp. 18-64; No. 40—1910, Part xl., pp. 146-230; No. 41—1911, Part xli., pp. 173-203; No. 42⁽³⁾—1912, Part xlii., pp. 40-75.

Descriptions of Twenty New Species of South Australian Coleoptera:—No. 43—1888, pp. 1-11.

Scientific Results of the Elder Exploring Expedition, Coleoptera:—No. 44—1892, pp. 16-61; No. 45—1892, pp. 177-202.

In Proceedings of the Linnean Society of New South Wales:—

Notes on the Hemiptera of the Hawaiian Islands:—1888,⁽⁴⁾ pp. 343-354.

(2) The first five parts not numbered originally.

(3) Posthumously.

(4) Not numbered, as no Australian Coleoptera described in same.

Notes on Australian Coleoptera, with Descriptions of New Species:—No. 46, p.p. 805-875.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species—No. 47, pp. 1387-1506.

Notes on Australian Coleoptera, with Descriptions of New Species:—No. 48—Part iii.,⁽⁵⁾ pp. 445-482; No. 49—Part iv., pp. 707-746; No. 50—Part v., pp. 1247-1276; No. 51—Part vi., pp. 147-156; No. 52—Part vii., pp. 303-366; No. 53—Part viii., pp. 553-592; No. 54—Part ix., pp. 775-790; No. 55—Part x., pp. 479-550; No. 56—Part xi., pp. 65-151; No. 57—Part xii., pp. 283-300; No. 58—Part xiii., pp. 185-208; No. 59—Part xiv., pp. 245-286; No. 60—Part xv., pp. 85-108.

Revision of the Genus *Heteronyx*, with Descriptions of New Species:—No. 61—Part i., pp. 1321-1362; No. 62—Part ii., pp. 137-170; No. 63—Part iii., pp. 426-444; No. 64—Part iv., pp. 661-706; No. 65—Part v., pp. 1217-1246.

Revision of the Genera *Colpochila* (including *Haplonycha*), *Sericesthis*, and their Allies, with Descriptions of New Species:—No. 66—Part i.,⁽⁶⁾ pp. 517-552.

Revision of the Australian Amarygmides:—No. 67—Part i., pp. 411-470; No. 68—Part ii., pp. 53-106.

Revision of the Genus *Paropsis*:—No. 69—Part i., pp. 637-693; No. 70—Part ii., pp. 166-189; No. 71—Part iii., pp. 218-263; No. 72—Part iv., pp. 656-700; No. 73—Part v., pp. 482-521; No. 74—Part vi., pp. 159-196.

Revision of the Australian Species of *Bolboceras*, with Descriptions of New Species:—No. 75, pp. 481-526.

In Proceedings of the Royal Society of Victoria:—

On some New Genera and Species of Australian Coleoptera:—No. 76—1899, pp. 206-233.

Revision of the Australian Aphodiides and Descriptions of three New Species Allied to them:—No. 77—1904, pp. 145-181.

In Report of the Horn Expedition to Central Australia:—

Coleoptera:—No. 78—1896, pp. 254-308.

Australasian Association for the Advancement of Science:—

Importance of Ascertaining Distribution of Australian Fauna:—1893, pp. 446-451.

He described or named a little over 3,000 species of Australian *Coleoptera*.⁽⁷⁾

(5) The first two parts were not numbered.

(6) All published.

(7) 3,069. A total far ahead of that of any other Australian entomologist.

As with many others, he at first did not specially mark his types, but of late years he did mark them, and all of those that were sent to the British Museum, and most of those remaining in his collection, were marked T.

Shortly before his death he sent many of the types to the British Museum, and a list of these was kept. At the time of his death he had two boxes filled with types, and these, after being examined and listed, were also sent to the British Museum.

He also named many species from the collections of the South Australian Museum. At the foot of his descriptions of many of these the types are explicitly stated to be in that institution. In talking the matter over with him only about a month before his death he informed the writer that when he had described specimens from the Museum only he returned the types to that institution, even when there were numerous specimens of a species. Thus the types of the beetles named from the Elder Exploring Expedition, from Mr. Zietz's trip to Lake Callabonna, Mr. J. G. Otto Tepper's from Kangaroo Island and elsewhere, and Mr. J. P. Tepper's from the Northern Territory, etc., should, with few exceptions, all be in the Museum.⁽⁸⁾

Co-types of many of his species, however, are scattered largely through his own and other collections, and his labels at the present time are well known to all Australian Coleopterists.

The increasing importance attached to type specimens of insects causes it to be of importance to Australian Coleopterists to know exactly where his types may be seen. I therefore went through all his papers and prepared a list of the species described from Australia. He named many other beetles, bugs, etc., from the Hawaiian Islands, but in the appended list only the Australian beetles are dealt with.

For the purposes of this list it was not considered desirable to give the usual abbreviations of the Transactions or Proceedings of the Societies in which the descriptions appeared, but to give a reference number to each paper containing descriptions of Australian beetles. The following abbreviations are also used:—

Sub. Substitute-name, for preoccupied names. For these names the types, of course, would originally bear different names, and the actual specimens were usually not known to Mr. Blackburn.

⁽⁸⁾ In some instances, however, he retained the actual type specimens and sent them to the British Museum. Where, therefore, the specimens so sent were marked as types, the present writer, in all cases, regards them as such.

- B. Type is in British Museum.
 M. Type is, or should be, in Macleay Museum, Sydney.
 N. Type is, or should be, in National Museum, Melbourne. Most of these were originally in Mr. C. French's collection; some were from the Horn Expedition, and a few were originally from the Museum. Unfortunately, in many instances, Mr. French removed Mr. Blackburn's labels, substituting some in his own writing for the sake of uniformity. He often, however, attached a special "type" label to the specimens.
 S. Type is, or should be, in South Australian Museum.

In a few instances no letter follows the reference, and in such cases the location of the type is unknown to me at present.

Many of the species were first referred to genera from which they were subsequently removed; but in the list the species are all noted as if belonging to the genera to which they were originally referred. In some cases, however, the specimens were sent to the British Museum under their revised names, and these exceptions are noted.

For facility of reference the families, genera, and species are arranged in alphabetical sequence.

LIST OF SPECIES NAMED BY MR. BLACKBURN.

- | | |
|-----------------------------------|--|
| Abacetus crenulatus, 49-726 (B) | Adelotopus creberrimus, 28-19 (B) |
| macleayi, 49-727 (Sub) | micans, 28-18 (B) |
| simplex, 49-726 (B) | tasmani, 28-18 (B) |
| Acalonoma pusilla, 59-256 (B) | Adimonia lugen, 19-96 (B) |
| Acantholophus franklinensis, 7-92 | mastersi, 19-87 (B) |
| (type in coll. J. Anderson) | richmondensis, 19-87 (B) |
| niveovittatus, 53-576 | Adoryphorus, 47-1412 |
| simplex, 78-292 (B) | Ægosoma carpentariæ, 58-191 (N) |
| tatei, 78-292 (B) | Æolus queenslandicus, 57-296 (B) |
| Acrogenius tinctus, 19-38 (N) | Æthinodes, 9-109 |
| Acrogenys australis, 6-132 (B) | marmoratum, 9-109 (B) |
| Acroniopus pallidus, 47-1423 (S) | Agelastica impura, 47-1499 (B) |
| Acupalpus morganensis, 53-556 (B) | lineata, 5-175 (B) |
| Acylophorus indignus, 43-4 (B) | Agestra punctulata, 53-584 (B) |
| Adelaidia, 9-130 | Agetinus æqualis, 47-1478 (S) |
| rigua, 9-130 (B) | Agonocheila fenestrata, 56-80 (B) |
| Adelium æquale, 55-539 (B) | koebelei, 18-201 (B) |
| alpicola, 55-536 (B) | perplexa, 16-201 (B) |
| angulatum, 55-538 (B) | stictica, 18-201 (B) |
| ellipticum, 16-219 (B) | Agrilus frenchi, 10-302 (N) |
| inconspicuum, 55-536 (B) | terræ-reginæ, 12-220 (B) |
| hindense, 55-538 (B) | Alaus darwini, 50-1259 (B) |
| occidentale, 53-574 (B) | Alcides terræ-reginæ, 27-141 (B) |
| pustulosum, 55-534 (B) | Alcmæonis punctulaticollis, 13-134 (B) |
| simplex, 44-44 (S) | |
| tropicum, 55-537 (B) | |
| victoriæ, 55-535 (N) | |

- Aleochara insignis*, 2-47 (B)
læta, 2-46 (B)
occidentalis, 2-46 (B)
pelagi, 2-45 (B)
 Only head and prothorax now remaining.
Alleleidea viridis, 10-302 (B)
Amarygmus æger, 68-94 (B)
alienus, 68-93 (B)
diaperoides, 47-1435 (S)
frenchi, 68-97 (B)
lilliputanus, 68-100 (B)
lindensis, 68-104 (B)
pectoralis, 68-96 (B)
perplexus, 68-102 (B)
pinguis, 68-102 (B)
porosus, 68-98 (B)
queenslandicus, 68-101 (B)
rimosus, 68-103 (B)
ruficornis, 68-96 (B)
rugaticollis, 68-104 (B)
rutilipes, 68-100 (B)
stolidus, 68-99 (B)
suaavis, 68-95 (B)
tardus, 50-1271 (B)
uniformis, 50-1272, 68-105 (B)
Amblytelus brevis, 56-87 (B)
discoidalis, 54-782 (B)
inornatus, 54-781 (B)
sinuatus, 56-87 (B)
Amphichroum adelaidæ, 11-23 (B)
Amphimela australis, 47-1491 (B)
piceicornis, 19-42 (B)
Amphiops australicus, 24-226 (B)
duplopunctulatus, 24-226 (B)
Amphirhœ sloanei, 48-453 (B)
Anacanthopus, 23-42
inermis, 23-43 (B)
Anacheirotus, 26-39
inornatus, 26-40 (B)
Ananca boisduvalii (see *Silis* (australis)
zietzi, 17-55 (S)
Anaplopus, 52-311
tuberculatus, 52-313 (B)
Anarciarthrum, 52-354
viride, 52-355 (B)
Anatisis frenchi, 54-789 (N)
muelleri, 22-59 (N)
Anaxo æreus, 10-308 (B)
affinis, 10-309 (B)
ater, 10-310 (B)
lindensis, 10-309 (B)
obscurus, 10-309 (B)
occidentalis, 10-311 (B)
puncticeps, 10-311 (N)
sparsus, 10-310 (N)
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Anepius, 30-29
koebelei, 30-30 (B)
raucus, 30-30 (B)
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aurilegulus, 20-257 (B)
calvus, 4-231 (B)
collaris, 57-286 (B)
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richardsæ, 51-149 (B)
Anilara angusta, 10-296 (N)
læta, 10-297 (B)
planifrons, 4-248 (B)
soror, 10-296 (N)
subcostata, 10-296 (S)
Anodontonyx antennalis, 37-266 (B)
chalceus, 37-263 (B)
consanguineus, 37-262 (B)
creber, 37-262 (B)
gravicollis, 37-260 (B)
hirticeps, 37-266 (B)
indignus, 37-264 (B)
rectangulus, 37-264 (B)
tetricus, 37-261 (B)
Anomala australasiæ, 56-113 (B)
Anoplognathus brevicollis, 55-493 (B)
concinuus, 26-41 (B)
macleayi, 55-495 (B)
Anorthorrhinus, 52-327
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Anthrenus flindersi, 9-132 (B)
ocellifer, 9-132 (B)
Anthribidæ, 27-141, 28-31
Antitrogus burmeisteri, 41-200 (B)
nigricornis, 41-199 (B)
Antoligostethus, 41-203
lucidus, 41-203 (B)
Antyllis alternata, 52-345 (B)
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tasmanicus, 14-301 (B)
Aparete nodosa, 45-179 (S)
Apate lindi, 50-1263 (B)
Apatodes, 47-1429
macleayi, 47-1429 (S)
Apellatus apicalis, 47-1440 (B)
nigricornis, 10-315 (B)
nodicornis, 10-314 (B)
Aphanasium variegatum, 45-196 (S)
Aphileus ferox, 17-56 (B)
Aphodius andersoni, 77-154 (B)
baldiensis, 77-156 (B)
callabonnensis, 17-32 (S)
frenchi, 11-35 (B)
insignior, 77-156 (B)
lindensis, 11-35 (B)
suberosus, 77-155 (B)
victoriæ, 22-88 (B)
yorkensis, 12-209 (B)
Aphthona cowleyi, 19-76 (B)
Apion terræ-reginæ, 56-151 (B)
Aposites gracilis, 58-198 (N)
lanaticollis, 11-61 (B)
niger, 11-62 (B)
Aprosiectus intricatus, 47-1464 (S)
Aræocerodes, 27-167
lilliputanus, 27-167 (B)

- Aræocerus asperulus*, 27-166 (B)
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 koebeleri, 27-164 (B)
 lindensis, 27-165 (B)
Arsipoda æneofulva, 19-47 (B)
 ænescens, 19-52 (B)
 collaris, 19-54 (B)
 concolor, 19-46 (B)
 consanguinea, 19-48 (B)
 deceptrix, 19-50 (B)
 detersa, 19-49 (B)
 fossipennis, 19-53 (B)
 hepatica, 19-54 (B)
 jocosa, 19-47 (B)
 jugularis, 19-53 (B)
 kingensis, 37-298 (B)
 læviceps, 19-46 (B)
 languida, 19-46 (B)
 laticollis, 19-56 (B)
 pallidicornis, 19-50 (B)
 paradoxa, 19-51 (B)
 picturata, 19-55 (B)
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 spectabilis, 19-48 (B)
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Arthropteris foveipennis, 11-24
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Articerus asper, 6-138 (B)
Asemantus, 20-248
 leai, 21-29 (B)
Aspidomorpha lauta, 19-108 (B)
 planipennis, 19-107 (B)
Aspidophorus humeralis, 60-92 (B)
Astræus major, 50-1257 (B)
 meyricki, 50-1256 (B)
 simplex, 12-211 (N)
 tepperi, 50-1259 (B)
Atænius coloratus, 77-169 (B)
 consors, 77-168 (B)
 deserti, 60-95 (B)
 gibbus, 77-166 (B)
 goyderensis, 78-264 (B)
 imparilis, 77-163 (B)
 koebeleri, 77-162 (B)
 macilentus, 77-167 (B)
 mendax, 11-36 (B)
 Sent as *Saprosites mendax*.
 moniliatus, 77-161 (B)
 nudus, 77-166 (B)
 palmerstoni, 9-135 (B)
 sparsicollis, 77-164 (B)
 speculator, 9-135 (B)
 spissus, 77-167 (B)
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 walkeri, 77-170 (B)
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Ateratocerus, 52-357
 intricatus, 52-357 (B)
Atermonocheila, 37-238
 longipes, 37-239 (B)
Aterpus abruptus, 56-132 (B)
 raucus, 56-132 (B)
- Atesta eremita*, 45-194 (S)
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Athemistus cristatus, 58-200 (B)
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 torridus, 58-202 (N)
Atomaria australis, 9-119 (B)
 eucalypti, 11-33 (B)
 lindensis, 9-119 (B)
Atractocerus victoriensis, 10-306 (N)
Atychoria rudis, 78-294 (B)
Augomela acervata, 47-1488 (B)
Aulacocyclus collaris, 20-233 (B)
 errans, 20-233 (B)
Aulacophora australis, 47-1498 (B)
 cucullata, 19-83 (B)
 denticornis, 19-83 (B)
 palmerstoni, 47-1497 (B)
 richmondensis, 52-360 (B)
Aulicus amabilis, 27-133 (B)
 cribratus, 27-134 (B)
 croesus, 27-127 (B)
 dives, 27-128 (B)
 eremita, 27-133 (B)
 modestus, 27-135 (B)
 mundus, 27-131 (B)
 nigrohirtus, 27-129 (B)
 parvulus, 13-131 (B)
 robustus, 27-131 (B)
Automolus funereus, 36-283 (B)
 irrasus, 36-285 (B)
 major, 36-286 (B)
 opaculus, 36-285 (B)
 pictus, 36-284 (B)
 semitifer, 36-283 (B)
Axynaon, 21-34
 championi, 21-35
 In the British Museum list no species of *Axynaon* was mentioned; but there was a *Chalcopteris championi*. But Blackburn did not name a *Chalcopteris championi*, so probably the name *Chalcopteris* was used in error for *Axynaon*.
- Bagous adelaidæ*, 59-285 (B)
 australasiæ, 59-284 (B)
 clarenciensis, 15-163 (B)
Baris orchivora, 26-61 (B)
Barronica, 18-202
 scorpio, 18-203 (B)
Barycistela, 10-327
 robusta, 10-328 (B)
Basitropis pallida, 27-156 (B)
 relicta, 27-154 (B)
Bebius variegatus, 11-64 (B)
Belus abdominalis, 45-187 (B)
 adelaidæ, 45-189 (B)
 bison, 45-184 (B)
 difficilis, 45-181 (S)
 distinctus, 45-190 (B)
 elegans, 45-187 (B)
 flindersi, 45-185 (B)
 frater, 45-182 (S)
 helmsi, 45-182 (S)
 insipidus, 47-1455 (S)
 mundus, 45-186 (B)
 perplexus, 45-184 (B)

- Belus regalis*, 45-188 (B)
tibialis, 45-190 (B)
ventralis, 45-182 (S)
- Bembidium** *dubium*, 2-43 (B)
errans, 2-43 (B)
hobarti, 29-123 (B)
ocellatum, 2-44 (B)
proprium, 2-43 (B)
secalioides, 54-786 (B)
victoriense, 54-785 (B)
wattsense, 29-123 (B)
- Berosus** *auriceps*, 48-447 (B)
debilipennis, 24-224 (B)
decepiens, 46-827 (B)
discolor, 46-829 (B)
duplicatus, 46-828 (B)
flindersi, 46-831 (B)
gravis, 46-826 (B)
macumbensis, 78-259 (B)
majusculus, 46-824 (B)
munitipennis, 17-30 (B)
queenslandicus, 24-225 (B)
simulans, 46-832 (S)
- Bethelium** *mundum*, 11-57 (B)
spiniorne, 25-91 (B)
tricolor, 11-56 (B)
- Bledius** *adelaidæ*, 2-49 (B)
caroli, 1-14 (B)
cowleyi, 30-22 (B)
infans, 9-76 (B)
injucundus, 1-14 (B)
insignicornis, 9-75 (B)
minax, 1-14 (B)
ovensensis, 9-76 (B)
pontilis, 30-22 (B)
- Blepegenes** *nitidus*, 55-533 (N)
- Bolboceras** *aratum*, 75-502 (B)
basedowi, 75-512 (S)
bovilli, 75-503 (B)
carinatum, 75-523 (B male, S female)
chelyum, 47-1395 (B)
clypeale, 75-511 (B)
fenestratum, 46-845 (B)
fraternum, 75-517 (B)
froggatti, 75-509 (B)
impressicolle, 75-520 (B)
lævipes, 75-517 (B)
loweri, 75-515 (B)
macleayi, 75-500 (B)
mandibulare, 75-513 (B)
nitens, 75-519 (B)
nitidiceps, 75-516 (B)
obscurius, 75-522 (B)
pontiferum, 75-525 (S)
richardsæ, 8-159 (B)
simpliciceps, 46-844 (B)
sloanei, 47-1393 (B)
subretusum, 75-518 (B)
tatei, 46-842 (S)
tenax, 75-507 (B)
terræ-reginæ, 25-25 (B)
truncatum, 75-509 (B)
- Bostrychidæ**, 13-131, 22-92, 44-39,
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- Bothriдерes** *costatus*, 4-197 (B)
tibialis, 4-196 (B)
variabilis, 4-196 (B)
victoriensis, 9-117
- There was no specimen bearing this label in Mr. Blackburn's boxes of types. But in his general collection there is a label, "Bothriдерes victoriensis, Blackb.," with a card on which are parts of two legs; these apparently being all that is left of the type.
- Brachypeplus** *barronensis*, 31-305 (B)
cowleyi, 31-304 (B)
kemblensis, 31-306 (B)
koebeli, 31-304 (B)
olliffi, 31-302 (B)
wattsensis, 31-303 (B)
- Brachysphyrus**, 32-160
irroratus, 32-160 (B)
- Brenthidæ**, 19-36
- Bruchidæ**, 26-62
- Bruchus** *lyndhurstensis*, 26-62 (B)
oodnadattæ, 26-63 (B)
persimulans, 26-64 (B)
quornensis, 26-63 (B)
- Bryaxis** *harti*, 9-78 (B)
inuitata, 9-79 (B)
lindensis, 9-77 (B)
ovensensis, 9-80 (B)
paludis, 9-81
- Bubastes** *inconstans*, 47-1414 (B)
laticollis, 47-1415 (B)
occidentalis, 10-293 (N)
splendens, 10-294 (N)
vagans, 12-313 (B)
- Bubastodes**, 12-212
sulcicollis, 12-212 (B)
- Bucolellus**, 5-210
ornatus, 5-210 (B)
- Bucolinus**, 12-252
longicornis, 12-252 (B)
- Bucolus** *convexus*, 11-72 (B)
frater, 18-255 (B)
posticalis, 18-256 (B)
- Bupala** *bovilli*, 31-317 (B)
dentata, 31-318 (B)
- Buprestidæ**, 4-234, 8-146, 9-136, 10-293,
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 15-140, 16-207, 19-35, 21-30,
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 32-181, 33-306, 42-72, 44-35,
 46-860, 47-1414, 50-1256, 51-152,
 52-307, 54-788, 55-496, 57-287,
 60-98, 78-268
- Byrrhidæ**, 6-138, 9-133, 32-173, 60-92
- Byrrhomorpha**, 56-109
anomala, 37-275 (B)
ponderosa, 56-111 (B)
verres, 56-110 (B)
- Byrrhus** *raucus*, 9-133 (B)
 Sent as *Pedilophorus raucus*.
torrensensis, 6-138 (B)
- Cacephatus**, 27-151
sericeus, 27-151 (B)
- Cacochroa** *obscura*, 46-858 (B)

- Cædiomorpha*, 4-272
australis, 4-272 (B)
Cædius lindi, 4-271 (B)
Cafius occidentalis, 2-48 (B)
Cairnsia, 18-224
cowleyi, 18-225 (B)
Callabonica, 17-36
propria, 17-36 (S)
Callirhipis cardwellensis, 20-258 (N)
Calloodes frenchi, 51-148 (B)
 Sent as *Anoplognathus frenchi*.
Calochromus cucullatus, 26-56 (B)
simillimus, 26-57 (B)
rostratus, 26-58
Calomela apicalis, 47-1489 (S)
distinguenda, 47-1490 (S)
eyrei, 51-155 (B)
flavescens, 52-358 (B)
imperialis, 45-201 (S)
lauta, 78-302 (B)
satelles, 45-200 (B)
tassalis, 47-1490 (B)
Candozea bovilli, 5-179 (B)
leai, 16-287 (B)
palmerstoni, 5-178 (B)
sculpta, 52-363 (B)
Cantharidæ, 6-141, 12-228, 25-59, 44-46
Canthydrus bovilli, 48-446 (B)
Car, 21-35
condensatus, 21-36 (B)
Carabidæ, 1-12, 2-36, 3-52, 4-177,
 6-132, 7-82, 9-65, 11-20, 14-294,
 15-139, 16-200, 17-27, 18-201,
 26-35, 28-16, 29-99, 32-91,
 33-261, 38-362, 43-1, 44-17,
 46-805, 47-1387, 48-445, 49-707,
 50-1247, 52-304, 53-553, 54-775,
 55-479, 56-65, 60-85
Cardiophorus eucalypti, 55-516
victoriensis, 55-516
Cardiothorax aeripennis, 12-226 (B)
Carenum cupreomarginatum, 3-63 (B)
fugitivum, 3-61 (B)
inconspicuum, 3-59 (B)
macleayi, 3-64 (B)
rugatum, 3-62 (B)
Cassida adelaidæ, 19-106 (B)
prothoracica, 19-107 (B)
Catasarcus armatus, 59-271 (B)
farinosus, 78-288 (B)
sericeus, 59-270 (B)
Cathartus cairnsensis, 32-151 (B)
Catocalphe, 18-220
minans, 18-221 (S)
Catypnes planicollis, 17-58 (B)
Caulobius advena, 23-51 (B)
compactus, 23-53 (B)
discedens, 23-52 (B)
evanescoens, 23-54 (B)
 Sent as *Automolus evanescoens*.
imitis, 36-289 (B)
punctulatus, 23-51 (B)
rotundus, 36-290 (B male, S
 female)
Cavonus parvus, 4-224 (B)
sculpturatus, 4-223 (B)
sharpi, 4-223 (B)
Centyres delens, 25-89 (B)
sinuatus, 56-129 (B)
Cephalodesmius minor, 26-36 (B)
Cerambycidæ, 4-284, 8-127, 10-342,
 11-56, 11-69, 12-233, 15-165,
 17-57, 18-222, 19-37, 20-259,
 21-37, 22-97, 25-90, 28-31, 31-319,
 36-323, 37-296, 38-386, 45-194,
 47-1456, 48-450, 49-742, 50-1273,
 51-154, 54-789, 55-543, 58-191,
 59-286, 60-106, 76-227, 78-299
Ceratognathus frenchi, 21-28 (B)
froggatti, 60-94 (B)
gilesi, 18-215 (B)
Cercyon fossus, 46-840 (B)
kingense, 37-231 (B)
Cerylon alienigenum, 32-133 (B)
Cestrinus angustior, 16-211 (B)
aspersus, 16-210 (B)
championi, 16-210 (B)
eremicola, 16-211 (B)
minor, 16-212 (B)
zietzi, 16-212 (S)
Chætœcnema (see *Flectroscelis*)
Chalcolampra adelaidæ, 48-479 (B)
distinguenda, 48-482 (S)
eremita, 45-200 (S)
hursti, 48-480 (B)
rustica, 8-138
Chalcomela sloanei, 52-356 (B)
Chalcophora beltanæ, 60-100 (B)
exilis, 60-98 (B)
frenchi, 9-136 (N)
pedifera, 52-307 (N)
Chalcopteropus acutangulus, 25-47 (B)
arthuri, 31-319 (B)
bellus, 67-433 (B)
boops, 25-45 (B)
bovilli, 67-453 (B)
brevipes, 67-434
 In the British Museum list a species
 was marked as being sent without the
 name. As *brevipes* is the only species
 whose type cannot be accounted for,
 the specimen sent was probably *brevipes*.
 Mr. Blackburn's number for it was 4442.
cairnsi, 68-72 (B)
carinaticeps, 67-468 (B)
carus, 67-430 (B)
catenulatus, 67-469 (B)
clypealis, 67-420 (B)
colossus, 67-454 (B)
confluens, 67-440 (B)
costatus, 25-46 (B)
crassus, 25-44 (B)
cribratus, 28-25 (B)
cylindricus, 67-452 (B)
difficilis, 67-426 (B)
eremita, 44-44 (B)
exoletus, 68-70 (B)
eyrensis, 67-442 (B)
froggatti, 67-436 (B)
gracilicornis, 25-45 (B)

- Chalcopterus gracilior*, 68-81 (B)
hunterensis, 68-77 (B)
imperialis, 67-455 (B)
inconspicuus, 67-466 (B)
interioris, 52-311 (N)
intermedius, 67-439 (B)
iridiventris, 67-458 (B)
iris, 25-43 (B)
jucundus, 25-50 (B)
juvenis, 67-429 (B)
kochi, 26-59 (B)
lætus, 67-423 (B)
laticollis, 68-81 (B)
leai, 68-79 (B)
lepidus, 67-465 (B)
longiusculus, 47-1435 (S)
longulus, 67-455 (B)
macer, 67-464 (B)
major, 67-449 (B)
mastersi, 68-73 (B)
mercurius, 67-449 (B)
meyricki, 44-45 (B)
micans, 67-441 (B)
mimus, 67-450 (B)
minor, 67-448 (B)
modestus, 67-432 (B)
mundus, 25-48 (B)
murrayensis, 67-462 (B)
neglectus, 67-446 (B)
nobilis, 68-76 (B)
oblongus, 67-464 (B)
obscurus, 67-445 (B)
ocularis, 68-79 (B)
palmerensis, 68-80 (B)
palmerstoni, 67-443 (B)
perlongus, 67-444 (B)
placidus, 67-435 (B)
plutus, 67-461 (B)
proditor, 25-44 (B)
prospiciens, 68-74 (B)
proximus, 68-71 (B)
puer, 25-41 (B)
pulcher, 68-78 (B)
punctulatus, 67-463 (B)
rusticus, 68-76 (B)
segnis, 68-85 (B)
semiseriatus, 67-460 (B)
setosus, 67-459 (B)
similis, 67-451 (B)
simius, 67-421 (B)
sparsus, 67-431 (B)
superbus, 52-309 (B)
tinctus, 67-425 (B)
versicolor, 67-424 (B)
vigilans, 67-433 (B)
viduus, 67-438 (B)
yorkensis, 67-467 (B)
zonatus, 25-46 (B)
- Chalcotænia angulipennis*, 78-269 (B)
 Sent as *Chalcophora angulipennis*.
sulciventris, 78-270 (B)
 Sent as *Chalcophora sulciventris*.
- Chariotheca besti*, 60-105 (B)
Charopteryx victoriensis, 12-226 (B)
Cheiloxena frenchæ, 13-138 (N)
insignis, 19-39 (B)
- Cheiragra macleayi*, 55-482 (B)
 Sent as *Phyllocidium macleayi*.
- Cheiroplatys accedens*, 20-245 (B)
bifossus, 20-243 (B)
compactus, 20-246 (B)
inermis, 76-212 (B)
pygmæus, 20-247 (B)
- Cheirrhamphica*, 23-25
interstitialis, 23-26 (B)
pubescens, 23-25 (B)
- Cherrus inconspicuus*, 44-53 (S)
longulus, 44-54 (S)
maurulus, 44-54 (S)
ocularis, 14-298 (B)
ruficornis, 14-299 (B)
- Chilocorus baileyi*, 50-1275 (B)
flavidus, 12-239 (B)
- Chirida lacunata*, 19-105 (B)
maxima, 19-104 (B)
multicolor, 19-103 (B)
simplicaria, 19-106 (B)
- Chlamydopsis comata*, 29-129 (B)
inæqualis, 9-94 (B)
sternalis, 9-93 (B)
pygidialis, 76-206 (B)
- Choleva adelaïdæ*, 9-87 (B)
antipodum, 9-87 (B)
macleayi, 32-94 (B)
minuscule, 9-88 (B)
victoriensis, 9-88 (B)
- Cholevomorpha*, 9-89
atropos, 32-96 (B)
extranea, 32-96 (B)
koebelei, 32-95 (B)
picta, 9-90 (B)
- Chromomea maculicornis*, 10-315 (N)
rufipennis, 10-316 (B)
- Chrosis angusticollis*, 27-114 (B)
- Chrysobothris interioris*, 17-46 (S)
Chrysomela australica, 45-199 (S)
- Chrysomelidæ*, 4-287, 5-175, 8-133,
 9-139, 10-345, 11-67, 12-235,
 13-138, 16-220, 19-39, 20-259,
 24-232, 25-93, 26-65, 27-167,
 29-131, 33-309, 37-296, 47-1470,
 48-457, 50-1273, 51-155, 52-356,
 55-544, 58-205, 60-107, 78-302
- Cicindela jungi*, 28-15 (B)
- Cicindelidæ*, 28-15, 44-16
- Cioidæ*, 4-265, 8-127, 10-308, 37-285
- Cis adelaïdæ*, 4-268 (B)
æqualis, 4-268 (B)
australis, 4-267 (B)
leanus, 37-285 (B)
munitus, 4-268 (B)
setiferus, 4-269 (B)
victoriensis, 10-308 (B)
- Cisseis bella*, 10-298 (N)
constricta, 4-254 (B)
dispar, 10-297 (B)
elongatula, 46-862 (S)
lindi, 4-254 (B)
obscura, 4-252 (B)
occidentalis, 4-255 (B)
parva, 4-253 (B)

- Cisseis perplexa*, 10-300 (B)
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⁹ In error printed 339.

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- Cydmaea crassirostris*, 58-190 (B)
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- Cyttalia sydneyensis*, 15-161 (B)
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beltanæ, 61-1343 (B)
bidentatus, 63-434 (B)
blandus, 39-78 (B)
borealis, 63-439 (B)
bovilli, 65-1220 (B)
breviceps, 61-1344 (B)
brevicollis, 61-1338 (M)
brevicornis, 62-148 (B)
calidus, 40-215 (B)
callabonnæ, 39-33 (S)
campestris, 40-166 (B)
capitalis, 40-225 (B)
carteri, 39-72 (B)
cliens, 40-184 (B)
coatesi, 39-42 (B)
collaris, 64-701 (B)

¹¹ Type sent to British Museum, although stated to be in Mr. J. Anderson's collection.

Heteronyx comans, 39-73 (B)
comes, 40-157 (B)
confertus, 40-219 (B)
conjunctus, 40-204 (B)
consanguineus, 55-490 (B)
constans, 62-154 (B)
convexicollis, 40-214 (B)
copiosus, 39-67 (B)
cornutus, 40-224 (B)
costulatus, 40-222 (B)
cowelli, 60-96 (B)
coxalis, 40-221 (B)
crassus, 62-161 (B)
cribriceps, 44-32 (S)
cribripennis, 42-45 (B)
crinitus, 40-161 (B)
cunnamullæ, 40-162 (B)
cygneus, 62-159 (B)
darlingensis, 61-1349 (M)
darwinii, 63-455 (B)
debilicollis, 39-60 (B)
debilis, 62-169 (B)
deceptor, 65-1227 (B)
declaratus, 39-25 (B)
decorus, 44-31 (S)
dentipes, 62-168 (B)
difficilis, 42-47 (B)
disjectus, 40-179 (B)
dispar, 38-379 (B)
diversiceps, 65-1234 (B)
doctus, 64-692 (B)
doddi, 38-381 (B)
dubius, 62-157 (S)
dux, 39-30 (B)
electus, 62-160 (B)
elongatus, 39-62 (B)

Name altered to *elongatus*.

elytrurus, 39-67 (B)
eremita, 39-63 (B)
erichsoni, 40-203 (Sub)
excisus, 65-1239 (B)
exectus, 39-74 (B)
fallax, 64-672
farinensis, 40-205 (B)
fervidus, 44-30 (S)
fictus, 40-181 (B)
firmus, 39-31 (B)
fissiceps, 65-1238 (B)
flavus, 64-696 (B)
fortis, 61-1354 (B)
fraserensis, 44-31 (S)
fraternus, 64-673 (B)
frenchi, 39-32 (B)
frontalis, 61-1336 (S)
fulvohirtus, 61-1337 (B)
furvus, 44-34 (S)
gracilipes, 61-1347 (B)
grandis, 27-113 (B)
granulatus, 40-163 (B)
granulifer, 62-146 (S)
griffithi, 39-26 (B)
hackeri, 40-205 (B)
helmsi, 44-33 (S)
hirtutus, 40-213 (B)
hirtuosus, 64-671 (B)

Heteronyx hispidulus, 33-385 (B)
horridus, 61-1342 (B)
hothamensis, 39-59 (B)
humilis, 40-183 (B)
ignobilis, 40-174 (B)
imitator, 39-34 (B)
impar, 40-213 (B)
incognitus, 55-487 (B)
incola, 63-436 (B)
incomptus, 39-29 (B)
inconspicuus, 40-216 (B)
incultus, 63-430 (B)
infirmus, 40-175 (B)
ingratus, 39-58 (B)
insignis, 61-1332 (B)
interioris, 39-69 (B)
intermedius, 39-75 (B)
intrusus, 40-158 (B)
iridiventris, 64-704 (B)
jejunus, 62-166 (B)
johannis, 42-46 (B)
jubatus, 64-669 (B)
labralis, 33-382 (B)
læviceps, 61-1354 (B)
laminatus, 64-690 (B)
lateritius, 62-165 (B)
leai, 39-33 (B)
lilliputanus, 65-1222 (B)
lindi, 61-1362 (B)
litigiosus, 38-378 (B)
lividus, 63-437 (B)
lobatus, 61-1353 (B)
longulus, 64-698 (B)
lubricus, 64-680 (B)
lucidus, 40-180 (B)
luteolus, 39-36 (B)
macilentus, 40-202 (B)
macleayi, 40-203 (B)
maculatus, 61-1361 (B)
mæstus, 40-206 (B)
major, 40-199 (B)
marcidus, 57-285 (B)
marginatus, 64-703 (M)
maurulus, 40-164 (B)
merus, 56-106 (B)
metropolitanus, 39-58 (B)
mildurensis, 40-218 (B)
mimus, 64-696 (B)
minutus, 40-210 (B)
miser, 40-211 (B)
modestus, 40-178 (B)
montanus, 64-681 (B)
monticola, 39-75 (B)
mulwalensis, 62-150 (B)
mundus, 39-56 (B)
nasutus, 62-147 (B)
neglectus, 40-177 (B)
nigrescens, 39-64 (B)
nigrinus, 64-677 (B)
nitidus, 53-559 (B)
normalis, 62-145 (B)
novitius, 40-220 (B)
nubilus, 39-66 (B)
nudus, 40-212 (B)
occidentalis, 61-1350 (M)

Heteronyx olliffi, 40-203 (B)
oodnadattæ, 39-24 (B)
orbis, 39-68 (B)
ordinarius, 40-210 (B)
oscillator, 64-678 (B)
pauper, 40-182 (B)
pauxillus, 40-176 (B)
pedarius, 40-226 (B)
peregrinus, 64-693 (B)
perkinsi, 39-55 (B)
piger, 62-153 (B)
pinguis, 65-1242

No specimen found bearing this name

placidus, 40-147 (B)
planiceps, 40-208 (B)
ponderosus, 39-39 (B)
posticalis, 64-700 (B)
potens, 63-428 (B)
proditor, 55-492 (B)
proprius, 40-160 (B)
prosper, 39-78 (B)
protervus, 56-107 (B)
puncticollis, 64-684 (B)
punctipennis, 62-149 (B)
punctipes, 39-62 (B)
puer, 40-217 (B)
pustulosus, 64-685 (B)
pygidialis, 61-1356 (B)
pygmæus, 40-159 (B)
quadraticollis, 65-1237 (B)
quæsitus, 39-54 (B)
queenslandicus, 39-37 (B)
randalli, 65-1226 (B)
rapax, 64-679
raucinasus, 62-152 (B)
rectangulus, 40-179 (B)
relictus, 39-79 (B)
rhinastus, 64-688 (B)
rhinoceros, 57-284 (B)
rothei, 64-683 (B)
rotundifrons, 63-443 (B)
rudis, 38-378 (B)
rusticus, 64-676 (B)
salebrosus, 39-71 (B)
satelles, 61-1348 (B)
scalptus, 64-689 (B)
sequens, 60-97 (B)
seriatus, 39-72 (B)
setifer, 65-1233 (B)
severus, 44-29 (S)
sexualis, 39-41 (B)
siccus, 44-33 (S)
simius, 64-675 (M)
simplicicollis, 39-65 (B)
simulator, 61-1355 (B)
sloanei, 62-164 (B)
socius, 39-57 (B)
solidus, 61-1342 (M)
sollicitus, 40-173 (B)
sordidus, 40-182 (B)
sparsus, 63-440 (B)
spissus, 39-40 (B)
spretus, 61-1340 (B)
squalidus, 38-380 (S)
striatus, 39-70 (B)

Heteronyx suavis, 39-27 (B)
subcylindricus, 40-217 (B)
subfortis, 38-385 (B)
submetallicus, 61-1360 (B)
sulcifrons, 39-70 (B)
suturalis, 17-37 (B)
sydneyanus, 53-559 (B)
tæniensis, 39-61 (B)
tarsalis, 39-26 (B)
tasmanicus, 39-54 (B)
tenebrosus, 39-29 (B)
tepperi, 61-1339 (S)
terrena, 55-486 (B)
testaceus, 61-1350 (B)
thoracicus, 39-76 (B)
torvus, 61-1335 (B)
tridens, 55-489 (B)
tristis, 61-1333 (B)
tropicus, 39-28 (B)
umbrinus, 39-30 (B)
unicus, 26-38 (B)
vacuus, 64-674 (B)
vagans, 64-694 (B)
validus, 40-160 (B)
variegatus, 61-1351 (B)
viator, 65-1228 (B)
vicinus, 40-158 (B)
victoris, 61-1346 (S)
viduus, 40-176 (B)
waterhousei, 40-201 (B)
xanthotrichus, 40-200 (B)
yilgarnensis, 53-557 (B)
zalotus, 40-148 (B)

Heterothops taurus, 43-4

Histeridæ, 9-92, 11-26, 29-129, 32-101,
 44-24, 76-206, 78-263

Holophylla australis, 4-212 (B)

Homalium adelaidæ, 4-191 (B)
morrisi, 30-28 (B)
tasmanicum, 30-27 (B)

Homethes angulatus, 56-68 (B)
gracilis, 56-69 (B)
parvicollis, 56-69 (B)
rotundatus, 56-70 (B)

Homœomota lætabilis, 76-232 (B)

Homœolacon, 7-90
gracilis, 7-91 (B)

Homotrysis arida, 17-53 (B)
callabonnensis, 17-53 (S)
fusca, 10-326 (B)
limbata, 10-323 (B)
lugubris, 10-322 (B)
nitida, 10-326 (B)
princeps, 10-325 (B)
rufa, 10-324 (B)
ruficornis, 10-322 (B)
sitiens, 17-53 (B)
tenebrioides, 10-325 (B)

Hopatromorpha, 37-289

Hopatrum adelaidæ, 16-214 (B)
carpentariæ, 16-213 (B)
cowardense, 16-215 (B)
darlingense, 16-216 (B)
darwini, 16-217 (B)
elderi, 44-39 (S)

- Hopatrum longicorne*, 44-39 (S)
 macleayi, 37-288 (B)
 meyricki, 16-213 (B)
 misellum, 37-288 (B)
 victoriæ, 16-218 (B)
Hoplostines, 52-361
 viridipennis, 52-361 (B)
Hoplozonitis, 12-228
 mira, 12-229 (B)
Hormocerus fossulatus, 19-36 (B)
Hyborrhynchus aurigena, 25-89 (B)
Hydræna evanescens, 24-229 (B)
 Sent as *Ochthebius evanescens*.
 rudallensis, 78-261 (N)
 simplicicollis, 78-261 (N)
 torrensensis, 46-836 (B)
 Sent as *Ochthebius torrensensis*.
Hydrobaticus australis, 46-823 (B)
 clypeatus, 52-305 (B)
 tatei, 78-258 (N)
Hydrobiomorpha, 46-814
 bovilli, 46-816 (B)
 helenæ, 49-741 (B)
 tepperi, 46-817 (B)
Hydrobius macer, 46-818 (B)
Hydrocanthus waterhousei, 3-65 (S)
Hydrochus adelaidæ, 46-832 (B)
 diversiceps, 24-228 (B)
 horni, 78-259 (N)
 interioris, 78-260 (B)
 læte-viridis, 78-260 (N)
 palmerstoni, 17-29 (B)
 regularis, 46-833 (B)
 victoriæ, 46-834 (B)
Hydrophilus scissipalpus, 29-128 (B)
Hydrophyllidæ, 9-66, 12-207, 16-203,
 17-29, 24-221, 29-128, 32-93,
 37-231, 44-24, 46-812, 48-447,
 49-741, 52-305, 57-283, 60-91,
 78-254
Hygrotrophus de visii, 24-225 (B)
Hycis nigra, 60-101 (B)
 occidentalis, 60-102 (B)
 variegata, 60-102 (B)
Hypattalus, 16-208
 elegans, 16-209 (B)
 punctulatus, 16-209 (B)
Hypaulax interioris, 47-1431 (B)
 iridescens, 47-1433 (S)
Hyperomma abnorme, 11-22 (B)
Hyphæria beltanensis, 45-179 (B)
 parallela, 45-180 (B)
 variabilis, 45-181 (B)
Hyphaltica, 19-70
 adelaidæ, 19-73 (B)
 anomala, 19-71 (B)
 lauta, 19-71 (B)
 mediocris, 19-72 (B)
 occidentalis, 19-72 (B)
Hypharpax obsoletus, 56-84 (B)
 sloanei, 9-65 (B)
 vilis, 54-777 (B)
Hyphoryctes, 17-37
 maculatus, 17-38 (B)
Hypocaccus piscarius, 32-108 (B)
 vernulus, 32-108 (B)
Hypocilibe heroina, 78-279 (B)
 inconspicua, 53-572 (B)
 læta, 53-567 (B)
 lugubris, 53-570 (B)
 major, 53-565 (B)
 rotundata, 53-568 (B)
 sculpturata, 53-569 (B)
 veternosa, 27-140 (B)
 vittata, 60-104 (B)
Hypocrema, 12-250
 pauillum, 12-251 (B)
Hypostigmodera, 12-215
 variegata, 12-215 (B)
Idæthina cincta, 9-107 (B)
Idiocephala palmerstoni, 47-1473 (S)
 pura, 47-1473 (S)
Idiophyes, 18-234
 brevis, 18-235 (B)
Illæna meyricki, 48-455 (B)
Iphiaustus dispar, 58-204 (N)
Ischiopsopha bourkei, 17-44 (B)
Isodon bidens, 20-239 (B)
 intermedius, 20-241 (B)
 lævipennis, 20-240 (B)
 meyricki, 20-237 (B)
 nasutus, 20-239 (B)
 novitius, 21-28 (B)
 terræ-reginæ, 20-238 (B)
Isotira raucipennis, 12-225 (B)
Johannica, 4-287
Laccobius australis, 9-67 (B)
 montanus, 9-67 (B)
Lacon adelaidæ, 55-505 (B)
 andersoni, 55-508 (B)
 brightensis, 55-503 (B)
 duplex, 55-506 (B)
 eucalypti, 55-507 (B)
 farinensis, 26-49 (B)
 lindensis, 55-504 (B)
 mansuetus, 57-288 (B)
 murrayensis, 55-504
 squalescens, 57-289
 yilgarnensis, 57-289
 zietzi, 17-48 (S)
Læmophlæus australasiæ, 11-30 (B)
 diemenensis, 32-140 (B)
 difficilis, 46-840 (B)
 frenchi, 32-146 (B)
 insignior, 32-143 (B)
 lindi, 46-841 (B)
 murrayensis, 32-141 (B)
 pusuleæ, 32-142 (B)
 victoriæ, 32-182 (B male, S
 female)
Lagria tincta, 48-449
Lagriidæ, 10-335, 48-449, 78-280
Laius conicicornis, 4-262 (B)
 distortus, 4-264 (B)
 eremita, 17-51 (B)
 eyrensis, 55-531 (B)
 femoralis, 55-531 (B)
 major, 47-1426 (S)
 nodicornis, 4-263 (B)
 pretiosus, 55-532 (B)
 variegatus, 47-1426 (S)

- Lasiodactylus obscurus*, 9-106 (B)
Lathridiidae, 4-201, 9-120, 78-264
Lathridius apicalis, 4-204 (B)
 costatipennis, 4-202 (B)
 minor, 4-204 (B)
 nigromaculatus, 4-203 (B)
 punctipennis, 4-204 (B)
 satelles, 4-202 (B)
 semicostatus, 4-203 (B)
Lathrobium adelaidae, 43-8 (B)
 exiguum, 3-66 (B)
 victoriense, 9-71 (B)
Lathropus brightensis, 32-147 (B)
Lecanomerus flavocinctus, 4-188 (B)
 lindi, 4-189 (B)
 major, 55-479 (B)
 nitidus, 54-779 (B)
 obscurus, 4-189
 striatus, 55-479 (B)
Lemidia angustula, 12-224 (B)
 leoparda, 12-224 (B)
 munda, 12-223 (B)
 pictipes, 12-222 (B)
 pulchella, 12-223 (B)
 simulans, 12-222 (B)
 soror, 12-223 (B)
Lepidiota bovilli, 42-54 (B)
 caudata, 7-85, 42-60 (B)
 darwini, 46-850 (B)
 deceptrix, 42-59 (B)
 degener, 46-853 (S)
 delicatula, 46-852 (S)
 frenchi, 42-58 (B)
 gilesi, 42-62 (B)
 grata, 7-86 (B)
 koebelei, 42-54 (B)
 leai, 42-57 (B)
 negatoria, 42-63 (B)
 perkinsi, 42-56 (B)
 rubrior, 42-55 (B)
 rufa, 46-854 (S)
 rothei, 4-213 (B)
 suavior, 42-56 (B)
 townsvillensis, 42-61 (B)
Lepispilus rotundicollis, 6-140 (S)
Leptacinus filum, 43-7 (B)
 picticornis, 43-7 (B)
 Sent as *Xantholinus picticornis*.
Leptops areolatus, 44-58 (S)
 baileyi, 47-1444 (B)
 biordinatus, 44-55 (S)
 contrarius, 44-60 (S)
 frontalis, 47-1445 (S)
 gravis, 44-57 (B)
 horni, 78-287 (B)
 insignis, 47-1443 (S)
 interioris, 44-59 (B)
 palmensis, 78-287 (B)
 planicollis, 44-58 (B)
 raucus, 44-56 (B)
 sculptus, 78-285 (B)
 sulcicollis, 44-60 (S)
 tempeensis, 78-286 (B)
Leptognathus minor, 49-740 (B)
Leucocraspedum elegantulum, 30-18 (B)
- Leucocraspedum lugens*, 30-18 (B)
 validum, 30-17 (B)
Licinoma pallipes, 55-542 (B)
 sylvicola, 16-219 (B)
Licymnius bicolor, 13-133 (B)
Lindia, 4-275
 angusta, 4-275 (B)
Liparetrus adelaidae, 56-101 (S)
 agrestis, 1-25 (B)
 alienus, 35-324 (B)
 ¹² *alpicola*, 55-483 (B)
 amabilis, 35-321 (B)
 analis, 1-23 (S)
 aridus, 17-34 (B)
 ¹² *aureus*, 1-27 (B)
 ¹² *bicolor*, 1-28 (B)
 blanchardi, 35-328 (B)
 brevipes, 35-328 (B)
 brunneipennis, 55-484
 The type has disappeared, but there are two co-types in the collection of the South Australian Museum. The name is a synonym of *ubiquitosus*.
 caviceps, 1-19 (B)
 cinctipennis, 35-327 (B)
 confusus, 42-43 (B)
 consanguineus, 35-322 (S)
 dispar, 1-25 (S)
 distans, 35-318 (B)
 distinctus, 17-34 (S)
 diversus, 1-21 (B)
 fallax, 46-849 (S)
 fimbriatus, 1-18 (B male, S female)
 gracilipes, 1-20 (B)
 granulatus, 1-28
 gravidus, 35-326 (B male, S female)
 incertus, 35-320 (B)
 insolitus, 35-330 (B)
 insularis, 1-24 (S)
 juvenis, 46-849 (S)
 laticulus, 47-1397 (B)
 latus, 1-26 (B)
 leai, 35-329 (B)
 lividipennis, 35-319 (B)
 lugens, 56-100 (B male, S female)
 macleayi, 1-27 (B)
 maurus, 56-99 (B)
 melanocephalus, 17-34 (S)
 minor, 35-327 (B)
 modestus, 1-25 (S)
 mysticus, 47-1398 (S)
 necessarius, 35-318 (B male, S female)
 nigroumbratus, 1-22 (B)
 palmerstoni, 46-847 (S)
 perkinsi, 35-324 (B)
 perplexus, 2-50
 No specimen in collection marked as the type. But one labelled as *perplexus* placed as *craniger*, *Macl.*
- ¹² These species sent under *Automolus*.

- Liparetrus posticalis*, 46-848 (B)
 puer, 35-323 (B)
 rothei, 1-22
 rotundicollis, 35-325 (B)
 rugatus, 35-329 (B)
 sedani, 2-50 (B)
 senex, 1-20 (S)
 simplex, 1-24 (S)
 spretus, 55-482
 suavis, 47-1398 (B)
 ventralis, 35-326 (B)
 vicarius, 35-321 (B)
- Liparochrus dilatatifrons*, 35-272 (B)
 hackeri, 42-40 (B)
 nitidicollis, 35-273 (B)
 rufus, 44-25 (B)
- Lipernes*, 5-211
 angulatus, 5-212 (B)
 creber, 18-240 (B)
 gibbosus, 18-240 (B)
 subviridis, 11-72 (B)
- Lipothyrea variabilis*, 47-1448 (S)
- Lispinus sulcipennis*, 30-27 (B)
- Lissodema frigidum*, 10-335 (B)
- Lithocharis lindi*, 2-48 (B)
 varicornis, 9-72 (B)
- Lithostrotus*, 16-200
 cœrulescens, 16-200 (B)
 planior, 38-362
- In error Mr. Blackburn marked the type as *latior*, but no such name has been published. The type has been sent to the British Museum with an explanatory note.
- Litocerus alpicola*, 9-98 (B)
 Sent as *Parasemus alpicola*.
 alternans, 9-95 (B)
 baccæformis, 31-293 (B)
 coloratus, 18-207 (B)
 consors, 14-295 (B)
 frigidus, 9-97 (B)
 koebelei, 18-208 (B)
 læticulus, 9-95 (B)
 lateralis, 9-97 (B)
- Sent as *Parasemus lateralis*.
 lautus, 31-290 (B)
 maculatus, 9-96 (B)
 major, 9-97, 18-208 (B)
 maritimus, 32-111 (B)
 noteroides, 18-208 (B)
 obscuricollis, 31-292 (B)
 palmerstoni, 9-95 (B)
 perparvus, 31-291 (B)
 plagiatus, 31-289 (B)
 pulchellus, 18-207 (B)
 sparsus, 31-290 (B)
 suturellus, 9-96 (B)
- Sent as *Parasemus suturellus*.
 sydneyensis, 11-26 (B)
 tinctus, 18-208 (B)
 uniformis, 9-98 (B)
- Sent as *Parasemus uniformis*.
- Lixionica*, 78-280
 costatipennis, 78-281 (B)
- Longitarsus victoriensis*, 19-76 (B)
- Loxandrus lævicollis*, 56-96 (B)
 micans, 56-97 (B)
 micantior, 33-261 (B)
- Lucanidæ*, 18-25, 20-233, 21-23, 22-88,
 60-94, 76-207
- Luciola cowleyi*, 21-34 (B)
- Lyctus costatus*, 4-265 (B)
 discedens, 4-267 (B)
 parallelocollis, 4-266 (B)
- Lygesis ornata*, 11-63 (N)
- Lymexylon adelaidæ*, 25-34 (S)
- Lymexylonidæ*, 10-306, 25-34
- Macleayia*, 1-29
 Both species sent under *Microthopus*.
 hybrida, 1-30 (B)
 singularis, 1-29 (B)
- Macratia victoriensis*, 10-336 (B)
- Macrogyrus fortissimus*, 29-126 (B)
 opacior, 29-127 (B)
- Macrohelodes*, 57-298
 crassus, 57-298 (B)
 gravis, 57-299 (B)
 intricatus, 57-299 (B)
 lucidus, 57-298 (B)
 tasmanicus, 21-33 (B)
- Macromalocera affinis*, 53-562 (S)
 sinuaticollis, 53-563 (B)
- Macrones besti*, 37-296 (B)
 debilis, 48-452 (B)
- Macroura baileyi*, 9-108 (B)
 bicalcarata, 31-309 (B)
 deceptor, 9-108 (B)
 inermis, 31-310 (B)
- Mæchidius antennalis*, 23-62 (B)
 capitalis, 37-283 (B)
 caviceps, 46-846 (S)
 clypealis, 60-95 (B)
 collaris, 23-60 (B)
 crenaticollis, 1-16 (B)
 excisicollis, 23-62 (B)
 gibbicollis, 23-59 (B)
 imitator, 23-60 (B)
 major, 1-16 (B)
 modicus, 23-61 (B)
 multistriatus, 23-61 (B)
 ordensis, 23-60 (B)
 raucus, 37-281 (B)
 relictus, 37-282 (B)
 rugosipes, 1-17 (B)
 sinuaticeps, 47-1396 (S)
 tibialis, 12-210 (B)
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Paryzeta vittata, 15-151 (B)
Paussidæ, 9-68, 11-24
Paussus australis, 9-68 (B)
Pedilidæ, 10-335, 52-311, 78-281
Pelorrhinus crassus, 56-135 (B)
proximus, 56-134 (B)
Peltonyxa australis, 9-113 (B)
invalida, 31-312 (B)
pubescens, 9-113 (B)
Fenthea mastersi, 22-97 (B)
tigrina, 28-37 (B)

- Pentodon australis*, 4-216 (B)
Pephricus nanus, 59-270 (B)
 squalidus, 12-232 (B)
 umbratus, 12-231 (B)
 vittaticeps, 59-269 (B)
Periptyctus, 18-234
 russulis, 18-234 (B)
Perperus convexipennis, 28-28 (B)
Petinopus, 23-35
 ægrotus, 23-36 (B)
Phacodes bellus, 10-345 (B)
 marmoratus, 10-344 (B)
 modicus, 28-31 (B)
 occidentalis, 58-192 (N)
 validus, 10-342 (B)
Phalacridæ, 9-94, 11-26, 14-295, 18-205,
 25-23, 31-289, 32-111
Phalacrinus, 9-99
 australis, 9-99 (B)
 comis, 18-215 (B)
 compressus, 31-297 (B)
 dilutior, 18-215
 Var. of *notabilis*.
 navicularis, 31-298 (B)
 notabilis, 18-214 (B)
 obtusus, 9-100 (B)
 rotundus, 9-100 (B)
 umbratus, 31-297 (B)
Phalacrus burruindiensis, 9-101 (B)
Phalota obscura, 48-454 (B)
Philhydrus, 17-29
 andersoni, 78-257 (B)
 burruindiensis, 48-447 (B)
 deserticola, 78-258 (B)
 eyrensis, 17-29 (B)
 lævigatus, 46-822 (B)
Philonthus glenelgi, 32-94
 ornatus, 2-47 (B)
Philophlæus confertus, 56-78 (B)
 laticollis, 56-77 (B)
 monticola, 56-75 (B)
 occidentalis, 53-553 (B)
 opaciceps, 49-714 (B)
 ornatus, 44-19 (S)
 pygmæus, 44-19 (S)
 sydneyensis, 56-76 (B)
 tasmaniae, 56-78
 Var. of *eucalypti*.
Philoscaphus crassus, 2-37 (S)
 duboulayi, 53-554 (B)
 tepperi, 2-36 (S)
Phlæocarabus farinæ, 29-112 (B)
 umbratus, 49-709 (B)
 unimaculatus, 49-708 (B)
Phoracantha elegans, 58-192 (B)
 lætabilis, 15-165 (N)
 posticalis, 58-193 (B)
Phormosa carpentariæ, 32-118 (B)
 grouvellei, 31-316 (B)
 thoracica, 31-316 (B)
Phorticosomus brunneus, 4-178 (S)
 calcaratus, 33-261 (B)
 mucronatus, 4-178 (B)
 randalli, 49-722 (B)
 robustus, 6-135 (B)
 similis, 4-179 (B)
Phyllocephala, 50-1253
 nigrohirta, 50-1254 (B)
Phyllotocidium, 23-24
Phyllotocus dispar, 7-83 (B)
 meyricki, 1-15 (B)
 occidentalis, 1-15 (B)
Phyllotreta australis, 8-146 (B)
Physolesthus pallidus, 50-1250 (B)
Pimelopus crassus, 4-221 (B)
 dubius, 4-222 (B)
 sydneyanus, 20-256 (B)
Pinophilus latebricola, 43-10 (B)
Plæsiorhinus, 14-303
 notatus, 14-304 (B)
Platycotyla coloratus, 32-147 (B)
Platydemia championi, 91-139 (Sub)
 fossulata, 4-273 (B)
 obscura, 47-1430 (B)
 Name altered to *championi* and so sent.
 victoriense, 14-297 (B)
Platydesmus inamœnus, 37-272 (B)
 inuitatus, 37-272 (B)
 major, 37-271 (B)
 punctulaticeps, 38-363 (B male,
 S female)
Platynus murrayensis, 49-741 (B)
Platyomopsis frenchi, 8-132 (B)
Platyomus baccæformis, 18-242 (B)
 consimilis, 18-244 (B)
 cribratus, 18-242 (B)
 obscuricollis, 18-244 (B)
 Sent as *Scymnodes obscuricollis*.
 terminalis, 18-245 (B)
Platyphanes creber, 12-225 (N)
 superbus, 60-105 (N)
¹³ *Plectroscelis aciculata*, 19-63 (B)
 alpicola, 19-61 (B)
 calida, 19-59 (B)
 crassipennis, 19-66 (B)
 crebra, 19-62 (B)
 eyrensis, 19-65 (B)
 hypocrita, 19-63 (B)
 impressipennis, 19-64 (B)
 lindensis, 19-61 (B)
 longior, 19-59 (B)
 meyricki, 19-66 (B)
 minutalis, 19-62 (B)
 noxia, 19-59 (B)
 olliffi, 55-548 (B)
 pallidior, 19-65 (B)
 quadraticollis, 19-65 (B)
 tumbyensis, 19-63 (B)
 varipes, 19-61 (B)
Polyoptilus costatus, 25-97 (B)
 gracilis, 8-133 (B)
 robustus, 8-134 (B)
 torridus, 25-98 (B)
Polyphrades fortis, 59-276 (B)
 fulvus, 59-273 (B)
 inconspicuus, 59-279 (B)
 lætus, 59-281 (B)
 laminatus, 59-277 (B)
 modestus, 59-274 (B)

¹³ All sent as belonging to the genus *Chaetocnema*.

- Polyprades perplexus*, 59-280 (B)
pictus, 59-278 (B)
rostralis, 59-272 (B)
rugulosus, 44-52 (S)
satelles, 53-575 (B)
tibialis, 59-275 (B)
tumidulus, 44-51 (S)
Porithea plagiata, 58-198 (B)
Praonetha bimaculata, 18-223 (B)
 Sent as *Prasonotus bimaculata*.
Prasonotus chapuisi, (Sub)
Prasyptera mastersi, 19-84 (B)
Prionopleura erudita, 8-136
suturalis, 8-137 (B)
Pristonychus australis, 46-811 (B)
Proctammodus, 11-37
minor, 22-89 (B)
Promecoderus sloanei, 28-19 (B)
Prosayleus intermedius, 59-253 (S)
Prostomis gladiator, 32-135 (B)
intermedius, 22-88 (B)
Proxyrodes, 44-48
maculatus, 44-48 (S)
Proxyrus gibbicollis, 59-261 (B)
Prypnus squamosus, 56-115 (B)
Psammodyus australicus, 77-173 (B)
obscurior, 77-173 (B)
Psammocæus incertior, 32-154 (B)
T-notatus, 32-154 (B)
upsilon, 32-155 (B)
vittiferus, 32-155 (B)
Pselaphidæ, 6-136, 9-77, 10-292
Pseudananca, 13-135
ruficollis, 13-135 (B)
Pseudeba, 32-119
novica, 32-120 (B)
Pseudocædius, 7-91
squamosus, 7-91 (B)
Pseudocavonus, 7-87
antennalis, 7-88 (B)
Pseudocistela, 10-316
ovalis, 10-317 (B)
Pseudoheteronyx, 56-111
creber, 38-366 (B)
helæoides, 56-111 (B)
laticollis, 38-366 (B)
Pseudoholophylla, 41-196
Pseudohydrobius, 24-231
floricola, 24-232
Pseudolacon, 7-89.
rufus, 7-90 (B)
Pseudolycus elegantulus, 25-86 (B)
puberulus, 25-87 (B)
torridus, 28-26 (B)
Pseudoparopsis, 25-99
Pseudopimelopus, 4-217
lindi, 4-218 (B)
Pseudoryctes monstrosus, 17-39 (N)
tectus, 12-211 (S)
trifidus, 17-40 (M)
Pseudotoxotus, 47-1470
lineata, 47-1471 (S)
Psylliodes lubricata, 19-78 (B)
- ¹⁴ *Pterohelæus ater*, 4-279 (B)
bagotensis, 78-274 (B)
brevicornis, 37-294 (B)
fraternus, 17-51 (B)
geminatus, 51-153 (B)
gracilicornis, 37-293 (B)
insignis, 4-277 (B)
ovalis, 4-281 (B)
puer, 37-295 (B)
raucus, 50-1266 (B)
regularis, 37-292 (B)
simplicicollis, 37-292 (B)
ventralis, 37-294 (B)
Ptinidæ, 10-306, 57-300
Pycnomerus interstitialis, 32-131 (B)
robusticollis, 32-131 (B)
sulcicollis, 32-132 (B)
Pylus pygmæus, 10-306 (B)
Pythidæ, 10-322, 13-134
Quedius andersoni, 43-6 (B)
baldiensis, 9-69 (B)
diemensis, 60-91 (B)
ferox, 3-66 (B)
inconspicuus, 43-5 (B)
koebeleii, 18-203 (B)
nelsonensis, 32-93 (B)
picipennis, 11-21 (B)
tepperi, 43-6 (S)
Rhaciodes forcipatus, 15-154 (B)
simplex, 59-283 (B)
strenuus, 15-154 (B)
Rhadinomosomus tasmanicus, 59-257 (B)
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Rhamphus australis, 7-93 (B)
distinguendus, 7-93 (B)
Rhinaria debilis, 56-138 (B)
tibialis, 56-136 (B)
Rhinobolus, 48-463
nitidus, 48-464 (B)
Rhinophthalmus modestus, 48-451 (B)
 Sent as *Stephanops modestus*.
Rhipidius australasiæ, 25-59 (B)
Rhipidoceridæ, 20-258, 26-50, 44-38,
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Rhipidophoridæ, 25-51, 26-60, 45-178,
 78-282
¹⁵ *Rhizobius apicalis*, 12-256 (B)
approximatus, 5-208 (B)
aurantii, 12-255 (B)
australis, 5-204 (B)
cæcus, 11-71 (B)
cæruleus, 12-256 (B)
crotchi, 18-256 (B)
cyaneus, 5-199 (B)
debilis, 5-201 (B)
discipennis, 18-257 (B)

¹⁴ In the British Museum list a species is noted as *Pterohelæus subcylindricus*. But I cannot find that Mr. Blackburn ever named such a species.

¹⁵ In the British Museum list a species was noted as *Rhizobius proprius*. But I cannot find that Mr. Blackburn ever named such a species.

- Rhizobius dorsalis*, 11-70 (B)
eminens, 18-257 (B)
fasciculatus, 12-256 (B)
fugax, 11-70 (B)
gosfordensis, 18-257 (B)
insipidus, 5-201 (B)
laticollis, 5-200 (B)
lanosus, 11-71 (B)
 Sent as *Erithionyx lanosus*.
lindi, 5-202 (B)
major, 5-206 (B)
nigronotatus, 12-253 (B)
nitidus, 5-206 (B)
occidentalis, 5-207 (B)
ornatipennis, 12-253 (B)
plebeius, 12-257 (B)
pulcher, 11-71 (B)
ruficollis, 5-202 (B)
satelles, 12-255 (B)
secessus, 19-108
speculifer, 12-254 (B)
speratus, 5-207 (B)
subaustralis, 18-258 (B)
subfusca, 5-205 (B)
toowoombæ, 12-254 (B)
umbratus, 5-208 (B)
- Rhodæa assimilis*, 41-191 (B)
callabonnensis, 16-205 (S)
consanguinea, 41-194 (B)
dubitans, 41-193 (B)
hirtuosa, 23-63 (B)
incognita, 41-195 (B)
laticollis, 41-192 (B)
magnicornis, 4-210 (S)
morbillosa, 23-64 (B)
mussoni, 56-112 (B)
pilosa, 41-191 (B)
planiceps, 41-195 (S)
rugulosa, 41-194 (B)
soror, 56-112 (B)
- Rhomosternus minor*, 58-207 (B)
monticola, 58-206 (B)
obscurus, 58-205 (B)
pallidus, 58-206 (B)
- Rhyparida æneotincta*, 47-1479 (S)
amplicollis, 47-1481 (S)
discopunctulata, 47-1485 (S)
herbacea, 47-1484 (S)
interioris, 47-1486 (B)
mastersi, 12-236 (B)
mediopicta, 47-1480 (S)
piceitarsis, 47-1483 (S)
posticalis, 47-1482 (B)
punctulata, 47-1482 (S)
satelles, 47-1485 (S)
uniformis, 47-1483 (S)
- Rhytiphora fasciata*, 60-106 (B)
frenchi, 18-225 (N)
maculosella, 31-320 (B)
simsoni, 28-41 (B)
spenceri, 21-38 (B)
uniformis, 28-40 (B)
- Rhytisternus bovilli*, 49-728 (B)
cardwellensis, 56-94 (N)
splendens, 56-93 (B)
sulcatipes, 46-809 (B)
- Rupilia angulaticollis*, 26-66 (B)
approximans, 26-67 (B)
brevipennis, 78-307 (B)
excelsa, 19-85 (B)
imprensa, 47-1499 (B)
rugulosa, 12-238 (B)
- Saprinus australasiæ*, 32-107 (B)
tyrrhenus, 32-106 (B)
westraliensis, 32-106 (B)
- Saprosites mansuetus*, 77-175 (B)
sternalis, 77-176 (B)
- Saprus*, 77-178
griffithi, 77-179 (B)
- Saragodinus tuberculatus*, 46-873 (B)
- Saragus addendus*, 78-275 (B)
inæqualis, 46-867 (B)
latus, 46-869 (S)
lindi, 46-868 (B)
macleayi, 46-871 (B)
mediocris, 46-870 (B)
satelles, 46-872 (B)
tricarinatus, 44-43 (S)
- Sarothrocrepis suavis*, 49-711 (B)
- Sarothromerus*, 37-237
- Sarotrium australe*, 9-115 (B)
- Sarticus brevicornis*, 44-23 (S)
obscurus, 44-23 (S)
- Sastra obscuricornis*, 19-84 (B)
- Scaletomerus*, 10-330
harpaloides, 10-330 (B)
proximus, 10-331 (B)
- Scaphidiidæ*, 9-90, 32-97
- Scaphidium alpicola*, 9-90 (B)
- Scaphisoma fernshawense*, 32-99 (B)
novicum, 9-91 (B)
perelegans, 32-98 (B)
queenslandicum, 32-98 (B)
- Scarabæidæ*, 1-15, 2-50, 4-206, 7-83,
 8-159, 9-135, 10-293, 11-34,
 12-208, 13-130, 15-139, 16-204,
 17-31, 18-219, 20-234, 21-28,
 22-88, 23-18, 25-25, 26-36, 27-113,
 28-21, 33-262, 34-281, 35-270,
 36-263, 37-233, 38-363, 40-146,
 41-173, 42-40, 44-25, 46-842,
 47-1393, 50-1251, 51-147, 52-305,
 53-557, 55-481, 56-99, 57-283,
 58-185, 59-245, 60-95, 76-211,
 78-264
- Sciatrophes*, 32-100
latens, 32-100 (B)
- Scimbalium agreste*, 43-8 (B)
lætum, 43-9 (B)
- Scirtes helmsi*, 55-524 (B)
- Scitala ambigua*, 37-253 (B male, S
 female)
celescens, 37-252 (B male, S
 female)
convexicollis, 37-248 (B)
coxalis, 37-254 (B)
hospes, 37-251 (B male, S
 female)
ino, 37-249 (B)
juvenis, 37-256 (B)
nemesis, 37-250 (B male, S
 female)

- Scitula nemoralis*, 37-246 (B)
subsericans, 37-256 (B)
- Sciton*, 56-101
paullus, 23-47 (B)
ruber, 56-102 (B)
variicollis, 37-275 (B)
- Sclerocyphon*, 55-523
maculatus, 55-523 (B)
- Scolecobrotus simplex*, 47-1465 (B)
validus, 58-199 (N)
variegatus, 47-1466
- Scolyptus obscuripes*, 50-1247 (B)
- Scopæus dubius*, 9-73 (B)
femoralis, 11-22 (B)
latebricola, 3-71 (B)
obscuripennis, 9-73 (B)
- Scopodes flavipes*, 16-202 (B)
intermedius, 16-202 (B)
intricatus, 18-202 (B)
rugatus, 60-85 (B)
simplex, 16-201 (B)
- Scraptia lunulata*, 22-95 (B)
- Scymena australis*, 4-270 (B)
- Scymnodes*, 5-189
difficilis, 5-190 (B)
eugeniae, 12-243
 Var. of *koebeleri*.
fulvohirtus, 12-243 (B)
immaculatus, 12-243 (B)
koebeleri, 11-69 (B)
varipes, 12-243
 Var. of *koebeleri*.
- Scymnomorpha*, 12-242
duplopunctata, 12-242 (B)
- Scymnus ambulans*, 18-252 (B)
aspersus, 5-194 (B)
aurugineus, 5-196 (B)
australasiae, 12-243 (B)
australis, 5-195 (B)
brisbanensis, 18-246 (B)
casuarinae, 5-193 (B)
cowleyi, 18-248 (B)
cucullifer, 12-244 (B)
ementitor, 18-248 (B)
flavifrons, 5-195 (B)
impictus, 18-247 (B)
inaffectatus, 12-246 (B)
insidiosus, 5-191 (B)
inusitatus, 5-191 (B)
jocosus, 12-244 (B)
kamerungensis, 18-249 (B)
lubricus, 5-192 (B)
marebensis, 18-249 (B)
meyricki, 5-192 (B)
mitior, 18-251 (B)
notescens, 5-196 (B)
obumbratus, 18-247 (B)
occidentalis, 5-196
 Var. of *flavifrons*.
operosus, 18-246 (B)
oscillans, 5-197 (B)
parallelus, 5-198 (B)
planulatus, 18-251 (B)
poonindiensis, 5-193 (B)
pretiosus, 12-246 (B)
queenslandicus, 12-247 (B)
- Scymnus sedani*, 5-197 (B)
simplex, 5-194 (B)
styx, 18-249 (B)
subclarus, 18-250 (B)
subelongatulus, 12-245 (B)
subevanidus, 18-250 (B)
sublatus, 12-246 (B)
sydneyensis, 12-245 (B)
terræ-reginæ, 18-247 (B)
vagans, 12-248 (B)
varipes, 18-252 (B)
victoriæ, 5-196 (B)
victoriensis, 12-245
whittonensis, 12-247 (B)
yarrensensis, 18-253 (B)
- Seirottrana dispar*, 55-542 (N)
major, 12-228 (B)
 Sent as *Adelium major*.
monticola, 55-541 (B)
simplex, 55-540 (B)
- Selenurus fernshawensis*, 27-115 (B)
sydneyanus, 12-221 (B)
variegatus, 12-220 (B)
- Semanopteris angustatus*, 4-232 (B)
carinatus, 17-43 (B)
concentricus, 20-251 (B)
dentatus, 17-43 (B)
distributus, 20-252 (B)
longicollis, 47-1412 (B)
meridianus, 20-250 (B)
minor, 4-233 (B)
persimilis, 17-42 (B)
rectangulus, 17-41 (B)
tricornatus, 20-252 (B)
- Serangium*, 5-209
bicolor, 18-255 (B)
hirtuosum, 11-73 (B)
maculigerum, 11-73 (B)
mysticum, 5-210 (B)
- ¹⁶ *Sericesthis dispar*, 66-549 (B)
¹⁶ *erosa*, 66-551 (B male, S female)
¹⁷ *micans*, 66-546 (B)
¹⁶ *parallela*, 66-545 (B)
¹⁶ *parvipes*, 66-549 (B)
¹⁷ *planiceps*, 66-547 (B)
¹⁶ *puncticollis*, 66-551 (B male, S female)
- Silis australis*, 55-530
 Name altered to *Ananca boisduvalii* and so sent to the British Museum.
- Silphidæ*, 9-86, 11-25, 15-139, 31-288, 32-94
- Silphomorpha boops*, 46-807 (B)
cordifer, 60-86 (B)
difficilis, 28-17 (B)
rufoguttata, 14-295 (B)
spretæ, 46-805 (S)
- Silvanus aridulus*, 32-151 (B)
armatulus, 9-113 (B)
monticola, 9-118 (B)
- Simodontus murrayensis*, 49-737 (B)

¹⁶ These species sent under *Scitula*.¹⁷ These under *Anodontonyx*.

- Sisyrium fraternum*, 11-58 (B)
 laevigatum, 11-80 (N)
 sparsum, 11-60 (B)
 ventrale, 11-59 (B)
 vittatum, 11-58 (B)
Solenia cowleyi, 19-88 (B)
Soronia simulans, 9-105 (B)
Sparactus costatus, 9-117
 No specimen marked as type in collection, but a named specimen marked as a synonym of *productus*, *Reitter*.
 elongatus, 9-116 (B)
 proximus, 9-116 (B)
 pustulosus, 9-116 (B)
Sphaeroderma baldiensis, 19-77 (B)
Sphyrocallus bicolor, 35-277 (B)
Spilopyra olliffi, 55-544 (B)
Staphylinidae, 1-13, 2-45, 3-66, 4-190, 9-68, 10-292, 11-21, 16-203, 18-202, 25-22, 30-16, 31-288, 32-93, 43-3, 54-788, 60-91, 78-262
Stenotarsus arithmeticus, 18-233 (B)
 commodus, 18-233 (B)
Stenus australicus, 54-788 (B)
Sternolophus caeruleus, 53-555 (B)
 tenebricosus, 46-813 (S)
Stethaspis monticola, 41-180 (B)
 sternalis, 42-48 (B)
Stethomela caudata, 12-237 (B)
Stigmatium bimaculatum, 22-91 (B)
Stigmodera arborifera, 11-51 (S)
 campestris, 21-31 (B)
 canaliculata, 11-51 (N)
 capucina, 12-218 (N)
 cara, 12-216 (B)
 caroli, 15-141 (B)
 carpentariae, 11-53 (N)
 cincta, 8-157 (Sub. B)
 dawsonensis, 8-155 (B)
 dispar, 11-50 (N)
 dulcis, 26-41 (Sub)
 elderi, 44-36 (S)
 equina, 11-48 (B)
 eremita, 8-153 (B)
 erubescens, 28-23
 filiformis, 12-217 (N)
 frenchi, 8-150
 guttata, 8-158 (B)
 guttaticollis, 8-157 (B)
 guttigera, 23-24 (B)
 hostilis, 11-46 (B)
 ignea, 12-219 (B)
 insignicollis, 26-45
 insignis, 12-217 (N)
 insularis, 21-30 (N)
 jubata, 8-150 (N)
 karattæ, 8-149 (S)
 kerremansi, 8-147 (Sub)
 longula, 11-54 (N)
 macleayi, 11-48 (N)
 magnifica, 19-35 (N)
 marcida, 11-52 (N)
 marmorea, 8-148 (S)
 minuta, 11-45 (B)
Stigmodera oleata, 15-142 (B)
 ornata, 11-53 (N)
 pallas, 28-22 (B)
 pallidipennis, 8-154 (B)
 pictipes, 15-140 (B)
 princeps, 9-137 (N)
 pulchripes, 21-31 (B)
 quadrinotata, 11-49 (N)
 rectipennis, 9-138
 regia, 12-218 (N)
 rubriventris, 26-46 (B)
 septemmaculata, 11-45 (S)
 skusei, 11-46
 Type in Australian Museum.
 sternalis, 11-47 (N)
 stillata, 8-148 (Sub)
 subgrata, 26-41 (Sub)
 subpura, 33-307 (B)
 terræ-reginæ, 14-295 (N)
 tyrrhena, 33-307 (B)
 victoriensis, 8-152 (B)
 wimmeræ, 8-151 (N)
Streneoderma, 27-157
 contemptum, 27-158 (B)
 planatum, 27-157 (B)
Strigoptera australis, 55-501 (B)
 frenchi, 55-500 (N)
 marmorata, 55-501 (B)
Strongylurus minor, 58-199 (N)
Styrus clathratus, 53-573 (B)
Sunius æqualis, 43-9 (B)
Sutrea mastersi, 19-68 (B)
 speciosa, 19-69 (B)
Sybra mastersi, 15-168 (B)
Syllitus heros, 76-231 (B)
 microps, 76-232 (B)
 uniformis, 45-197 (B)
Symbothinus, 53-582
 nasutus, 15-151 (B)
 puer, 14-302 (B)
 squalidus, 53-583 (B)
Symphyletes compos, 31-319 (B)
 dentipes, 58-202 (B)
 deserti, 78-301 (B)
 fasciatus, 28-39 (B)
 fraserensis, 45-198 (S)
 lentus, 28-38 (B)
 modestus, 8-131 (B)
Syzeton lætus, 10-337 (B)
 lateralis, 10-338 (B)
Syzetonellus, 10-340
 alpicola, 10-340 (B)
Syzetoninus, 10-339
 inconspicuus, 10-330 (B)
 mundus, 10-339 (B)
Tachinus novitius, 9-68 (B)
Tachys adelaidæ, 2-40 (B)
 baldiensis, 54-782 (B)
 brightensis, 54-785 (B)
 captus, 2-42 (B)
 flindersi, 2-41 (B)
 infuscatus, 2-38 (B)
 lindi, 2-39 (B)
 ovensensis, 54-784 (B)
 semistriatus, 2-41 (B)
 similis, 2-39 (B)

- Tachys uniformis*, 2-40 (B)
 yarensis, 11-20 (B)
Talaurinus imitator, 78-290 (B)
 inæqualis, 78-289 (B)
 rufipes, 78-290 (B)
 strangulatus, 17-56 (B)
Taromorpha, 60-85
 alternata, 60-85 (B)
Tarsotenes, 27-139
 simulator, 27-139 (B)
Teinogenys inermis, 53-561 (B)
Teispes frenchi, 12-234 (B)
Telenica subfasciata, 59-261 (B)
Telephorus andersoni, 4-261 (B)
 fusicornis, 55-529 (B)
 galeatus, 55-529 (B)
 palmerstoni, 47-1424 (S)
 pauillus, 4-261 (B)
 proprius, 4-260 (B)
 tepperi, 47-1424 (S)
 vibex, 4-261 (B)
 victoriensis, 55-528 (B)
Telmatophilus breviformis, 18-218 (B)
 cairnensis, 18-217 (B)
 koebelei, 18-217 (B)
 sharpi, 18-216 (B)
 singularis, 18-218 (B)
 stygius, 18-218 (B)
 sublautus, 32-158 (B)
Temnopalpus, 4-233
 bicolor, 4-233 (B)
Temnoplectron diversicolle, 16-204 (B)
Tenebrionidæ, 4-269, 6-140, 7-91, 9-139,
 12-224, 13-132, 14-297, 16-210,
 17-51, 19-36, 21-34, 22-93,
 25-35, 26-59, 27-140, 28-25,
 31-319, 33-308, 37-286, 44-39,
 46-863, 47-1430, 50-1266, 51-153,
 52-309, 43-564, 55-533, 57-300,
 59-252, 60-101, 78-273
Tentegia parva, 78-299 (B)
 spenceri, 78-298 (B)
Teretriosoma gradile, 32-110 (B)
 sorellense, 32-111 (B)
Teretrius doddi, 32-109 (B)
Terillus carinatus, 47-1476 (S)
 micans, 47-1475 (B)
 politus, 47-1476 (B)
 suturalis, 48-461 (B)
Tessaromma nanum, 25-93 (B)
Tetracha helmsi, 44-16 (S)
Tetralobus thoracicus, 52-309 (N)
Tetrigus australicus, 19-35 (B)
Thallis dentipes, 18-231 (B)
 femoralis, 18-230 (B)
 macleayi, 18-228 (B)
 perplexa, 18-228 (B)
 subvinula, 18-229 (B)
 venustula, 18-229 (B)
Thalycrodes, 9-110
 cylindricum, 9-112 (B)
 pulchrum, 9-111 (B)
 tenebrosum, 9-111 (B)
 Var. of *australe*, *Germ.*
Thanasinomorpha, 10-304
 intricata, 10-304 (B)

- Themelia*, 15-159
 inconspicua, 15-160 (B)
Thenarotes australis, 4-184 (B)
 discoidalis, 4-184 (B)
 metallicus, 4-185 (B)
 Sent as *Notophilus metallicus*,
 minor, 4-185, 29-115 (B)
 nigricornis, 54-780 (B)
Thoris mœrens, 76-229 (B)
 septemguttata, 76-228 (B)
Thyregis, 77-145
 kershawi, 77-146 (B)
Timareta concolor, 59-264 (B)
 lineata, 59-263 (B)
 munda, 59-264 (B)
 pusilla, 59-265 (B)
 subfasciata, 59-266 (B)
Titinia bicolor, 56-120 (B)
 brevicollis, 56-118 (B)
 cremita, 56-119 (B)
 læta, 56-119 (B)
Todima lateralis, 32-118 (B)
Tomyris ænea, 48-471 (B)
 antennata, 48-472 (B)
 difficilis, 48-473 (B)
 gracilis, 48-468 (B)
 impressicollis, 48-469 (B)
 læta, 48-468 (B)
 longicornis, 48-470 (B)
 minor, 48-475 (B)
 negligens, 48-466 (B)
 obscura, 48-467 (B)
 paradoxa, 48-473 (B)
 rasa, 48-465 (B)
Toxicum addendum, 47-1431 (S)
 curvicorne, 4-276 (B)
 spretum, 4-276 (S)
Trechodes, 29-119
 gibbipennis, 29-119 (B)
Trechus baldiensis, 60-88 (B)
 simsoni, 60-90 (B)
 solidior, 29-118 (B)
 subornatellus, 29-117 (B)
 tasmaniae, 29-118 (B)
 victoriæ, 60-89 (B)
Trichalus funereus, 26-51 (B)
Trichananea, 10-341
 victoriensis, 10-341 (B)
Trichelasmus basalis, 37-236 (B)
Trichocarenum, 44-20
 elderi, 44-21 (S)
Trichoreus, 11-73
 cinctus, 11-73 (B)
Trichosalpingus, 10-332
 brunneus, 10-333 (B)
 obscurus, 13-134 (B)
Trichosaragus, 50-1269
 pilosellus, 50-1271 (S)
Trigonothops lindensis, 56-66
 Var. of *pacifica*,
 occidentalis, 56-66 (B)
Triphyllus intricatus, 9-123 (B)
Tristaria labralis, 11-30 (B)
Trogoderma adelaidæ, 9-125 (B)
 alpicola, 9-124 (B)
 antipodum, 9-123 (B)

- Trigoderma baldiense*, 9-127 (B)
debilius, 32-164 (B)
difficile, 9-126 (B)
exsul, 32-164 (B)
eyrense, 9-124 (B)
froggatti, 11-34 (B)
lindense, 9-125 (B)
longius, 32-165 (B)
macleayi, 9-126 (B)
maurulum, 32-165 (B)
meyricki, 9-128 (B)
occidentale, 9-127 (B)
reitteri, 12-207 (B)
singulare, 9-128 (B)
tolarense, 32-163 (B)
varipes, 12-208 (B)
yorkense, 9-127 (B)
- Trogophlæus paludicola*, 2-49 (B)
- Trogositidæ, 9-112, 31-311
- Tropideres evanescens*, 27-150 (B)
- Trox augustæ*, 11-39 (B)
elderi, 11-37 (B)
- Sent as *Megalotrox elderi*.
eremita, 11-38 (B)
euclensis, 11-39 (B)
eyrensis, 34-293 (B)
insignicollis, 78-265
mentitor, 78-266 (B)
perhispidus, 34-296 (B)
quadridens, 11-38 (B)
setosipennis, 34-292 (B)
strzleckensis, 17-33 (B)
tasmanicus, 34-292 (B)
- Sent as *Megalotrox tasmanicus*.
tatei, 34-291 (B)
- Sent as *Megalotrox tatei*.
tricolor, 34-295 (B)
velutinus, 11-40 (B)
- Tryphocharia frenchi*, 12-233 (B)
princeps, 47-1460 (S)
punctipennis, 47-1462 (B)
solida, 58-194 (N)
uncinata, 47-1461
- Typhosecis adspersa*, 17-59 (B)
- Ulomoides*, 4-274
humeralis, 4-274 (B)
- Uracanthus acutus*, 48-451 (B)
froggatti, 60-106 (B)
- Volvulus punctatus*, 46-839 (B)
- Xantholinus picticornis* (see *Lepta-*
cinus)
- Xanthophæa concinna*, 29-102 (B)
cylindricollis, 29-103 (B)
filiformis, 14-294
loweri, 52-304 (B)
satelles, 14-294 (B)
- Xeda magistra*, 15-153 (B)
notabilis, 15-153 (B)
- Xenidia bizonata*, 19-43 (B)
melancholica, 19-43 (B)
picticornis, 19-42 (B)
- Xuthea formosa*, 19-77 (B)
- Xylopertha canina*, 13-131 (B)
hirticollis, 22-92 (B)
mystica, 50-1264 (B)
vidua, 50-1265 (B)
- Xylophilidæ*, 10-336, 16-219
- Xynedria*, 58-185
interioris, 58-186 (B)
- Xynotropis*, 27-152
micans, 27-152 (B)
- Yorkeica*, 25-90
marmorata, 25-90 (B)
- Zietzia*, 16-205
geologa, 16-206 (S)
- Zonitis andersoni*, 6-142 (B)
aspericeps, 25-69 (B)
brevicornis, 6-143 (B)
carpentariæ, 25-68 (B)
cowleyi, 25-65 (B)
gloriosa, 6-147
helmsi, 44-46 (S)
longipalpis, 25-67 (S)
murrayi, 6-146 (B)
queenslandica, 25-66 (B)
rustica, 6-145 (B)
subrugata, 25-66 (B)
yorkensis, 25-68 (B)
- Zygocera concinna*, 28-36 (B)
- Zymaus inconspicuus*, 47-1446 (B)

Mr. Blackburn had also some types of Chrysomelidæ named by Chapuis, and these were sent to the British Museum. Following is a list of same, according to a list received from that institution:—*Cadmus alternans*, *C. arrogans*, *C. lutatus*, *C. ornatus*, *C. purpurascens*, *C. sculptilis*, *C. strigillatus*, *C. trispilus*; *Cryptocephalus æger*, *C. argentatus*, *C. bihamatus*, *C. chrysoelinus*, *C. conjugatus*, *C. convexicollis*, *C. dichisus* (no doubt dichrous), *C. eumolpus*, *C. gracilior*, *C. iridipennis*, *C. perlongus*; *Edusa suturalis*; *Loxopleurus æneolus*, *L. corruscus*, *L. dæmoniacus*, *L. pauxillus*; *Neocles sulcicollis*; *Paropsis irrorata*, *P. populosa*.

THE IONIZATION PRODUCED BY THE IMPACT OF SOLID BODIES IN AIR.

By KERR GRANT, M.Sc., and G. E. M. JAUNCEY, B.Sc.

[Read April 11, 1912.]

INTRODUCTION.

This paper contains an account of experimental investigations made by the authors on the phenomenon of the ionization which accompanies the impact of solid bodies in air.

The magnitude of the effect and of the total charge on the air, and the dependence of these magnitudes upon the nature of the surfaces of the impinging bodies and upon the energy of impact, as well as the character of the ions produced, have been more or less fully determined.

Two different methods of investigation have been employed, impact being produced in the one by a rifle bullet striking a metal target, and in the other by allowing a stream of shot or similar material to fall upon a plate.

The paper is divided into three sections:—The first containing a brief historical review; the second a description of the methods and results of the experiments; the third a brief summary and discussion of the results. The second section is divided into two subdivisions—the first relating to experiments made with the air-gun, the second to those made with the stream of falling shot or beads.

I. HISTORICAL REVIEW.

In 1892 Lenard discovered that the air at the foot of a waterfall was powerfully electrified, and showed by experiment that this was due to the splashing of the water on the rocks and consequent rupture of the water surface.

This effect and other allied phenomena have since been studied in detail by many observers and shown to occur with many different liquids and solutions: but so far as we can find the corresponding effect for solids has not been observed, much less studied.

The first observations of this effect were made in September, 1910, for the case of a leaden bullet striking an iron target. The air in the vicinity of the target was examined in the usual way by means of an insulated electrode of brass wire connected to an electrometer, an electric field being

applied across the space between target and electrode. On impact of the bullet on the target the electrometer indicated the reception of a considerable charge, and this independently of the direction of the field, showing that ions of both signs were present in the air between target and electrode.

In the earlier experiments a Winchester rifle was employed, but in order to avoid effects due to exploded gases accompanying the bullet the Winchester was discarded in favour of an air-rifle, with which no such parasitic effects could be detected.

The rifle was mounted with its muzzle at a distance of about 6 ft. from the target; it threw a leaden bullet weighing .96 gram, with a velocity of about 700 ft. per second.

The results of preliminary qualitative experiments were stated in a paper read by one of us⁽¹⁾ before the Australasian Association for the Advancement of Science at Sydney, January, 1911.

II.A. METHODS AND RESULTS OF EXPERIMENTS WITH AIR-RIFLE.

The method of investigation employed in the first instance, *i.e.*, when the ions are produced by the impact of a bullet on a target, will be understood best by reference to the accompanying diagram (fig. 1). The bullet fired from the air-gun perforates a thin sheet of paper, *LN*, and impinges upon the target, *P*, the nature of which can be varied at will. An annular metal electrode, *AB*, is supported in front of the target at a distance from it of about 1.5 cm. and insulated as shown with sulphur and guard-ring. Target and electrode are enclosed in hollow metal box, the lid, *CD*, of which is removable. This box with the target can be raised to any desired potential by means of a battery of 500 small accumulators and the charge driven on to the electrode measured by a Dolezalek electrometer of suitably arranged sensibility.

In making measurements of the total ionization the electrometer reading (mean of two or three successive swings) was taken 15 seconds after impact of the bullet, in which time practically all ions of a given sign produced in the chamber were found to be collected. A number of measurements (usually five or six) were made in each experiment and the arithmetic mean of these taken. The amount of variation in the effect is indicated by the mean error of these measurements. Where necessary, correction was made for the natural leak of the instrument. The order

(1) Notes on Ionization by Impact, by Kerr Grant, M.Sc.

FIG. 1

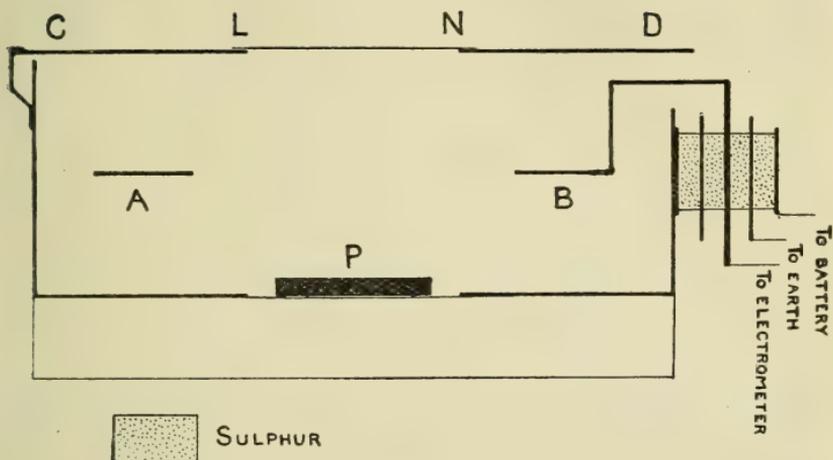
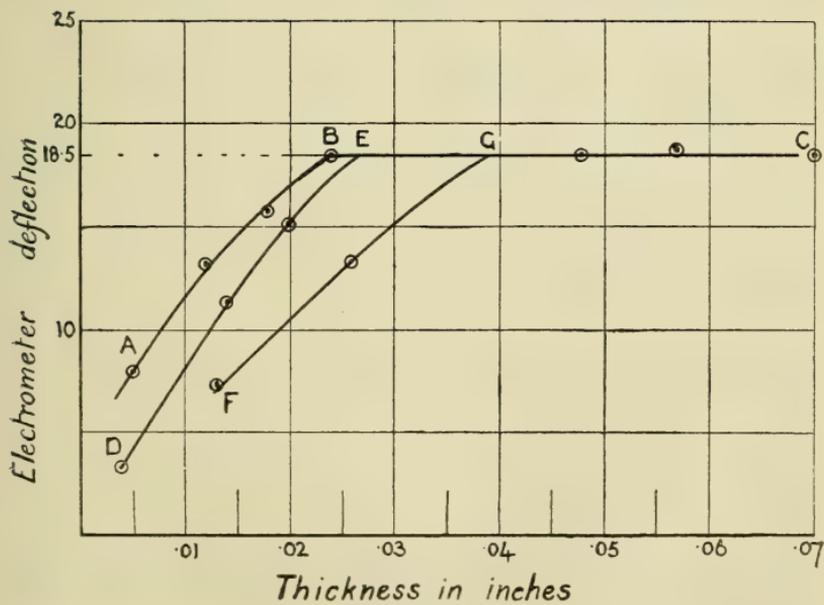


FIG. 2



of magnitude of the effect when a 1-gram bullet strikes a metal target with a velocity of about 700 ft. per second is six E.S. units, and approximately the same for *+ve* and *-ve* ions, *i.e.*, one E.S. unit per 3×10^7 ergs of kinetic energy destroyed. Little variation was produced by varying the material of the target so long as this is of metal. This is shown by the following table of measurements:—

Material of Target.	Reading.
Lead (A)	16 \pm 3
“ (B)	69 \pm 4
Iron (A)	35 \pm 3
“ (B)	60 \pm 3
Zinc (A)	36 \pm 3
Copper (A)	34
Brass (B)	63

Two sets of observations (A) and (B) are tabulated, the sensibility of the electrometer being higher in the latter set. The lead target used in (A) had been battered by previous usage, that in (B) was a fresh plate. This is the probable cause of the anomalous behaviour of the lead in the first case. When a wooden target was used the deflection of the electrometer needle was very much smaller than in the above cases.

In the above cases the target was not perforated by the bullet. When targets of lead-foil or sheet-lead were used the effect was found to vary with the thickness of the target, increasing with the thickness, but reaching a certain maximum value, while the target was still easily perforable. This is exhibited in the curve, *ABC*, shown in fig. 2. Other metals were found to behave similarly as shown in the curve, *DEC*, given for sheet-copper, the maximum ionization being the same in all cases, but the critical thickness decreasing with increasing density of the metal. The curve, *FGC*, is for sheet-zinc.

When the bullet perforates a target of sheet-metal the air in front of the target is found to be ionized, but practically no ionization could be detected in the air behind the target. For example, with the electrode and chamber in front a reading of 34 scale divs. was obtained, whereas the reading when both were transferred to the rear was only 0.32 scale divs.

If two perforable targets were placed in series the total ionization was found to be equal to the sum of the ionizations produced by each separately, provided the front target is not allowed to act as an electrostatic shield to the rear one.

FIG. 3

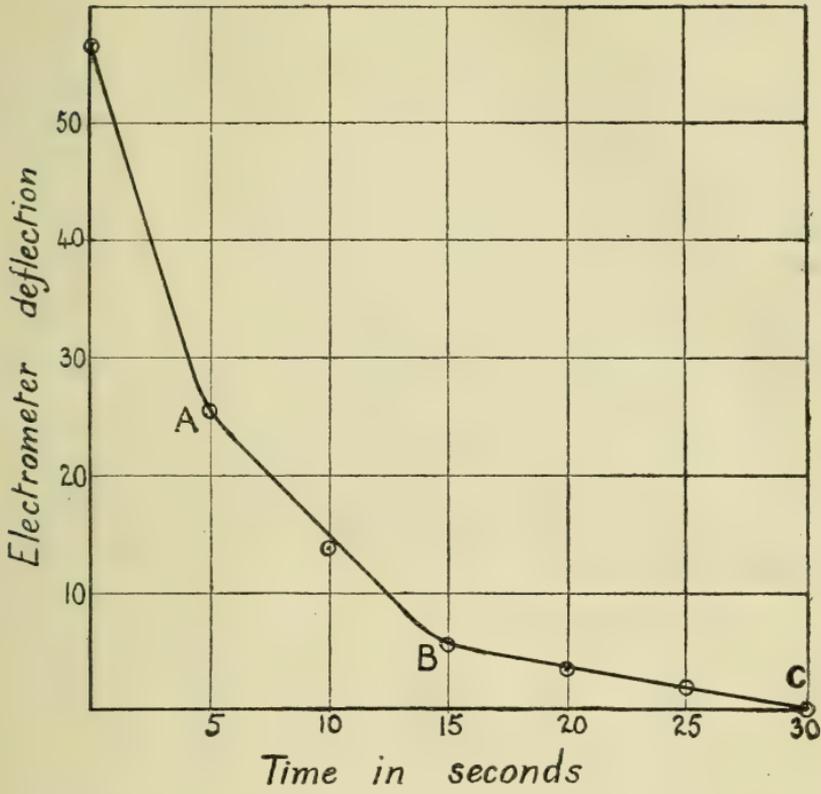
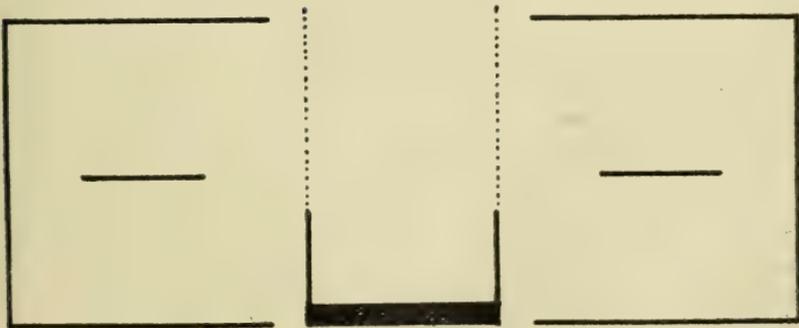


FIG. 4



Cleaning the surface of the target produced little if any difference in the magnitude of the effect; neither was any variation observed when a light target was backed by a heavy metal plate.

The mobility of the ions was roughly determined by a modification of Langevin's method (J. J. Thomson, *Conduction of Electricity through Gases*, 2nd Ed., p. 64). The distance of electrode from target was 1.9 cm. and the P.D. 600 volts. The curve showing the number of ions collected when the electrometer circuit was closed at different intervals after impact of the bullet is shown in fig. 3. This curve, for $-ve$ ions, shows three tolerably distinct kinks at *A*, *B*, *C*, due to species of ions having mobilities 2×10^{-4} cm./sec. per volt/cm., 4×10^{-4} cm./sec. per volt/cm., and 1.2×10^{-3} cm./sec. per volt/cm. The coefficient of recombination was found to be of the mean value 38 ϵ .

The dependence of the ionization produced on the velocity of the bullet was investigated by allowing the bullet to impinge after penetrating varying thicknesses of lead-foil, in doing which its velocity was, of course, reduced. The velocity was measured by the ballistic method. The following table exhibits the results:—

Velocity.	Ionization.	V^2	$\frac{V^2}{I}$	$\frac{V}{I}$
126	33	16013	485	382
106	26	11293	434	408
96	17	9271	545	565
69	11	4888	444	627

The amount of ionization is seen to be, within the limits of experimental error, proportional to the square of velocity of impact, *i. e.*, to the energy of impact.

It was also sought to discover whether any radiations of a penetrating character akin to β or γ radiations from radioactive substances were associated with the impact of the bullet. To test for this effect the target was separated from the ionization chamber by a cylinder made of metal near the target and of wire-gauze covered with thin tissue-paper farther away (see fig. 4) to prevent any ions produced at the target from reaching the electrode. Under these conditions the charge received by the electrometer was so nearly equal to the natural leak that the existence of an ionizing radiation is made very improbable. Thus, with paper removed from wire-gauze the mean electrometer reading was 240, with paper covering gauze the reading was only 1.8, the natural leak being of the same order as this last.

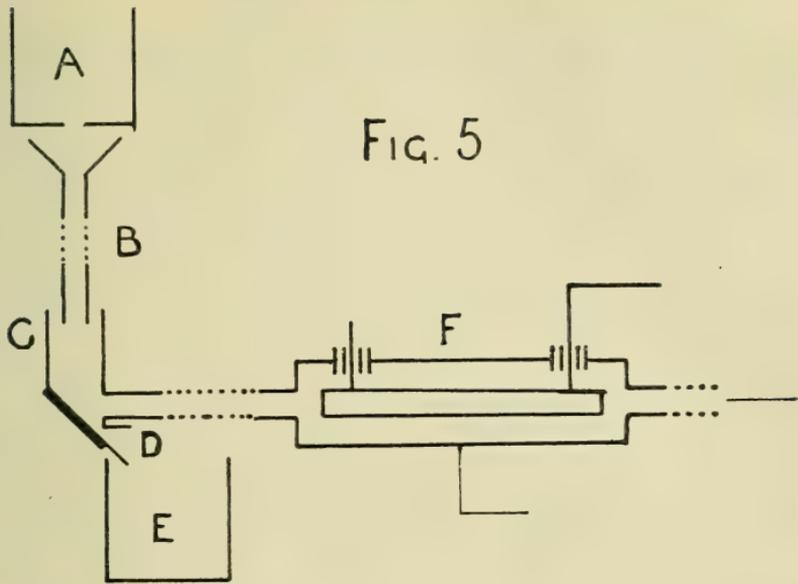
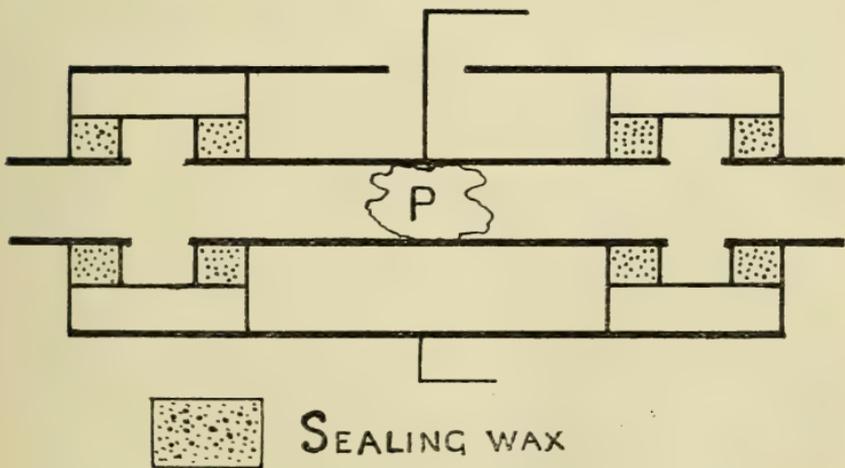


FIG. 5

FIG. 5A



II. B. METHODS AND RESULTS OF EXPERIMENTS WITH STREAM OF FALLING SHOT OR BEADS.

In all the above experiments the bullet was of lead. Attempts to make bullets for the air-rifle of other material were not successful, and since it was desirable to investigate fully the influence of the nature of the impinging material other methods of producing the effect were sought. After tentative experiments by firing an arrow tipped with different materials and dropping bodies from a height upon a plate, in all of which a slight ionization in the immediate vicinity of the target was detectable, we were finally led to the construction of the apparatus sketched in fig. 5, by means of which a steady stream of shot or similar material was allowed to fall upon a solid plate. A steady stream of air drawn over the plate could then be examined, and was found to contain, under given conditions, a remarkably constant number of ions. The order of magnitude of the effect in the case of lead shot was such that one E.S. unit of charge was collected per 3×10^8 ergs of kinetic energy destroyed. This, however, can be regarded only as a very rough approximation, owing to the difficulty of getting a sufficiently rapid current of air to prevent loss by recombination and for other obvious reasons.

The shot is contained in a copper vessel, *A*, and falls freely, when a shutter covering the hole in its bottom is drawn aside, down a brass tube, *B*, from this into a wider tube, *C*, at the base of which is the target inclined at 45° to the horizontal. The shot by an aperture at *D* escapes into the vessel *E*. A current of air is drawn by means of a filter pump over the target and either through a Zeleny tube, *F*, or through a Faraday tube (fig. 5A), which serve respectively to measure the total ionization of a given sign or mobility of the ions and the total charge. The outline, *P*, in fig. 5A represents a plug of cotton wool. The height of the vessel, *A*, and the material of the target can be varied at will.

The first experiments with this apparatus were directed to a confirmation of the law that the ionization is proportional to the energy of impact, *i.e.*, in this case, to the height of fall. The accuracy with which this law holds for the impact of a stream of leaden shot on a brass target is shown by fig. 6.

The mobility of the ions was determined by Zeleny's method (J. J. Thomson, *Conduction of Electricity through Gases*, 2nd Ed., p. 58). The saturation curves for the positive and negative ions respectively are shown in fig. 7, A and B. The values of the mobilities when the abscissæ of the points *X* and *Y* were used in calculating were 1.6×10^{-3} cm./sec. per volt/cm. for both positive and negative ions, but the

FIG. 6

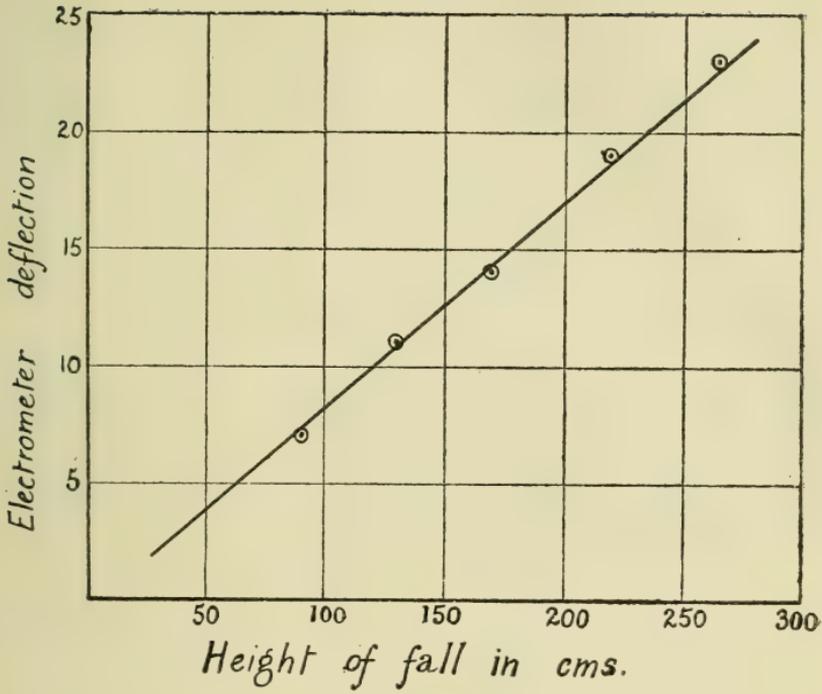
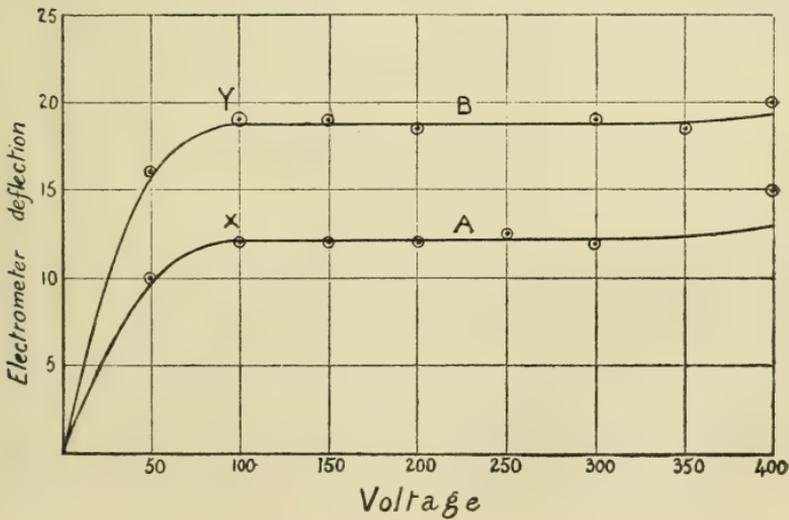


FIG. 7



nature of the curves shows that they are produced by a mixture of ions of varying mobility, the mean mobilities, however, being the same for positive and negative ions.

No point of inflexion could be found in the mobility curves, even when the field reached a value of 400 volts/cm.

The shot used in these experiments and in the preceding weighed .0392 gm. per shot. When glass beads (diameter .036 in.) were substituted for the shot and allowed to fall through a glass tube on a glass target the saturation curves shown in fig. 8 were obtained. The character of these curves shows that the variety of ions is still greater than in the case of those produced by lead shot. Calculating for the points *P* and *Q* as the elbows of the curves the mobilities are found to be 1.0×10^{-3} for both positive and negative ions.

The sign of the total charge on the air drawn over the target was determined by drawing it through the Faraday tube. When lead shot fell upon a target of any metal the total charge on the air was small and of variable sign. On the other hand, when the shot fell upon an insulator (glass, ebonite, silk) the charge on the air was invariably positive. The following are typical measurements:—

Target.	Reading.
Brass	0 ± .2
Zinc	+ .2 ± .2
Ebonite	+ 1.1 ± .2
Glass	+ 6.9 ± .5
Silk	+10.0 (q.p.)

When glass beads are used the charge on the air is always negative:—

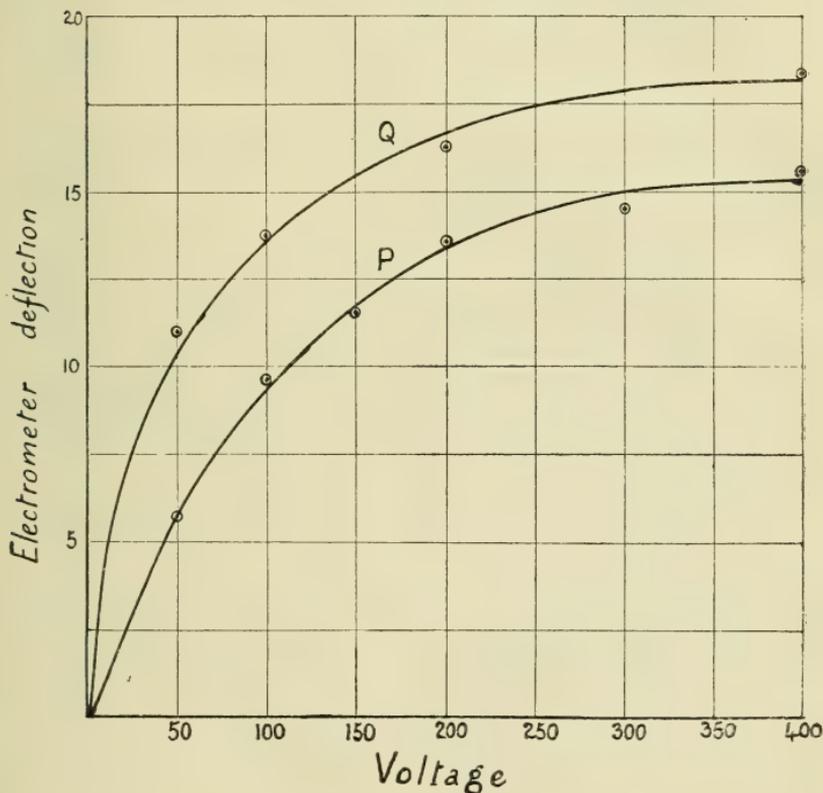
Target.	Reading.
Brass	−10.0 ± .1
Ebonite	− 8.1 ± .6
Glass	− 4.5
Silk	− 3.0

To test whether electrification incurred by the beads in touching the metal tube in their fall had any influence a glass tube was substituted for this, and was found to exert no important influence on the readings. The ionization produced in the process of falling through the fall-tubes was also measured, and found to be less than 10 per cent. of the total ionization.

In making experiments with the stream of lead shot falling upon a metal target it was observed that if unused shot were allowed to fall upon a new target (say, of brass) the

amount of ionization in the air drawn off was at first very large, but decreased at first rapidly and then more slowly as the shot continued to fall, asymptoting, apparently, to a definite minimum value. A typical set of readings exhibiting this "fatigue" effect is as follows:—7.0, 6.2, 5.2, 4.9, 4.3, 4.1, 4.0, 3.9, 3.7, 3.5. For this reason it was found impossible to compare satisfactorily the magnitude of the effect with targets of different metal and also with shot of different

FIG. 8



diameters. When targets of glass or ebonite were employed the above effect was insignificant, a steady reading being obtained from the outset. Thus with a glass target the successive readings 1.9, 2.2, 2.2, 2.1 were obtained; with an ebonite one 3.1, 3.0, 3.05.

Ionization is likewise found to occur whatever substance be allowed to fall on the target, *e.g.*, with sugar, salt, caustic soda, etc., the effect with sugar being larger than for any other substance examined.

III. SUMMARY AND DISCUSSION OF THE EXPERIMENTAL RESULTS.

The results of the experiments described above sufficiently establish—

- (1) That ionization is a general consequence of the collision of solid bodies in air.

The Lenard effect is thus produced both by solid and liquid bodies.

- (2) That for bodies of a given kind the amount of ionization is proportional to the energy of collision.
- (3) That the amount of ionization depends in general on the nature of the colliding bodies, or at least on the nature of their surfaces.

The constancy of the effect when a leaden bullet strikes a metal target is perhaps explicable on the assumption that the ions are formed mainly, if not entirely, at the surface of the lead, invariably the softer metal.

- (4) That the number of positive ions produced when two metallic bodies collide is equal to the number of negative, but when one of the bodies is an insulator the numbers are unequal.
- (5) That the ions formed are of very small mobility, comparable with that of the large ions in the air, those produced in the slow oxidation of phosphorus, the splashing of liquids, etc.
- (6) That the ions are produced mainly, if not entirely, at those portions of the surface of the bodies where contact takes place in collision.

The evidence for this last statement is to be found in the additive law for targets of thickness giving the maximum effect, when placed in series. Thus, if an ionization x be produced by a target of thickness a , and an ionization y for a target of thickness b , the bullet having already traversed a target of thickness a outside the chamber, then the total ionization due to both targets placed within the chamber is found to be x and y , whereas the effect due to a single target of thickness a and b is simply x . The "fatigue" effect exhibited when lead shot falls upon a metal target also finds ready explanation on the assumption that the ionization is a surface effect.

- (7) When a leaden bullet perforates a metal target the ionization increases with thickness of target up to a certain maximum, after which increasing the target, even to the point at which the bullet no longer pierces it, produces no further effect.

The explanation of this fact may possibly be found in the existence of an electrical double layer on the surface of target or bullet, from which the ions are set free in proportion to the energy lost by the bullet on striking the surface. Thus, the number of ions formed will increase with the amount of kinetic energy destroyed up to the point at which the "double layer" in region of impact is entirely disintegrated. If this explanation hold, however, it is obvious that a critical velocity should also exist above which no further variation of ionization with velocity should occur. No evidence of such a limit was obtained with the speeds employed.

In the present state of ignorance with regard to the causes and mechanism of ionization in general, no complete explanation can be offered of the above results. The cause is no doubt to be sought in the destruction of kinetic energy at the moment of impact, and the transformation of this energy into energy of intra-molecular vibration. It may plausibly be assumed that the internal energy of a certain number of molecules would be increased to the limit at which instability and consequent ionization result.

It is more difficult, perhaps, to offer even a general explanation of the inequality in number of the positive and negative ions which occurs when one or both of the bodies is an insulator. Such an inequality might naturally be connected with the existence of an electric field, due to the electrification of the colliding bodies: but the fact that the total charge in the air when glass beads fall upon a target of any material, whether this latter be electro-positive or electro-negative to glass, is invariably negative, renders this mode of explanation improbable. The same inequality has, of course, been observed in the Lenard effect, and the same explanation will probably cover both cases.

It may be suggested, in conclusion, that this effect plays a part in certain other phenomena, *e.g.*, in the luminescence of meteoric swarms, such as Saturn's rings, and possibly in tribo-luminescence. An attempt was made to reproduce the well-known luminescence of a vacuum tube containing mercury by substituting glass beads. This was unsuccessful.

Nevertheless, the apparent ease with which bodies electrify by friction in high vacua may be associated with the absence of such ionization as we have investigated above.

**ON AN OUTLIER OF OLDER CAINOZOIC ROCKS IN THE
RIVER LIGHT NEAR MALLALA.**

By WALTER HOWCHIN, F.G.S., Lecturer in Geology and
Palæontology, University of Adelaide.

[Read April 11, 1912.]

PLATE I.

The distribution of the older Cainozoic rocks in South Australia is such as to suggest that, at one time, there was a continuous sheet of these beds over the maritime districts, including much of the highlands, and extending inland to an unknown distance. The occurrence of these marine fossiliferous rocks in their present positions give proof of a former lower level of the land which allowed an epicontinental extension of the sea margins. They also tell of a subsequent elevation of the land, including the submerged continental shelf, amounting to many hundreds of feet, which made of South Australia an upland plateau. These elevatory movements exposed the marine sediments to severe weathering and erosion, by which they have been entirely denuded from large areas that they once occupied.

It is only in the extreme western and eastern sides of the southern portion of South Australia that the older Cainozoic rocks have been preserved in extensive sheets—the one occupying the head of the Great Australian Bight and extending inland for a distance of, at least, 150 miles; the other includes the Murray Plains (extending northwards into New South Wales) and the South-East to the Victorian borders. Between these extreme localities, where the main outcrops occur, crust movements of great importance have transpired, which have broken up and removed the greater part of the beds referred to, leaving only isolated fragments as outliers of the main formation, some of which are so small that they would not yield sufficient material to make a good quarry. Of these outlying fragments the following groups may be indicated:—

1. In southern Yorke Peninsula, resting on glacial clay of Permo-Carboniferous age:—Outcrops occur in the neighbourhood of Troubridge, on the south coast; along the south-eastern coast, from Edithburgh to near Black Point; Point Turton, Hardwicke Bay; and several inland patches.

2. In northern Yorke Peninsula:—On the western side, cliffs at Wallaroo Bay, also at Tickera Bay, and extending inland to Boor's Plains. On the eastern side there is a small capping resting on older rocks at Ardrossan, and outcrops occur, mostly in cultivated fields, around Kulpara.

3. Small occurrences on Kangaroo Island:—Along the shore at Queenscliffe; resting on granite at Cape Willoughby; and a small outlier, inland from Smith Bay, on the north coast.

4. On the eastern side of Gulf St. Vincent:—A high-level patch on the Hindmarsh Tiers; and another, at much lower level, at the railway bridge over the Finnis, on the eastern side of the ranges; a narrow fringe on the coast of Gulf St. Vincent, near Sellick's Hill; on ploughed land on Mr. Oliver's farm near Bellevue; along the sea cliffs at Port Willunga, and at Port Noarlunga; the beds have been proved in several well-sinkings, near Paradise, in the Torrens valley, as well as in the Kent Town bore; at a high level above Gawler; and in the deep bore at Croydon on the Adelaide Plains.

The small outcrop which forms the subject of the present paper was discovered in an unexpected situation, in the middle of the Adelaide Plains, where there is usually a great thickness of alluvium of recent age. It is also interesting from the fact that it is the most northerly exposure of these beds, at present known, on the eastern side of Gulf St. Vincent.

The River Light is a juvenile river that pursues an erratic course, first, as a longitudinal stream taking its rise near Waterloo, and flowing north and south; it subsequently takes an easterly direction but, instead of finding its way to the Murray flats, it suddenly turns and takes a westerly course, cutting through the low ranges, transversely, and loses itself on the plains. In its upper portions the river flows over an old Cambrian peneplain, consisting mainly of rotten aluminous rocks, which are well seen at Hamley Bridge. At a distance of about five miles below Hamley Bridge the river ceases to have a rocky bed and enters on the maritime plains, which, as flood plains of great extent, owe their existence to an antecedent system of drainage entirely distinct from the present. Here it has cut for itself a passage through alluvial deposits, which, in places, form steep and high banks; the flow of water becomes sensibly diminished after leaving the rocky portion of its course, and, in summer, the lower portions of the river are either dry or

contain only a few small stagnant pools at distant intervals. The river fails to reach the sea, becoming lost in the absorbent soil near the township of Lower Light.

The Red Banks, where the outlier of Lower Cainozoic rocks occurs, take their name from a series of large washouts on the left bank of the River Light (Section 5, Hundred of Grace), near the bridge on the main road to Mallala. At this point the river makes a remarkable bend to the south and then returns north by a course almost parallel with itself. The inside of the loop consists of alluvial deposits, somewhat lower than the normal banks, built up largely by flood waters. On the east side of the bend a few small and local streams (which only run when heavy rain occurs) have cut deeply into the banks by falling over the cliffs, and the latter have retreated, irregularly, from the river for nearly a quarter of a mile. The banks consist of red clay (which is sometimes white or mottled), loamy clay, sand, coarse grit to fine gravel. The walls are steep—in places perpendicular—and are undergoing rapid waste.

Between the river level and the top of the retreating clay banks there is an extensive platform, or middle terrace, rising slightly in level towards the head of the washout and, opening out inwards, the banks are arranged around this middle platform in amphitheatre form.

This middle platform, or terrace, owes its existence to a hard floor of Cainozoic limestone which underlies the alluvial cover, and has presented a greater resistance to the erosive action of the streams than the soft sediments. The following measurements were determined by aneroid:—From river level to limestone platform, 40 ft. ; from top of limestone to highest point of adjacent cliffs, 40 ft.

A complete section of the beds is as follows:—

- (a) Marly soil with nodules of surface travertine, 6 ft.
- (b) Light-reddish-coloured clay loam, 14 ft.
- (c) Dark-red and mottled clays and loam, 20 ft.
- (d) Fossiliferous Cainozoic limestone (thickness not proved), 20 ft.

Near the head of the washout, the stratum (b) is replaced by light-coloured to reddish sand and fine gravel which occupy a gutter of erosion about 40 ft. in width. This gutter does not seem to pass down into stratum (c) and is covered unconformably by the superficial bed (a). It has no accordance with the present lines of drainage.

The chief point of geological interest in this section is the occurrence of the marine Cainozoic beds, which form the surface of much of the middle terrace towards its upper limits. These beds occupy the entire width of the washout, which is at this point 68 yards, and are seen to pass under the alluvial banks on either side. They are apparently horizontal, and form a small scarp near their upper limits (plate i.). A small creek on the northern side of this area makes a series of small waterfalls by flowing over ledges of the Cainozoic limestone. This creek gives a section of about 16 ft. of these beds, and as they crop out again at the surface, about half-way between the main exposure and the river, it may be estimated that the beds in question must be, at least, 20 ft. in thickness.

The beds, for the most part, are a fairly pure limestone, but they have been considerably leached, and from this cause the rock is open in texture and most of the gastropods, bivalves, and some other forms, are present only by casts and impressions. A thin siliceous layer proved to be exceptionally rich in its fossil contents.

The following palæontological determinations have been made:—

FORAMINIFERA (seen only in section by fracture):—
Miliolina, sp.; *Nodosaria*, sp.

ACTINOZOA:—Cast of an Aporose coral.

ECHINODERMATA:—*Lovenia forbesi*, Duncan; *Monostychia australis*, Laube; *Fibularia gregata*, Tate; *Echinolampas posterocrassus*, Gregory.

POLYZOA:—*Retepora*, sp.

BRACHIOPODA:—*Magellania pectoralis*, Tate.

LAMELLIBRANCHIATA:—*Pecten hochstetteri*, Zittel; *Trigonia semiundulata*, McCoy; *Pectunculus convexus*, Tate; *Venus (Chione)*, sp.; *Dosinia*, sp.; *Leda*, sp. (cast).

GASTROPODA:—*Ancillaria ligata*, Tate; *Turritella aldingæ*, Tate; *Conus*, sp. (cast); *Natica*, sp. (cast).

SCAPHOPODA:—*Dentalium*, sp. (cast).

The above list of fossils shows no peculiar features, the occurrences are such as are found in the contiguous outliers of the same age, at Aldinga, Adelaide, and Gawler. The Echinodermata are the most abundant of the forms present. *Pecten hochstetteri* is also very common. The siliceous band carries numerous examples of *Pectunculus*, *Chione*, *Trigonia*,

and *Leda*, while fragmentary Polyzoa make up the greater part of the finer material of the limestone.

To what extent these marine Cainozoic beds occur in the district is unknown, as the country is uniformly covered with alluvium of considerable thickness. There is reason to believe, however, that the small outcrop at the Red Banks forms part of an extended sheet of these beds existing in the neighbourhood, but hid from sight by the newer deposits. The extensive development of travertine limestone in the district favours this view. A few miles out from Wasleys railway station, on the road to the River Light, the ground becomes distinctly calcareous and nodules of travertine are thickly strewn over the cultivated land and are gathered up and used for road metal. In several places this surface limestone is sufficiently thick to be quarried. All the stone buildings of Mallala and neighbourhood are constructed of travertine limestone, the stone being obtained from local quarries. Whilst it is not maintained that the marine limestones are concurrent with this surface-travertine limestone throughout the district, the very considerable development of the latter, locally, can be best explained by assuming that the extensive leaching of the older limestone has yielded the greater part of the travertine, which is always a secondary product.

This small outlier of Lower Cainozoic rocks in the Light is of considerable interest as bearing on the ancient topography of the country, especially when studied in relation to other outliers of similar beds in adjacent districts. The nearest locality for rocks of the same age is at Gawler, situated about 15 miles in a direction south-easterly from the Red Banks. The two outcrops are, however, of distinctly different lithological types. In the case of the Gawler beds, the fossils occur in a coarse grit, while the beds at Red Banks, on the Light, are true limestones. Such strong contrasts must be referred to different conditions of deposition. The Gawler beds give evidence of strong currents, probably a shore-line, while the Red Banks deposits were laid down at some distance from the shore and in a position that was protected from land wash. The material obtained from the Kent Town and Croydon bores was fine-grained and strongly calcareous with a greater likeness to the Red Banks outcrop than to the Gawler.

The most interesting feature, however, is the remarkable discordance which these several outliers, although relatively adjacent, exhibit in relation to their respective elevations. In the Kent Town bore the Lower Cainozoic beds were proved, in their upper limits, at a depth from the surface of 127 ft.,

or 12 ft. above sea-level. At the Croydon bore, two and a half miles west of Adelaide, the upper limit of the same beds occurs at about 700 ft. below sea-level. At Gawler, they have an elevation of about 400 ft. above sea-level; and at the Red Banks (as determined by aneroid) they are about 230 ft. above sea-level.

This great discordance, within short geographical distances, can only be reasonably explained by the occurrence of step-faulting, probably more or less influenced by differential erosion of the beds. It has been demonstrated⁽¹⁾ that such step-faulting has occurred in localities, further south, since the period when the marine beds of this age were laid down, and it is highly probable that the effects of such earth-movements would be felt marginal to Gulf St. Vincent throughout its entire length.

The results of step-faulting would be to produce a series of distinct shelvings of the older rocks at different depths. It is believed that the Red Banks Cainozoics rest on such a shelf or platform of Cambrian rocks. That is the usual order in which the geological formations mentioned occur in this part of the country. Moreover, about a mile to the north of the Red Banks, the Cambrian slates outcrop in a small gully near the middle of Section 1, Hundred of Grace. This is the first evidence of Cambrian outcrops in the Lower Light, but about two and a half miles further up the valley, to the north-east, in Sections 151 and 153, strong outcrops of these rocks occur in the bed of the river and continue from this point to Hamley Bridge. I was informed by Mr. Marshman, of Mallala, that in a well-sinking near the Woolsheds Methodist Church, at the five cross-roads, about three miles out from Wasleys, the old "blue-rock" (Cambrian) was struck at a depth of 40 ft., and no water tapped.

It is therefore certain that each of the Cainozoic outliers, included within the Adelaide and Red Banks groups, rests on Cambrian steps or platforms. The highest of these steps is that which carries the Gawler fragment, at an elevation of about 400 ft., above present sea-level. The Red Banks platform is about 200 ft. above sea-level. The Kent Town bore proved the Cambrians at 221 ft. below sea-level; and at the Croydon bore at 2,206 ft. below sea-level. It is possible that the Cainozoic sea-floor was uneven originally, which might account for some differences of level, but can scarcely account for the extraordinary disparity, within short dis-

(1) Howchin, Trans., Proc., and Rep. Roy. Soc., S.A., vol. xxxv., 1911, p. 47.

tances, amounting to about 2,600 ft. These facts are set forth in the following Table:—

LOCAL OUTLIER.	SURFACE LEVEL	UPPER LIMITS OF EOCENE.		CAMBRIAN PLATFORM.	
		Above sea level.	Below sea level.	Above sea level.	Below sea level.
	Feet.	Feet.	Feet.	Feet.	Feet.
1. Gawler ...	415	400	—	360	—
2. Red Banks	270	230	—	210	—
3. Kent Town	139	12 ⁽²⁾	—	—	221
4. Croydon ...	56	—	700	—	2,206
5. Dry Creek	16	—	(?)	—	(?)
6. Smithfield...		—	(?)	—	(?)

Bores have been put down at Dry Creek and Smithfield. In the first locality named, the bore penetrated to 410 ft., and at that depth touched the base of a Pliocene marine deposit. The same geological horizon was met with, at about the same depth, in the Smithfield bore, and also in the Croydon bore; and although the sinking at Dry Creek and Smithfield was not in either case carried down to bed-rock, it seems probable that these bores are within the deeply-sunken area revealed by the Croydon bore, and are shown in the above Table for comparison.

The chief points of interest in the observations now submitted are in extending the known area of the older Cainozoic sea limits, and also in the additional evidence it affords of the shelving-distribution of the remnants of these old marine deposits consequent on the sinking of the gulf area by successive steps.

My acknowledgments are due to Mr. T. Nevin, late head teacher of Mallala public school; Rev. C. E. Schäfer, and Mr. Marshman, for supplying interesting local information; and to Mr. R. E. Stanley, an undergraduate at the Adelaide University, for calling my attention to this outcrop.

DESCRIPTION OF PLATE I.

View of washout in Red Banks, River Light. The ledge on which the bag and hammer rest is the upper limit of the Cainozoic outcrop.

(2) When Tate described the Kent Town section he had not distinguished between the two lower marine series, but classed them all as "Miocene." Guided by the nature of the material I have assumed that, in Tate's section, the Miocene beds are included from Nos. 13 to 16; an interval of erosion is represented by No. 17, and the Eocene from Nos. 18 to 24. The upper limit of No. 18 is 12 ft. above sea-level.

ADDITIONS TO THE FLORA OF SOUTH AUSTRALIA.

By J. M. BLACK.

[Read May 9, 1912.]

PLATES II. AND III.

The subjoined list is mainly the result of botanical investigations carried out during the past year. The plants marked with an asterisk are aliens which have been found more or less well established in this State.

DILLENACEÆ.—*Hibbertia sericea*, Benth., var. nova *major*.
Differt a formâ typicâ sepalis et foliis majoribus (illis 10-15 mm., his 15-20 mm. longis), necnon numero staminum (20-25) et ovulorum (8 in quoque carpello).

Near Port Lincoln (H. H. D. Griffith).—A stouter plant than the typical form, and larger in all its parts, the sepals densely villous with long silky hairs.

Hibbertia acicularis, F. v. M., var. nova *sessiliflora*. Floribus sessilibus, sepalis glabris, staminibus 4 rarius 6, carpellis pubescentibus 3-4-ovulatis.

Frequent in the Mount Lofty Ranges and often growing near *H. stricta*, R. Br. Mentioned in 1862 by Mueller in *Plants Indigenous to the Colony of Victoria*, i., 17, where, after describing *H. acicularis*, he wrote:—"On stony mountains at Glen Osmond, in the Bugle Ranges, and towards Mount Remarkable (within the colony of South Australia), occurs a closely allied species, of which the fruit is as yet unknown. It differs chiefly in higher erect growth and glabrous sepals." In *Fragmenta*, xi., *H. acicularis* with sessile flowers is mentioned as growing on the Loddon and at Stawell, as well as in South Australia, but the variety was not named by Mueller, as far as I know. This appears to be the only form of the species in South Australia. It is distinguished from *H. stricta* by its narrow, pungent-pointed leaves, glossy on the upper surface. As forms with both sessile and pedicellate flowers are admitted under *H. stricta* there seems no reason why the definition of *H. acicularis* should not be widened in the same way.

LINACEÆ.—**Linum strictum*, L. Maitland, Yorke Peninsula (A. G. Edquist). "Grew on rubbish tip and is spreading over uncultivated land."—Mediterranean region.

CISTACEÆ.—**Cistus hirsutus*, Lamk. Roadsides, Mount Lofty (H. H. D. Griffith).—Ornamental plant from the Mediterranean region.

RUTACEÆ.—***Asterolasia muricata***, sp. nova. Frutex humilis ramosus, ramulis stellato-pubescentibus, foliis breviter petiolatis late oblongis crassis rigidis 7-14 mm. longis superne tuberculato-muricatis glabris inferne concavis albo-tomentosis, floribus flavis subsessilibus solitariis axillaribus vel 1-3 terminalibus, calyce minuto, petalis induplicato-valvatis externe stellato-pilosis, staminibus 10, ovario tomentoso bilobato, stigmatibus magno emarginato.

Near Mount Thisbe, Kangaroo Island (H. H. D. Griffith, October, 1908). The only species of *Asterolasia* as yet found in South Australia. It belongs to Bentham's section *Urocarpus* (*Fl. Aust.*, i., 352), all the other species of which are Western Australian. (Plate ii.)

LEGUMINOSÆ.—**Vicia gracilis*, Lois. Longwood.—Europe.

NOTE.—*Pultenaea graveolens*, Tate, has been found at Mount Remarkable (E. C. Black), leaves glabrous above and with margins much more revolute than in the specimens from the Mount Lofty Ranges. *P. trifida*, Black (*Trans. Roy. Soc.*, S.A., xxxiii., 224). This species is nearest to *P. densifolia*, F. v. M., which it resembles in the spreading leaves with recurved tips, but in *P. trifida* they are hairy, larger, distinctly mucronate, and without the prominent lateral nerves below; bracteoles trifid and flowers lighter in colour. The Tate Herbarium contains a specimen of *P. trifida* in leaf only, labelled "Mount Pleasant Station, 6/3/86."

UMBELLIFERÆ.—***Carum sioides***, sp. nova. Herba perennis aquatica glabra, rhizomate stolonifero, caule erecto sulcato fistuloso ramoso, foliis pinnatisectis inferioribus 8-10-jugatis, foliolis ovato-oblongis sessilibus æqualiter serratis base truncatis, foliis superioribus paucijugatis, foliolis inæqualiter inciso-dentatis, floribus albis, umbellis pedunculatis 8-12-radiatis oppositifoliis et terminalibus, involucri et involucelli bracteis 4-8 lineari-lanceolatis sæpius integris, calycis dentibus obsolete, petalis albis emarginatis cum acumine inflexo, fructu parvulo subglobo (1 $\frac{3}{4}$ mm. longo) a latere compresso ad commissuram constricto, mericarpium jugis angustis, vittis subpericarpio sitis solitariis latis totam valleculam occupantibus, carpophoro bipartito cruribus mericarpio plus minus adnato.

Growing in or close to running water at National Park, Belair, at Willunga, and beside North Para River, Nuriootpa.

In habit, carpophore, and petals this species might belong to *Sium*, but the absence of calyx-teeth and the solitary vittas are not characters of that genus. Specimens forwarded to two great botanical establishments have been determined variously as *Sium latifolium*, L., and *S. erectum*, Huds. (*S. angustifolium*, L.), evidently without examination of the fruit. In the *Naturalized Flora of S.A.*, p. 71, I described it under the name of *Sium latijugum*, Clarke. This is an Indian species, for whose inclusion in *Sium* Clarke altered one of the generic characters by making the furrows of the fruit univittate. Since then specimens have been sent from South Australia to Calcutta and carefully examined by the Director of the Royal Botanic Garden at Sibpur (Major Gage) and Mr. M. S. Ramaswami, who find that our plant differs from *S. latijugum* in the narrow slender ridges of the carpels and in the shape of the leaflets. They advise placing it in *Apium* and instance its resemblance to *A. nodiflorum*, Reichb. It seems to me, however, that the bipartite carpophore and the emarginate petals exclude it from that genus, and I have placed it in *Carum*, with which it agrees very fairly, especially when the generic character is extended so as to include *Petroselinum*, Hoffm. Although in our plant the branches of the carpophore usually remain united to the carpels and fall off with them, they are sometimes seen, in the ripe fruit, free from them for a considerable part of their length. It is only in specimens from Nuriootpa that I have found 1 or 2 pinnatifid bracts in the involucre, and of these specimens I have not been able to obtain fruits. The plant here described is very probably the *Sium latifolium*, L., mentioned in *Fl. Aust.*, iii., 336, as an introduction. There can be little doubt that it is a native. (Plate iii.: 1, flower; 2, petals; 3, transverse section of fruit; 4, fruit.)

COMPOSITÆ.—*Helipterum floribundum*, D.C., var. *nova tubulipappum*. Corollæ lobis inæqualibus, uno profunde inciso, pappi setis planis 6-8, dimidio inferiore in tubulum connatis.

Oodnadatta (Miss Staer). A variety with slightly woolly, rigid branches, the involucre bracts all pure white, as in the type, but pappus semitubular, as in *H. Trædelii*, F. v. M. Similar specimens from Mount Lyndhurst, labelled "*H. floribundum*," are in the herbarium of the Museum of Economic Botany. Differs not only in pappus, but in the larger leaves and stouter stems, from the slender form found in the mallee country from Dublin northwards towards Port Augusta, with the outer bracts golden-brown and the appearance of an annual (? var. *Sturtianum*, Benth.). The flowers

in each head of var. *tubulipappum* number over 100. (Plate ii.)

Senecio odoratus, Hornem., var. *nova obtusifolius*. Differt a formâ typicâ foliis obovatis glaucis crassiusculis flaccidis confertis, auriculis parvis parce dentatis, paniculâ densiore.

Along the coast at Port Elliot. This low, leafy shrub seems to be a maritime form of *S. odoratus*. Although it has a very distinct aspect, I can see no difference in the flower-heads which would justify raising it to the rank of a species. (Plate iii.; 1, flowerhead; 2, leaf of var. *obtusifolius*; 3, leaf of typical form.)

STYLIDIACEÆ.—*Leeuwenhoekia Sonderi*, F. v. M. Tintinnarra, in very poor soil among the scrub. Hitherto only recorded for Victoria. Distinguished from *L. dubia*, Sond., by the labellum with dark crimson hood, shorter corolla (2 mm. as against 4 mm.), and calyx-lobes glabrous, instead of glandular-hairy.

EPACRIDACEÆ.—*Leucopogon hirtellus*, F. v. M., var. *nova glabrifolius*. Eyre Peninsula (S. A. White), exact locality not given. Differs from the type, which is only recorded from Victor Harbour, in its glabrous leaves, glossy-green on the upper side. In my specimen they are shorter than in the typical form (4.5 mm. as against 7.8 mm.). The Museum of Economic Botany contains specimens of var. *glabrifolius* from Kangaroo Island.

PLUMBAGINACEÆ.—**Statice psiloclada*, Boiss. Well established in places on Lefevre Peninsula (F. S. Salisbury).—An ornamental plant from the Mediterranean region.

BORAGINACEÆ.—**Anchusa capensis*, Thunb. Robe (C. D. Black). A garden escape.—South Africa.

LABIATÆ.—**Calamintha Nepeta*, Savi. ("Lesser Calamint"). Roadsides near Mitcham.—Europe. **Salvia horminoides*, Pourr. This species may be very well separated from **S. Verbeneca*, L. ("Wild Sage"), as is done by many botanists. It is distinguished by corolla only slightly exceeding the calyx and leaves less deeply cut. Both species are common here.—Southern Europe.

CHENOPODIACEÆ. — **Chenopodium ambrosioides*, L. ("Mexican Tea"). Port Lincoln (H. H. D. Griffith).—Southern Europe, America.

ILLECEBRACEÆ.—*Scleranthus minusculus*, F. v. M. Murray Bridge (H. H. D. Griffith).—Hitherto only recorded for Victoria.

SCROPHULARIACEÆ.—**Linaria græca*, Chav. Common near Clarence Park.—Mediterranean region.

PLANTAGINACEÆ.—**Plantago Bellardii*, All. Bordertown (Miss Turner).—Mediterranean region.

OROBANCHACEÆ.—**Orobanche Mutelii*, Schultz. Sands near Glenelg (S. Dixon).—Mediterranean region.

PROTEACEÆ.—Note on *Grevillea quinquenervis*, Black (Trans. Roy. Soc., S.A., xxxiii., 325). This species seems to be most closely allied to the broad-leaved form of *G. oleoides*, Sieb., var. *dimorpha*, Benth. (*G. dimorpha*, F. v. M., var. *latifolia*), of Victoria and New South Wales. It is distinguished from the eastern species by leaves shorter and 5-nerved, a shorter perianth-tube with whitish tomentum and the lower half bearded internally (instead of a reddish tomentum and the upper half of the tube bearded internally). It has also a much shorter pistil.

EUPHORBIACEÆ.—**Euphorbia falcata*, L. Reephram, near Adelaide (F. S. Salisbury).—Mediterranean region.

NAIADACEÆ.—**Aponogeton distachyum*, Thunb. ("Cape Pondweed"). Creeks near Mount Lofty (H. H. D. Griffith). Probably a garden escape.—South Africa.

LILIACEÆ.—**Ornithogalum arabicum*, L. Robe. A garden escape.—Mediterranean region.

GRAMINEÆ.—**Schismus fasciculatus*, P. B. (*S. marginatus*, P. B.). Near Cockburn.—Mediterranean region and South Africa. *Sporobolus indicus*, R. Br. Banks of Torrens near Botanic Park (F. S. Salisbury) and Adelaide Park Lands.—Most warm countries, including the Eastern States of Australia and the Northern Territory.

DESCRIPTION OF PLATES.

PLATE II.

Helipterum floribundum, D.C., var. *nova tubulipappum*.—Flower, pappus, corolla, and involucre bracts.

Asterolasia muricata, sp. nov.—Flower and section of pistil.

PLATE III.

Carum sioides, sp. nova.—1, flower; 2, petals; 3, transverse section of fruit; 4, fruit.

Senecio odoratus, Hornem., var. *nov. obtusifolius*.—1, flower-head; 2, leaf of var. *obtusifolius*; 3, leaf of typical form.

OBSERVATIONS ON THE HABITS OF THE LARGE CENTRAL AUSTRALIAN MONITOR (*VARANUS GIGANTEUS*), WITH A NOTE ON THE "FAT BODIES" OF THIS SPECIES.

By E. C. STIRLING, M.D., Sc.D., F.R.S.

[Read June 13, 1912.]

PLATE IV.

As the opportunity of observing, at close quarters, the large Central Australian Monitor lizard, *Varanus giganteus*—and for that matter the same may be said of many other of our native fauna—does not often occur, I have thought that a few notes respecting some of their habits may not be without interest to members of the Society.

By the kindness of Mr. G. K. Grant Warren, of Balariung, William Creek, the National Museum received on February 9 of this year two living specimens of this species, both males, as was subsequently ascertained by dissection. Unfortunately by the misapplication of terms which is so common in Australia, the name "goanna" is commonly applied to this, as well as to some other species of Australian Varanidæ, the word being generally understood to be a corruption of iguana, which properly belongs to quite a different group of lizards that is unrepresented in Australia. The origin of the name Monitor, which constitutes the vernacular designation of the Varanidæ, is peculiar. The native name of the Egyptian representative of this group is "ouaran," which is the Arabic term for lizards in general; this word written as "waran" has been confused with the German "Warnen," to warn, hence these reptiles have been called Warn-eidechsen, or warning lizards, and it is this erroneously derived idea of warning, or admonition, which has found expression in the Latin term Monitor.⁽¹⁾

The particular species, *Varanus giganteus*, is known locally in regions adjacent to Lake Eyre as "Perentie," or by its variants "Perinthie," or "Parenthie," which words I believe have originated from a native name, though I am not aware of the tribe to which it belongs. Further north, in the MacDonnell Ranges, it is called Echunpa, in the Arunta language, and it gives its names to one of the most important totem divisions of that tribe.

For some time we have been anxious to prepare for the Museum collection some properly-mounted specimens of this reptile, and, with that view, we were glad to have the opportunity of keeping them under observation so that we might

(1) "Royal Natural History," R. Lydekker, Section ix., p. 150.

learn something of their habits and attitudes, of which very little appears to be known. With this view they were placed together in a large wire-netted cage, about 10 ft. long by 4 ft. wide by 3 ft. high, which gave them plenty of room to move about.

Though, from what can be gleaned from books, there appears to be a general similarity as to habits in all the members of this well-marked and widely-spread group, I could find but the scantiest references to this Australian species, and, supplementing our own observations by the results of inquiries made from those who know the animal in its wild state, I am able to offer a few notes of a little-known reptile that may not be without interest. Incidentally our observations have enabled us now to mount specimens in natural attitudes and so to correct various errors into which even the most careful taxidermist can scarcely avoid falling if he has never seen the animal he deals with alive.

In this connection one may express regret that so many reproductions of badly, or unnaturally, mounted specimens, or of inaccurately-drawn plates, have found their way into books of natural history purporting to give true representations of the animals in their natural state. These reproductions, repeated as they so often are from book to book, or serving as models for other mounted specimens, lead to the perpetuation of very erroneous ideas as to the real attitudes and true appearance of the animals in life. It is hoped that the illustrations accompanying this paper, which are reproductions from photographs of the living animals, will, so far as the species is concerned, at least serve as faithful models, either for the taxidermist or zoological artist, of an animal not often observed at close quarters. I think it will also be acknowledged that the Museum taxidermists have in their recently mounted specimens very accurately reproduced some of the unsuspected yet, as it appears, very characteristic attitudes of these reptiles.

The two monitors, received in a perfectly sound and healthy condition, and in process of shedding their skin in patches, were kept under observation in their cage for over three months. From what I had heard of their great voracity and comprehensive tastes in their wild state I anticipated that there would be no difficulty in feeding them, but though eggs, dead and live mice and sparrows, live guinea pigs, and a live rabbit were at different times placed in the cage, they voluntarily ate nothing, and, with the exception to be mentioned directly, they did not attempt to interfere with any of these animals, nor did the latter show any fear of their formidable companions. Thinking the reptiles might at

length be feeling the effects of starvation, and it was evident that they were becoming emaciated and less active, they were on two occasions taken out of their cage and forcibly fed with strips of raw meat—a matter of some little difficulty in the case of the larger specimen on account of his size and strength. It was after the second of these feedings, when possibly excited by the handling or by the taste of meat, that the larger reptile seized the live rabbit, then in the cage, by the loins, holding on to it with a bulldog grip that was never changed or relaxed until the victim died. But it made no attempt to eat the rabbit, though this was left dead in the cage for two days. The guinea pigs used to run over the reptiles, sometimes even perching on their heads in the most confiding way.

The result of this abstinence from food was a progressive emaciation and dwindling vigour, though on being excited they showed themselves still capable of powerful and active movements. Even at the end of the starvation period of three months the larger specimen still retained, as was shown by dissection, two solid masses of fat weighing a pound each. These will be subsequently described.

In their wild state, Mr. Warren informs me, the Perentie is practically omnivorous as regards flesh foods, its diet mainly consisting of other lizards, snakes, birds, eggs, the smaller animals, and, of late years, the rabbit, the only animal of small size that is immune to its attacks being the echidna. The late Mr. Gillen told me he saw one catch and kill a one-third grown kangaroo, and then, placing his forefeet on the body, it tore out pieces of flesh like a dog.

Everyone that has seen these reptiles in their wild state testifies to the extraordinary pace with which they can travel over the ground, and that agility was still manifest in our specimens under the limitations of their cage. In this, when moving quickly, their gait was distinctly quadrupedal, the body, head, and tail being raised some inches above the ground, but, I am informed by Mr. P. Barbe Ayliffe, that when traveling at their topmost speed the forelimbs are raised from the ground, so that their gait then becomes bipedal. We had, however, no opportunity of observing this under the restricted space in which our specimens were confined. I have myself seen this mode of progression, which recalls that attributed to some of the extinct dinosaurs, to take place in the Frilled Lizard (*Chlamydosaurus kingii*), and it has also been noticed by Mr. J. Rau, one of our taxidermists, in the case of *Amphibolurus cristatus* under extreme speed. It is probable, I think, that closer observation would show a similar mode of progression for other of the more swiftly moving lizards.

One feature of the Perentie became immediately apparent,

viz., the habitual use of the long and muscular tail as a weapon of offence. Whenever the animals became excited either by the suspicious movements of one another, or by being touched by a rod, or even by the too close presence of spectators, most vigorous blows that resounded against the sides of the cage were struck with this organ. The striking of the blow could generally be anticipated by the preparatory attitude in which the tail was held, that is to say, it was flexed well to one side in a curved position, the muscles being manifestly tense. To prevent any obstruction to the blow the thick proximal part and the end of the tail were held clear of the ground so that it touched only by a limited length of its middle portion. Mr. Gillen, who was well acquainted with these animals, informed me that he once saw a large Perentie knock down a native woman in this way by a blow on the legs, and Mr. Warren writes that he had known both forelegs of a dog to be broken in a similar manner. No one who has seen the force of these blows could have any difficulty in accepting such statements.

This offensive use of the tail is described ⁽²⁾ in the case of *Varanus salvator*, apparently the largest member of this group, which inhabits Ceylon, the Malay Peninsula, and the islands of the Malay Archipelago, and extends, according to the British Museum Catalogue of Lizards (1885), to the Cape York Peninsula of Queensland, but I have not seen the habit noticed in the case of *Varanus giganteus*. It is, however, not unlikely a common feature of the larger members of the group. When alarmed the Perenties have a habit of running up trees in their efforts to escape, which they do with extraordinary swiftness; they have been known, also, to run up a man or a horse, probably, in their alarm, mistaking these vertical objects for trees. On one occasion, at Alice Springs, Mr. Gillen treated the lacerated breasts of a lubra who had been attacked by one, and, according to this informant, the blacks, who have a fear of these animals, state that such attacks were not uncommon. It may be, however, that the attacks are not deliberate, but that in their alarm and desire to escape they run up the first vertical object that presents itself, under which circumstances wounds would not unlikely result from the very sharp and strong claws or even from the teeth.

Notwithstanding the fear of the natives for these reptiles their flesh is esteemed a great delicacy, and it is no doubt in consequence of the appreciation of it by the adults that it is one of the foods (which, it may be observed, are generally of some gastronomic merit) that are forbidden to uninitiated boys

(2) "Reptiles of the World," R. L. Ditmars.

of the tribe.⁽³⁾ I have also heard white men speak approvingly of the flesh of the tail of the Perentie, though in the case of one man who had often tried he stated that it always induced vomiting.

The aspect of the head and neck is very snakelike, and it was noticed that in moving amongst the branches of a dead limb placed in the cage in imitation of a small tree that the Perentie was able, while holding on by the grasp of its hind limbs only and by utilizing the tail as a lever, to project the rest of the unsupported body into space while seeking for a hold for the fore paws.

When excited or provoked they utter a sound which may be described as a combination of a hiss and of a continuous blowing sound like that of a blacksmith's bellows, and under these circumstances of provocation the throat is inflated into a large and conspicuous pouch, often to a more considerable degree than is shown in pl. iv., figs. 1 and 2; the long-forked tongue is also protruded and withdrawn with lightning-like rapidity.

They are stated to be capable of being readily tamed, and I have been told of one that used to appear regularly at stated times to be fed and to follow its adopted master about.

In their native habitat they usually live in holes in the ground, and, according to Mr. Warren, they prefer a hole that enters under a rock to one in the open ground. In these holes they hibernate from May to August, living sometimes singly and sometimes male and female together.

Distribution.—As is so often the case with many of our Australian animals, we have very little information as to the exact distribution of this species. Many, indeed, of our animals have already become extinct without our having been able to answer this question, and it will probably be the same with many others. Mr. Gillen told me that they occur in Central Australia from about Strangways Springs, in the south, to Hann's Range, about 80 miles north of the MacDonnell Ranges, but as to its range east and west of this tract I have no information. Its favourite habitat being rough, stony country, its distribution is no doubt largely determined by these conditions. The late Mr. John Bagot used to speak of them as common and of large size on what was, then, his Peake Station, which comprised the country around Warrina, and Mr. Warren writes that they are only found on certain limited parts of the rough country on Anna Creek Station.

So far these limits constitute *Varanus giganteus* a Central Australian species, but in the British Museum Catalogue of Lizards (1885) one, the type of the species, is stated as having come from the "North Coast of Australia," which seems to

⁽³⁾ Spencer and Gillen, "Native Tribes of Central Australia," p. 471.

indicate that the species may have a more extended range than is indicated by its Central Australian distribution.

Size.—In this respect, as might be anticipated of such relatively large lizards, one hears most exaggerated statements. The late Mr. John Bagot, however, assured me that he had seen specimens 7 ft. 6 in. in length, and I have it from Mr. Gillen that one killed by himself measured 7 ft. 2 in. The total length of the largest of the few stuffed specimens recorded in the British Museum Catalogue of Lizards (1885)⁽⁴⁾ is given as 206 cm., or 6 ft. 9 in., but it is not stated whether this measurement referred to the actual animal, to the skin, or to the mounted specimen. A detailed statement of the dimensions of our own specimens will appear directly, but in the meantime it may be said that the total length of the larger of the two was 5 ft. 10½ in., and of the smaller 5 ft. 4½ in., and that their weights, at the close of what was practically a starvation period of more than three months, during which they manifestly lost bulk, were respectively 17 lb. and 9 lb. It will thus be seen that though not differing greatly in length there was a very marked difference in the weight of these two specimens. Not long ago we received the skin of a specimen from William Creek, the length of which, when mounted, is identical with that of the larger of our two living specimens, but this skin may have been somewhat stretched in its removal, which is very liable to happen under the hands of an unskilled operator, who was in this case an aboriginal. Relatively large amongst other lizards as are these land reptiles, they are, nevertheless, the dwarfed descendants of much larger lacertilian forms, for we have in the Museum a few vertebræ of an extinct Monitor (*Varanus priscus*, Owen) obtained at the Warburton River which, if the size may be reckoned by crocodilian comparisons, must have been 20 ft. in length, or possibly even larger.

Table showing dimensions of two specimens of *Varanus giganteus*:—

	Male A. cm.	Male B. cm.	Longest Specimen in British Mus. Cat. of Lizards (1885).
Total length	179·5	163	206
Head (maxm.)	13·6	12	14 (5)
Neck	18	15	22
Body	47·8	42·5	53
Tail	100	93·5	117
Fore limb	25·2	21	27
Hind limb	32·1	29	35
Weight, in lbs. (after 100 days' starvation period)	17	9	—

(4) This is the type specimen.

(5) It is not stated whether this refers to the maximum length of the head or to that taken in the median line, which falls short of the former. In our own specimens the maximum length is given.

In the description of the conspicuous colour-markings of this species the British Museum Catalogue, while correctly stating the neck and throat to be marked with large blackish reticulations on a white ground, adds that the belly is immaculate. In the larger of the two above-mentioned Museum specimens the chest was marked by four well-marked single, irregularly zig-zagging, but on the whole, transverse black bands, and the belly by six double bands of similar disposition, the reticular pattern appearing on the sides. A very little fore-and-aft approximation, however, of the ventral bands would have formed a reticular pattern by the meeting of the angles of the zig-zag lines. In the smaller specimen the belly was marked with a reticular pattern similar to that on the sides of the neck, only much fainter in colour.

Fat-bodies (Corpora adiposa).—A median longitudinal incision through the front of the abdominal walls exposed on either side a large lobulated, dorsoventrally compressed mass of firm, bright-yellow fat, which, but for its slender vascular attachments at the posterior end, lay free in an apparently closed extra-peritoneal cavity. The inner or median wall of this cavity was formed by a smooth, tough membrane, which apparently constituted the parietal peritoneum of the abdomen, while on the outer side the fat mass lay in close contact with the glistening inner surface of the lower ribs and abdominal walls.

The constituent lobules composing these fat masses were, for the most part, irregularly, transversely arranged, the length of the lobules being generally coincident with the width of the adipose mass, though some fell short of this, and, in consequence of their close and accurate coaptation, the body as a whole appeared as a more or less superficially lobulated, but otherwise compact, mass. The compactness was, however, only apparent, for the constituent lobules were very easily and naturally separable from one another, being held together only by a superficial connective tissue capsule of extreme tenuity and slight vascularity on the front and back of the organ, but of rather firmer texture at the ends of the lobules, where these together formed the lateral margins of the body. Thus, when the removed fat mass was held up by one end, the weight of the dependent lobules was sufficient to rupture to a great extent the connective tissue attachments of the lobules on the front and back, so that these fell away from one another for the greater part of their length, remaining joined chiefly at their ends, that is to say, at the lateral edges of the body, where the inter-lobular attachments were strongest. The appearance under these circumstances was that of a thick pad or cushion of fat perforated by transversely disposed fenestræ,

these apertures being widest at points corresponding to the centres of the lobules and becoming narrower and more slit-like towards their ends, where they still remained attached.

The combined weight of the two masses in the largest specimen at the close of a three and a half months' starvation period was 2 lb.

Concerning the full significance of these fat bodies our knowledge is still incomplete, but according to C. K. Hoffmann⁽⁶⁾ they correspond to the *corpora adiposa* of Amphibians and have some relation to the sexual activities, a view which is supported by their periodic increase and decrease of size. They reach, says this writer, their maximum of development in Spring. From the composition of these bodies it is also reasonable to suppose that they may serve as reservoirs of fat to be utilized for nutritional purposes during the hibernation period, but if so it is remarkable that they should still have been so large (constituting 12 per cent. of the total body weight) at the close of the long fast, when all other obvious adipose tissue had disappeared from the body. As, however, the animals when killed had evidently shrunk in bulk, particularly in respect to the region of the trunk, it is very probable that some amount of reduction in the fat masses had taken place.

DESCRIPTION OF PLATE IV.

Varanus giganteus.

The three figures, taken from life, represent the animals in characteristic attitudes. In figs. 1 and 2 the larger specimen shows the gular pouch inflated to a moderate degree; the latter figure also shows the body completely raised from the ground, and the tail, here concealed behind the body, was also similarly raised, as well as strongly flexed. The great length of the tail is shown in figs. 1 and 3, and the snake-like appearance of the head is seen in the case of the smaller animal in both these figures.

⁽⁶⁾ Bronn's Thierleben Abt 3, Reptilien (Eidechsen und Wasserserechsen, p. 994).

**NOTES ON RECURRENT TRANSGRESSIONS OF THE SEA
AT DRY CREEK.**

By WALTER HOWCHIN, F.G.S., Lecturer in Geology and
Palæontology, University of Adelaide.

[Read July 11, 1912.]

By the courtesy of Mr. T. G. Ellery, Town Clerk of Adelaide, my attention was called to an interesting section exposed by the sinking of a drainage tank connected with the City Abattoirs. The tank is situated in the south-east corner of Section 920 (Grand Junction), Hundred of Port Adelaide, at the five cross-roads, about a mile to the south of the Dry Creek Railway Station. I visited the spot in company with Mr. Filmore, an officer of the City Council, and was enabled to make a careful examination of the section, which proved to be as follows:—

	ft. in.
1. Surface soil—loamy clay	5 6
2. Reddish sharp sand, slightly argillaceous ...	2 0
3. Very compact red clay	7 6
4. Bluish, grey, to whitish clay, thickly beset with fragmental shelly matter	2 6
5. Bed of <i>Ostrea</i> , <i>Arca</i> , etc., in great numbers ...	2 0
6. Blue clay of unknown depth	0 6
	20 0

The flats between Port Adelaide and Dry Creek Railway Station have been but recently elevated above sea-level. The railway at Dry Creek is, according to the official figures, 16 ft. above low-water mark, and as the average height of the tidal wave is estimated at $8\frac{1}{2}$ ft., it follows that the railway is only $7\frac{1}{2}$ ft. above high-water level. Indeed, the elevation of the maritime plains is still incomplete, as is evidenced by the extensive estuarine area of the North Arm, with numerous reticulating creeks and swamps which occupy most of the area. The intervening land surfaces are mostly saline and covered with samphire growths. These flats have been built of estuarine mud containing shells characteristic of such a habitat. The shells can be found abundantly strewn over the surface of the ground and along the sides of the creeks, but especially on the artificial embankments that have been constructed by heaping up the adjoining mud. Among the commonest forms thus found are *Chione corrugata*, *Ampullarina quoyana*, species of *Risella*, and *Bittium estuarium*.

Several small creeks in the neighbourhood of Dry Creek arise from seepings from the higher ground, are moderately fresh, and flow north-westerly into the North Arm inlet—the tidal waters of the latter come up to within about a mile of Dry Creek.

On the eastern side of Dry Creek Railway Station there is a gradual rise of the land, which is at once made evident by a change of herbage, but in some directions the marine shells can be traced on the eastern side of the railway as well as on the western. It is, however, difficult to draw the limits of the old estuarine area as, since the retreat of the sea, a certain amount of land-wash and the accumulation of a humus soil have made a covering that obscures the estuarine silts. In constructing the new portion of the line to the Abattoirs, on the north-east side of the railway station, and at about a quarter of a mile from the latter, it was found necessary, in making an embankment, to excavate to a shallow depth the soil on either side of the permanent way, and in doing this the shelly marine clays that underlie the top soil became exposed. In this situation *Ampullarina quoyana* is very common, *Risella* is less so, and *Chione* is rare—at least so far as surface indications go. The elevation of this bed above present sea-level (tested by aneroid) appears to be about the same as that of the Dry Creek Railway Station. The slightly drier conditions at this point have permitted the growth of a travertine crust overlying the shelly bed, varying in thickness from $\frac{1}{2}$ in. to 3 in. It is not a pure limestone, but the partial decomposition of the shells has yielded a cementing agent by which the immediately overlying soil has become consolidated into a crust. The material thrown out from recently dug post-holes, adjacent to the shelly bed, supplies evidence that much of the underlying red sands have also been hardened, probably from a like cause, into a sand-rock. Marine shells were rarely found thrown out from these post-holes, which suggests that the shelly bed is superficial and, in this position, of no great thickness.

The occurrence of this raised sea-bed was recognized by the late Professor Ralph Tate soon after his arrival in South Australia, and in his Presidential Address before this Society (then known as the Adelaide Philosophical Society) in 1879, stated, "The estuarine limestone, which fringes the Dry Creek salt marsh, and which is of about 6 to 12 in. thick, and crowded with *Amphibola* [*Ampullarina*] *quoyana*, *Risella melanostoma*, and other littoral shells, is not more than 12 ft. above ordinary high-water mark. The limestone overlies the drift, but graduates into the estuarine muds and sands which occupy the salt marsh. The marsh is at rare intervals over-

flown, but extraordinary tides do not reach the estuarine limestone." (1)

The geological section exposed in the present excavation at Dry Creek is of very great interest as showing alternations of the height of the land in relation to the sea that has led to repeated modifications of our coast-line. It has been a complex movement in which the sea has twice transgressed upon the land and twice retired during recent geological times. This conclusion is reached by a twofold testimony—(1) the stratigraphical succession, and (2) the zoological evidence.

With regard to the geological succession, there are two fossiliferous horizons, one at or near the surface and the other at a depth of 18 ft. below the surface, and in between these two marine horizons there are some 16 ft. or 18 ft. of alluvial wash. The upper marine bed was not detected in the sinking now under description, but its prevalence in the neighbourhood is abundantly evident. The bed of triturated shells (No. 4 in section) which immediately overlies the oyster bed, may have accumulated, at least in part, by the action of surface water acting on the fossiliferous material after the retirement of the sea; but if we exclude this doubtful bed, there remains 15 ft. of fresh-water deposits that mark the interregnum between the two encroachments of the sea. The blue clay (No. 6 in section) that underlies the oyster bed is no doubt the tenacious blue clay of the Adelaide plains, probably of Pleistocene Age, which is met with in most sinkings in Adelaide and neighbourhood, and forms the brick-earth of our local potteries and brick-making. It is a fresh-water deposit, and marked the base of the water-level in the present sinking at Dry Creek, as the oyster bed, which is immediately above it, carried a strong runner of water.

There is a marked contrast in the organic facies of the two shell-bearing beds. The upper-bed carries just such mollusca as live in our estuaries to-day, and in about the same relative proportions. It is essentially a present-day type of deposit. The lower marine bed, in addition to carrying such forms as still live in the Port Creek, contains others that do not exist there at the present day. The large oyster, *Ostrea angasi*, which is the most striking shell in the lower bed, although plentiful, in places, in Spencer Gulf, no longer occurs, or but rarely, in our local waters; and *Arca trapezia*, which is also a very common form in the Dry Creek lower marine bed, is no longer an inhabitant of South Australian waters. These two shells do not occur in the superficial

(1) Trans. Philosoph. Soc. of Adelaide [Roy. Soc., S.A.], 1878-9, p. lxix.

marine bed, but they are the principal forms that make up the lower marine bed. The altered distribution of these two species in our local sea-areas marks an important interval of time—a measure of time that must have been sufficiently long to permit of a gradual change of conditions that led up to the total extinction of one species and local limitations of another species, in South Australian waters.

A sample of the lower marine bed was washed and on examination the following foraminifera were noted:—

Miliolina secans, d'Orb.; *M. circularis*, Bornem.; *M. undosa*, Karrer; *M. boueana*, d'Orb.; *M. oblonga*, Montagu.

Triloculina trigonula, d'Orb.; *T. tricarinata*, d'Orb.

Spiroloculina grata, Terq.

Pulvinulina repanda, Fichtel and Moll; *P. punctulata*, d'Orb.

Rotalia beccarii, Linn.

Polystomella crispa, Linn.

The above are all shallow-water forms, but scarcely typical of estuarine conditions. *Polystomella crispa* is in great numbers, and *Triloculina trigonula* and *Rotalia beccarii*, although not so plentiful as the first named, are common forms in the material. All the species present are represented by strongly built examples and are more typical of open sea conditions than a brackish estuary. On the other hand there is a remarkable absence of some of the commonest species which occur in the shallow waters of our present seas, more especially *Nubecularia*, which is the commonest foraminifer of our coasts and, in most gatherings, number more than all the other foraminifera together—yet not a single example of this form was observed in the Dry Creek material. In addition to the foraminifera several species of *Entomostraca* (*Ostracoda*) were noted.

All the shells contained in this bed were honeycombed by boring organisms to an unusual degree. Many of the shells had been perforated to such an extent that scarcely any portion of the shell preserved its solid form—and every shell appeared to have been more or less attacked in this way. The parasitic intruder was probably the minute boring sponge, *Cliona*, which makes a host of any shell or calcareous rock that it may find handy to utilize for this purpose. The waters, at the locality referred to, must have supplied congenial conditions for the development of this particular organism.

The geological section at Dry Creek shows a close accordance with similar sections that have been exposed in excava-

tions near Port Adelaide. In 1886 I submitted to the Society a short paper⁽²⁾ on one such an exposure, and therein stated that "there are strong presumptive evidences, based on several collateral lines of proof, that the Post-Tertiary beds of the seaboard do not represent a regular succession of marine beds, but that there was a break in the continuity of their deposition. In the view we have taken, there is an *older* and a *newer* bed of recent marine, with an intercalated formation of fresh-water origin dividing the same, and connected with the fresh-water bed two horizons representing dry-land conditions."⁽³⁾

The above conclusion, reached twenty-six years ago, has received its confirmation in the Dry Creek section. When allowance is made for the different situations and the natural thinning of the beds to landward, the two sections may be regarded, in their main geological features, as practically identical. In the Glanville section the upper marine bed was laid down on an open sea beach, consisting of white sand, littoral waste, and layers of sea-weed deposited by wave action; while at Dry Creek the corresponding bed is an estuarine clay, laid down in a land-locked back-water, of which the present North Arm inlet is the shrunken remnant. The lower marine bed at Glanville is highly calcareous, in places almost a limestone, and was laid down probably under some depth of water, while the corresponding bed at Dry Creek is a silt that accumulated under shallower conditions. The range of life was much more restricted in the Dry Creek area than it was in the open sea conditions represented at Glanville. The large warm-sea foraminifer, *Orbitolites complanta*, which occurs plentifully in the Glanville section, is entirely absent from the Dry Creek bed, probably excluded by the shallowness of the waters and their more muddy condition, but the important time-indicator shell, *Arca trapezia*, is abundant in both localities.

By the courtesy of the officers of the Engineer-in-Chief's Department I am informed that the level-crossing at the railway, situated a short distance to the west of the excavation at Dry Creek, is 19.84 ft. above low-water mark. The difference of level between this crossing and the excavation is inappreciable, so that it may be said that the upper limits of the *Ostrea-Arca* bed is about 2 ft. above present low-water mark, and that, were it not for the land-wash that has dammed back the sea, the bed in question at Dry Creek would

(2) "Remarks on a Geological Section at the new Graving Dock, Glanville, with Special Reference to a supposed Old Land Surface now Below Sea-level," Trans Roy. Soc., S.A., vol. x., pp. 31-35.

(3) *Loc. cit.*, p. 35.

be submerged at high water to the extent of $6\frac{1}{2}$ ft. At Glanville the same bed, if relieved of the overburden, would be submerged at high water by about 25 ft. or 26 ft., which difference can be easily accounted for by the gradual slope of the old sea floor towards the west. In the Dry Creek section, 12 ft. to 15 ft. of fresh-water sands and clays separate the two marine deposits, while, at Glanville, the thickness of the alluvial wedge amounts to 11 ft., if we recognize the beach deposits as the base level of the upper marine bed, and 26 ft. if we take the full thickness between the lower marine and the fossiliferous estuarine clay at the top of the section, which seems to be the same horizon as that represented in the upper marine at Dry Creek.

At both Dry Creek and Glanville the lower marine bed rests on alluvium. The next marine horizon below those dealt with in this paper is that of the Lower Pliocene, proved in the boring for water put down by the Australian Smelting Company, at their works, at Dry Creek.⁽⁴⁾ The site of the bore was at the margin of the recent marine sites, 14 ft. above sea-level. The Lower Pliocene marine sands were met with at a depth of 320 ft., so that a period sufficiently long to permit of the laying down of 300 ft. of alluvial material must have intervened between the withdrawal of the Pliocene sea and its return in Pleistocene times. It may be interesting to point out that we now have evidences of five distinct recurrences of sea-intrusion in the neighbourhood of Adelaide, *viz.*, Recent, Sub-Recent, Pliocene, Miocene, and Eocene, each of which intrusions was separated from the others in the succession by long periods of dry-land conditions.

(4) Tate "On the Discovery of Marine Deposits of Pliocene Age in Australia," Trans. Roy. Soc., S.A., vol. xiii., p. 172, 1890.

FURTHER NOTES ON AUSTRALIAN COLEOPTERA, WITH
 DESCRIPTIONS OF NEW GENERA AND SPECIES.
 No. XLII.

By the (late) REV. CANON BLACKBURN, B.A.
 (Communicated by Mr. A. M. LEA.)

[Read August 8, 1912.]

[Just prior to his death Mr. Blackburn had completed descriptions of numerous species of the genus *Lepidota*; he had also described a few species of other genera, and was preparing to systematically investigate the *Dynastides*. As his writings are quite ready for publication, and the types of the new species are marked as such, it appears very desirable that these, his final descriptions and notes, should be published.—A. M. LEA.]

LAMELLICORNES.

LIPAROCHRUS.

L. hackeri, sp. nov. Minus nitidus; piceo-niger, sat convexus; ovatus; supra glaber; clypeo subtiliter punctulato, antice late truncato, lateribus ante oculos subito fortiter dilatatis; prothorace fortiter transverso, antrorsum fortiter angustato, supra in disco sat lævi latera versus subtiliter subobsolete punctulato, lateribus leviter arcuatis, angulis anticis acutis posticis rotundato-obtusis, basi subtiliter marginata; elytris subtilius geminatim striatis, striis subtiliter punctulatis, interstitiis planis sparsim subtilissime punctulatis; tibiis anticis extus bidentatis. Long., 6 l.; lat., 3½ l.

Its larger size distinguishes this species from all its allies known to me. In my tabulation of characters of the known Australian *Liparochni* (Trans. Roy. Soc., S.A., 1905, p. 271) it falls beside *L. sculptilis*, Westw., from which it differs by, *inter alia multa*, its dorsal surface almost without puncturation, the elytral interstices (the alternate ones very wide) quite flat, the much stronger crenulation of the external margin of its front tibiæ, its much longer tarsi.

L. hackeri is probably nearer to some *Liparochni* described from New Guinea than to any previously known as Australian. From the descriptions of these it differs, *inter alia*, as follows:—From *L. dux*, Arrow, by the very distinct puncturation of its elytral striæ; from *L. ingens*, Felsche, by the smooth non-tessellated interstices of its elytral striæ; from *L. papuus*, Lansb., by its dark antennæ (the flabellum, of paler colour, excepted) and quite evidently punctulate

elytral interstices; and from *L. alternans*, Macl., by its non-costulate elytra. The type seems to be a female.

North Queensland (Little Mulgrave River); Mr. Hacker; given to me by Mr. Lea.

L. geminatus, Westw. This species is very variable in respect of sculpture—especially that of the pronotum. I have examples from various localities in South and Western Australia which I cannot regard as representing more than one species, but among which there are very definitely two quite distinct types of sculpture on the pronotum—in some specimens that segment bearing extremely fine short transverse scratches, while in others the scratches (similar in shape) are very much larger and deeper (quite twice as large). The specimens with finer puncturation have also the external teeth of the front tibiæ smaller and blunter than those of the others and are on the average of smaller size. Both these forms occur near Adelaide. I observe similar differences among specimens all of which I have taken to be *L. multi-striatus*, Har., the only other *Liparochrus* of which I possess numerous specimens. I have hitherto regarded these differences as sexual. I cannot, however, discover any marked difference between the front claws of the two forms which, as pointed out by Mr. Arrow (Trans. Ent. Soc., London, 1909) distinguishes the sexes of two *Liparochri* of which I do not possess a male. I notice that in the paper quoted Mr. Arrow describes a *Liparochrus (timidus)* allied to *L. geminatus* of which he had before him “a series of specimens” and does not refer to its sexual characters, from which I assume that in it the sexual difference of the claws is wanting. The species which I take to be *silphoides*, Har., presents the sexual distinction in the claws. Mr. Arrow’s two species mentioned above as having the claw distinction and the species which I take to be *silphoides* (probably = *L. raucus*, Fairm.)—also the species described above as *L. hackeri*, of which the type is probably a female—another species which I take to be *H. sculptilis*, Westw. (probably = *H. ciliboides*, Har.), and of which I believe my specimen to be a female—*L. alternans*, Macl. (not *alternatus*, as quoted by Arrow), and *L. papuus*, Har., are the only species known to me as having only two external teeth on the front tibiæ (I do not possess the description of *L. sulcatus*, Montrouz.). All of the above-mentioned species of which the male is known (and no others, so far as known) present a sexual distinction in the front claws, and all of them, so far as I know them, are of *facies* markedly different from the rest of the species attributed to *Liparochrus* (one of which, *L. geminatus*, Westw., is apparently the type species). If it should prove that the males of all of them have

asymmetrical claws it will probably be desirable to regard them as forming a genus distinct from *Liparochrus*. It may be added that Mr. Arrow, in the valuable memoir noted above, does not refer to the genus *Antiochrus*, Sharp, to the type of which he presumably has access, and on which I wrote some notes in Trans. Roy. Soc., S.A., 1905, pp. 273-5, those notes being conjectural to the extent involved in my not having seen the typical species.

PROCHELYNA.

P. heterodoxa, Burm. I have a specimen before me taken flying in the sunshine on Eyre Peninsula by Mr. J. S. Blackburn which there can be little doubt is this species. It agrees with Burmeister's description in every respect except in the scarcely perceptible tendency to reddish colouring at the base of its elytra, its being a trifle smaller than the type, and (as far as I can see) its mentum not particularly narrow. It unfortunately died with its head much depressed towards the prosternum, so that the form of its mentum—which is densely pilose—cannot be examined satisfactorily without breaking the specimen—indeed, in any case, dissection would be necessary. But even if the form of the mentum does not quite square with Burmeister's description, the close agreement with the decidedly unusual characters of sculpture, etc. (especially the elytra completely and quite strongly striate in their hinder half, but in front non-striate except close to the suture, the strongly pointed pygidium, the red bristles fringing the elytra), would certainly, I think, point to the probability that Burmeister's description of the mentum is defective rather than to the likelihood of two species occurring in South Australia so closely resembling each other and yet differing in the form of the mentum. I note some hairs about the margin of the pronotum suggestive of the probability that my specimen is abraded (as was, in that case, probably Burmeister's type), and that in a fresh specimen the pronotum is more or less pilose.

P. rubella, Schauf. There is no mention in the brief description of this species of any character indicative of its being rightly referred to *Prochelyna*, or even to the *Systellopid* Group—nor, on the other hand, of any character inconsistent therewith. I have hitherto considered that the phrase “(pronoto) utrinque medio tubere prædito” rendered it unlikely to be a *Systellopid*, but the examination of a specimen referred to below under “*Atholerus*” has shaken that opinion, and there seems to be no definite ground left, apart from Schaufuss having called it a *Prochelyna*, for referring it to any particular genus. It is much to be desired that the type be examined and reported on.

ATHORUS.

A specimen from the Swan River belonging to Mr. Lea is, I think, certainly a member of this genus, and I can find no reason to separate it generically from the specimen discussed above as being probably *Prochelyna*, unless a dissection of the mouth organ of both species should serve the purpose. Even as species the two are decidedly close. The specimen from Swan River agrees very well with the description of the typical species (*A. obscurus*, Shp.)—also from Swan River—except in its elytra being wholly fuscous (the lateral margins excepted) and not at the base only. It seems, however, to be certainly distinct sexually from the specimen I refer to *Prochelyna*, its antennal flabellum being much shorter, its tarsi evidently shorter, its pygidium notably less vertical and much more convex, and its ventral segments distinctly longer. Its most remarkable character, however, consists in the presence on the middle of the pronotum, a little behind the front, of a small deep fovea on the level of the general surface in its hinder part, but in its front part sinking into the general surface in such fashion that its front part has a semi-circular vertical wall, on either side of which there is a small but distinct tubercle. As the other characters of the specimen are fairly conclusive of its being a female, and this prothoracic fovea seems like a male character, I should be disposed to regard it as an accidental abnormality, were it not for the reference mentioned above to the presence of two tubercles on the pronotum of a species which Schaufuss has referred to *Prochelyna*. Unfortunately the *Systellopides* are so rarely met with that I have never yet been able to examine two specimens that are unquestionably the sexes of a single species. It should perhaps be added that the present insect and that I have discussed under *Prochelyna* can scarcely be the sexes of a single species, on account of considerable difference in elytral striation—which is not likely to be of a sexual character.

LIPARETRUS.

L. confusus, sp. nov., Mas. Sat breviter ovalis; parum nitidus; niger, antennis palpis tarsis et (basi excepta) elytris plus minusve rufis; corpore toto pilis erectis vestito, his in capite pronoto et elytris obscure fulvis alibi cinereis; antennis 8-articulatis; clypeo subnitido, leviter subgrosse punctulato, antice late leviter emarginato; fronte confertim subtilius rugulosa; prothorace sat fortiter transverso, antice sat angustato, supra æquali, confertim sat fortiter ruguloso, lateribus arcuatis; elytris crebre fortiter nec grosse vix seriatim punctulatis, haud striatis, costulis vix manifestis circiter 2 instructis; tibiis

anticis extus 3-dentatis; tarsorum posticorum articulo 2^o quam basalis sat longiori.

Fem. latet. Long., 3½ l.; lat., 1¼ l.

This species is a member of my 14th Group of *Liparetri* (Trans. Roy. Soc., S.A., 1905), and in the tabulation (*loc. cit.*) must stand beside *nigrinus*, Germ., from which it differs by, *inter alia*, smaller size, bicolorous almost absolutely non-costulate elytra, darker pilosity of dorsal surface, and much more asperate pygidium and propygidium. It is perhaps nearest to the species I have treated as *L. sylvicola*, Fab., but differs from it by the very much less coarse sculpture of its dorsal surface (especially of the pronotum and propygidium), the much narrower black base of its elytra, etc. It differs from both the species just mentioned by the front of its clypeus widely emarginate.

Victorian Alps; Buffalo Mountain.

ANEUCOMIDES.

With much reluctance I find it necessary to refer provisionally to *Aneucomides*, the insect to be described below, since, in spite of great difference in facies and in some structural characters that would be generic in many groups of *Coleoptera*, I can find no structural distinction except in respect of characters that are certainly variable within the limits of some genera in the *Sericoides*. Unfortunately I have been unable to examine some of the mouth parts of the type-species of *Aneucomides*, as its specimen still remains unique, and it is not unlikely that the maxillæ might furnish a valid generic difference if they could be dissected in *A. coloratus*, but without such dissection the present insect must certainly be placed in *Aneucomides*.

A. hirticollis, sp. nov., Mas. Sat elongatus, subparallelus; sat nitidus; testaceus, capite antennis pedibusque nonnihil rufescentibus; capite sparsim, pronoto pygidio et corpore subtus dense, hirsutis; palpis maxillaribus valde elongatis, articulis 2^o quam 3^{us} multo longiori, 3^o 4^o que inter se sat æqualibus; maxillarum lobo externo sat fortiter bidentato; mento et palpis labialibus fere ut *A. colorati*, Blackb.; labro fere ut *A. colorati* sed magis exstanti; antennis sat elongatis, 8-articulatis, laminis 4 instructis (his articulis basalibus 4 conjunctis longitudine sat æqualibus, antennarum articulo 4^o intus angulato; oculis sat magnis vix manifeste granulatis; capite confertim subtiliter punctulato; clypeo antice rotundatum modice reflexo; prothorace quam longiori duplo latiori, fere ut caput punctulato, antice parum angustato, lateribus leviter arcuatis, angulis anticis sat

rectis posticis leviter obtusis; elytris subtiliter geminatim striatis, sat sparsim vix subtiliter nec profunde punctulatis, interstitiis alternis quam cetera multo angustioribus obsolete convexis; pygidio abrupte verticali, antice subtiliter leviter (postice vix manifeste) punctulato; abdomine brevi confertim subtiliter sat profunde punctulato (segmento apicali fere lævi excepto); pedibus sat robustis, femoribus posticis sat fortiter tumidis, tibiis anticis extus tridentatis (posticis brevibus transversim unicarinatis a basi ad apicem fortiter dilatatis), tarsis elongatis gracilibus quam tibiæ multo longioribus; unguiculis gracilibus elongatis simplicibus.

Fem. latet. Long., 7 l.; lat., $3\frac{1}{2}$ l.

A much more elongate and narrow species than *A. coloratus*, Blackb., with the facies of a somewhat narrow *Haplonycha*. The antennæ are structurally much like those of *A. coloratus*, but decidedly longer and more slender, the maxillary palpi very different, but not more so than is frequent between species of *Haplonycha*. The abdomen short, strongly punctulate, and with extremely strong ventral sutures is characteristic of both species.

Western Australia (exact locality not known). Given me by Mr. French.

HETERONYX.

H. cribripennis, sp. nov. Modice elongatus, postice parum dilatatus; subnitidus; ferrugineus; supra pilis brevibus adpressis vestitus; clypeo crebre subtilius ruguloso, antice truncato, oculos in exteriorem partem haud superanti; labro clypei planum superanti; capite antice (a tergo oblique viso) tripliciter convexo (parte mediana quam laterales haud multo angustiori); fronte subgrosse vix crebre punctulata; hac clypeoque ut plana vix disparia visis; antennis 8-articulatis, articulo 3^o quam 2^{us} sat multo breviori; prothorace quam longiori ut 7 ad 4 latiori, antice minus angustato, vix crebre nec profunde punctulato (puncturis circiter 20 in segmenti longitudine), lateribus (superne visis) leviter arcuatis, angulis anticis parum productis posticis (superne visis) rectis vix retrorsum productis, basi leviter bisinuata, margine basali sat æquali; elytris confertim subtiliter punctulatis (trans elytron puncturis circiter 45); pygidio sat fortiter sat crebre punctulato; coxis posticis quam metasternum sat brevioribus, quam segmentum ventrale 2^{um} sat longioribus; tarsorum posticorum articulo basali quam 2^{us} parum breviori quam 3^{us} paullo longiori; unguiculis appendiculatis, parte apicali parva. Long., $3\frac{1}{2}$ l.; lat., $1\frac{2}{3}$ l.

This is an easily recognizable species, the feebly impressed puncturation of its pronotum and elytra with the punctures of the latter very much finer and closer than of the former being unusual in *Heteronyx*. It is a member of my Group VI. (Trans. Roy. Soc., S.A., 1910, pp. 149, etc.), and in the tabulation of species of that group falls beside *cygneus*, Blackb., on account of its clypeus not extending laterally beyond the contour of the eyes. The two may be thus distinguished:—

- H. Punctures of pronotum deeply impressed
and sparse (about 15 in the length) *cygneus*, Blackb.
HH. Punctures of pronotum much smaller,
fainter, and closer *cribripennis*, Blackb.

South Australia (Cleve); taken by Mr. J. S. Blackburn.

H. johannis, sp. nov. Ovatus, sat brevis; parum nitidus; ferrugineus, elytris nigro-fuscis; supra pilis adpressis minus brevibus cinereis vestitus; clypeo subtilius minus crebre ruguloso, antice subtruncato, oculos in exteriorem partem haud superanti; labro clypei planum superanti; antice haud perpendiculari; capite antice (a tergo oblique viso) tripliciter convexo (parte mediana quam laterales fere duplo angustiori); fronte crebre sat subtiliter punctulata; hac clypeoque fere planum continuum efficientibus; antennis 9-articulatis; prothorace quam longiori ut 9 ad 5 latiori, antice minus angustato, supra subtiliter sat crebre nec profunde punctulato (puncturis circiter 26 in segmenti longitudine), lateribus (superne visis) sat rotundatis, angulis anticis manifeste productis posticis (superne visis) rotundato-obtusis, basi vix bisinuata, margine basali sat æquali; elytris subtiliter confertim nec profunde punctulatis (trans elytron puncturis circiter 55), obsolete striatis; pygidio minus crebre minus subtiliter nec profunde punctulato; coxis posticis quam metasternum haud brevioribus, quam segmentum ventrale 2^{um} multo longioribus; tarsorum posticorum articulo basali 2^o longitudine sat æquali; unguiculis posticis elongatis appendiculatis, parte basali quam apicalis haud longiori. Long., 4 l.; lat., 2½ l.

The colouring of this species (entirely ferruginous except black-brown elytra) if constant distinguishes it from nearly all other *Heteronyces*. It is a member of my Group VIII., and in the tabulation of the species of that group (Trans. Roy. Soc., S.A., 1910, pp. 187, etc.) falls beside *waterhousei*, Blackb., from which it differs (besides colour) by, *inter alia*, labrum (as in *H. xanthotrichus*, Blackb.) not hav-

ing the front face perpendicular, middle lobe of trilobed outline of head much narrower, form shorter and wider, dorsal surface notably less nitid, prothorax more transverse, with sides more rounded, elytra quite visibly striate, basal two joints of hind tarsi scarcely different in length. It is to be noted that the punctures of the pygidium are very notably less close and less fine than those of the rest of the dorsal surface.

South Australia (Cleve); taken by my son, Mr. John S. Blackburn.

H. difficilis, sp. nov. Sat elongatus, postice vix dilatatus; minus nitidus; ferrugineus; supra pilis adpressis brevibus vestitus; clypeo crebre subtilius ruguloso, antice emarginato, oculos in exteriorem partem haud superanti; labro clypei planum superanti; capite antice (a tergo oblique viso) tripliciter convexo (parte mediana quam laterales duplo angustiori); fronte subtilius sat crebre punctulata; hac clypeoque ut plana minus disparia visis; antennis 9-articulatis; prothorace quam longiori ut 9 ad 5 latiori, antice modice angustato, supra crebre subtiliter punctulato (puncturis circiter 35 in segmenti longitudine), lateribus (superne visis) sat arcuatis, angulis anticis sat acutis modice productis posticis (superne visis) obtusis, basi leviter bisinuata, margine basali sat æquali; elytris confertim subtiliter punctulatis (trans elytron puncturis circiter 50), obsolete substriatis; pygidio nitido piloso sparsius punctulato; coxis posticis quam metasternum vix brevioribus quam segmentum ventrale 2^{um} multo longioribus; tarsorum posticorum articulo basali quam 2^{us} multo (quam 3^{us} parum) breviori; unguiculis posticis elongatis, appendiculatis, parte basali quam apicalis vix longiori. Long., 5 l.; lat., 2 $\frac{2}{5}$ l.

A member of my Group VIII. In the tabulation of species of that group (Trans. Roy. Soc., S.A., 1910, pp. 187, etc.) stands next to *H. scalptus*, Blackb. Compared with *scalptus* the present species (which is really very close to it) is notably smaller, with sides of prothorax more rounded, puncturation of pronotum and elytra distinctly a little less extremely fine, pygidium much more nitid and considerably less closely punctulate, etc. This insect is also near *H. waterhousei*, Blackb., and *H. johannis*, Blackb., differing from the former by, *inter alia*, its substriate elytra; from the latter by, *inter alia*, very different colouring and conspicuously convex subsutural interstice; and from both by larger size and narrower form.

South Australia (Cleve); taken by Mr. J. S. Blackburn.

STETHASPIS.

Since I dealt with this genus (Trans. Roy. Soc., S.A., 1911) I have obtained specimens which enable me to supplement my former notes with some important additions. Mr. Carter has sent me a male of each of the two species that I regard as *S. eucalypti*, Boisd., and *metrosideri*, Burm., and of which I had previously known only the females. *Metrosideri* was described on a female. The examination of these males is conclusive as to the distinctness of the species which I have regarded as *eucalypti*, Boisd., from the species that I have called *metrosideri*. The male sent by Mr. Carter of the former species has an antennal flabellum of 6 laminæ, while in the flabellum of the other male the laminæ are only 5, and so there can remain no doubt that the species I have considered to be *metrosideri* and *eucalypti* are distinct species. In my former memoir (*loc. cit.*) I expressed a doubt about my identification of *metrosideri*, and the examination of the male does not throw fresh light directly upon the point. It, however, brings out the fact that the absence of erect hairs on the ventral segments, which Burmeister regarded as a specific character, is only sexual, as this male has erect hairs like those of *eucalypti*. Indirectly, however, the study of this male tends to confirm my identification, inasmuch as the legs of the specimen in question are green, and that character (together with the presence of erect hairs on its ventral segments) removes practically all doubt about the identification of it with *S. lætus*, Blanch.—discussed in my former notes—and settles the point, I think, that *lætus* and *metrosideri* are, as conjectured in my former paper, one species—the latter being the female. The name *lætus* has priority. It should be added that the green colouring of the legs of the male is probably not a sexual character, since it appears also in a female of *eucalypti* sent by Mr. Carter with the male. The male *lætus* has in its elytral striæ the double rows of short white setæ which my former paper noted as present in the female, and that character is certainly a valid specific distinction from *eucalypti*; also the punctures in the elytral striæ are much closer in *lætus* than in *eucalypti*, and the external teeth on the front tibiæ of the male are much stronger in the former than in the latter. *Lætus* and *eucalypti* differ from all the other *Stethaspides* known to me in their much longer metasternal process.

S. sternalis, sp. nov., Mas. Supra viridis, capite pronoto elytrisque plus minusve testaceo-marginatis, sternis obscure ferrugineis, abdomine pygidioque obscuris, antennis palpis pedibusque rufis; pilis erectis sat elongatis albidis (in fronte pygidio femoribus et segmentis

ventralibus sat crebre, in pronoto elytrisque sparsissime, in sternis dense) vestitus; capite fortiter sat crebre punctulato, clypeo antice truncato-vix-emarginato subtiliter marginato nec reflexo; antennis 9-articulatis, articulo 3^o valde elongato, flabello 6-laminato, laminis quam antennarum articuli ceteri conjuncti parum brevioribus, lamina basali quam ceteræ parum breviori; prothorace quam longiori ut 10 ad 5 $\frac{2}{3}$ latiori, antice valde angustato, supra sparsim (ad latera magis crebre) punctulato, lateribus pone medium sinuatis, angulis anticis obtusis posticis acute rectis, basi piloso-fimbriata fortiter bisinuata; scutello fere ut pronotum punctulato; elytris, fere ut *S. eucalypti*, Boisd., fortiter punctulato-striatis, puncturis setæ albidas perbreves uniseriatim ferentibus, interstitiis convexis lævibus; pygidio crebre subtilius (quam *S. eucalypti* multo minus subtiliter) aspero; processu sternali nullo, sterno antice declivi-carinato; tibiis anticis extus modice bidentatis (quam *S. eucalypti* magis, quam *S. læti*, Blanch., minus, fortiter); tarsis elongatis sat gracilibus; segmentis ventralibus minus crebre minus subtiliter punctulatis.

Fem. latet. Long., 10 $\frac{1}{2}$ l.; lat., 5 $\frac{1}{2}$ l.

Five specimens (all males) of this insect occurred to me on the Buffalo and other mountains of the Victorian Alps, at a high elevation. The species resembles *S. eucalypti*, Boisd., of same sex, in its 6-laminate antennal flabellum (the laminæ, however, are distinctly longer, especially the basal one in proportion to the others), but differs strongly in the absence of a sternal process; the sternum ending at the level of the intermediate coxæ as an obtuse carina vertically truncate. Other notable distinctions consist in the clypeus not reflexed in front, the much less fine asperity of the pygidium, the much less fine and less close puncturation of the ventral segments, the greater length and less robustness of the tarsi, the evidently more strongly developed external teeth of the front tibiæ. From the insect mentioned above as *lætus*, Blanch., this species differs by, *inter alia multa*, the 6-laminate antennal male flabellum and the absence of a sternal process; from *S. monticola*, Blackb., by the male antennal flabellum with 6 long laminæ, the pronotum non-pilose and thinly punctulate, etc.; from *piliger*, Blanch., and *nigrescens*, Blanch., by, *inter alia multa*, its very much greater size. It should, perhaps, be added that I have taken a *Stethaspis* (female only) in the Dividing Range of Victoria which may possibly be the female of this species, but since its sternal process is distinctly less obsolete than in the males from the Alps (not, apparently, a sexual character in other

species), and there are other minor differences, it is more likely to be the female of another species of which I have not seen the male.

Victorian Alps.

The additional material that is now before me enables me to supply a much more satisfactory statement in tabular form than my previous paper contained of the distinctive characters of the known Australian *Stethaspides*, as follows:—

- | | |
|--|----------------------------|
| A. Sternal process elongate and acuminate, very strongly passing the middle coxæ. | |
| B. Punctures of elytral striæ small and close, and bearing white setæ in a double row. Flabellum of male antennæ with only 5 laminæ | lætus, <i>Blanch.</i> |
| BB. Punctures of elytral striæ notably larger and less close; setæ very sparse and not in double rows. Flabellum of male antennæ with 6 laminæ | eucalypti, <i>Boisd.</i> |
| AA. Sternal process scarcely, or not, passing the middle coxæ. | |
| B. Pronotum non-pilose (except a few hairs about front and base) and thinly and finely punctulate. Flabellum of male antennæ with 6 long laminæ | sternalis, <i>Blackb.</i> |
| BB. Pronotum entirely pilose. | |
| C. Pygidium confluently asperate. Colour not black. | |
| D. Punctures of elytral striæ 1-3 similar. Flabellum of male antennæ with only 5 long laminæ ⁽¹⁾ | monticola, <i>Blackb.</i> |
| DD. Punctures of 2nd elytral stria notably larger and sparser than of 1 and 3. Flabellum of male antennæ with 6 long laminæ | piliger, <i>Blanch.</i> |
| CC. Pygidium not nearly confluently sculptured. Colour black. Flabellum of male antennæ with 6 very long laminæ (much longer than joints 1-3 together) | nigrescens, <i>Blanch.</i> |

RHOPÆA.

In the tabulated statement of the distinctive characters of species of this genus (Trans. Roy. Soc., S.A., 1911, p. 189) there is the following error to be noted, *viz.*, against the letter "C." the word "twice" is omitted. The lines should

(1) Joint 4 of the antennæ is scarcely more than dentiform within.

read "Joint 3 of antennæ not longer than *twice* its width at the apex," corresponding to "Joint 3 of antennæ much more than twice as long as wide" against "CC."

PARALEPIDIOTA.

P. lepidoptera, sp. nov., Mas. Sat elongata, postice parum dilatata; rufotestacea, antennarum flabello dilutiori; supra squamis parvis albidis vestita, his in capite pronoto pedibusque sparsis sat crassis in elytris sparsis subtilibus magis setiformibus in pygidio subtilibus sat confertis; sternis et meso-thorace pallide fulvo-villosis; segmentis ventralibus squamis minimis albidis sat confertim vestitis; clypeo latera versus grosse sparsim punctulato, alte reflexo, antice emarginato; fronte in parte postica crebre minus grosse punctulata; palporum maxillarium articulis 2^o modico 3^o brevi 4^o quam 2^{us} 3^{us} que conjuncti nonnihil longiori, hoc supra late profunde excavato; antennis 10-articulatis, articulis 3^o quam 2^{us} sat longiori 4^o brevi intus spiniformi 5^o-10^o fortiter laminiformibus (lamina basali quam ceteræ paullo breviori; prothorace quam longiori ut 5 ad 3 latiori, antice sat fortiter angustato, supra sparsim subfortiter punctulato, lateribus fortiter crenulatis mox pone medium subangulatis, angulis posticis acute rectis, basi subtiliter marginata; scutello sat crebre minus fortiter punctulato; elytris longitudinaliter leviter costulatis, sat crebre vix fortiter punctulatis; pygidio crebre subtilius punctulato; tibiis anticis extus fortiter tridentatis, posticis transversim vix manifeste carinatis; tarsis posticis quam tibiæ paullo brevioribus; unguiculis magnis, intus pone medium dente parvo instructis; segmento ventrali apicali postice late emarginato. Long., 11 l.; lat., 5 $\frac{1}{4}$ l.

Feminæ palpis maxillaribus quam maris brevioribus, antennarum articulo 4^o haud spiniformi flabello multo breviori, prothorace ad latera dilatato vix angulatum, elytris minus concinne punctulatis, tarsis brevioribus, segmento ventrali, apicali haud emarginato. Long., 12 l.; lat., 5 $\frac{2}{5}$ l.

In this species the prothorax is somewhat conspicuously small as compared with the elytra, and is very strongly convex. The lamellæ of the antennal flabellum of the male are fully as long as joints 1-4 together. A thick fringe of long fulvous hairs protrudes over the base of the elytra from beneath the basal margin of the pronotum. There is no apparent sternal projection behind the front coxæ. I am fairly certain that the male and female described are specifically identical, since the only differences I find between

them are in respect of obviously sexual characters, with the exception of the slight difference in the lateral curve of the prothorax, which is perhaps a little puzzling; but the general agreement in non-sexual characters is too close to allow of their being considered two species. The male was given to me by Mr. Lea, labelled "Cairns"; the female by Mr. Perkins, labelled "N. Queensland."

North Queensland.

LEPIDODERMA.

I have recently procured a type-written copy of Brenske's treatise on this genus referred to in my previous paper (Trans. Roy. Soc., S.A., 1911, p. 197), and find that its author had not extended the limits of the genus to include species that, in my opinion, should not be placed there. It was his inclusion of *Antitrogus* in *Lepidiota* which led to the thought that a similar extension of *Lepidoderma* might possibly bring into the number of the new species he described under that name the insect for which I founded the genus *Paralepidiota*. I have now given to it a specific name and description (*vide supra*). As Brenske's treatise occurs in a publication of the *Societas Entomologica*, which, I am informed, is out of print, a brief *resumé* of its contents will probably be useful to Australian workers on the *Coleoptera*. The treatise is, on the whole, rather disappointing for the reason that, although it contains a lengthy note on the relation of *Lepidoderma* to the *Leucopholides*, there is no reference in it to the spurs of the hind tibiæ, which in his former paper on the *Leucopholides* discussed by me (*loc. cit.*) Brenske regarded as of value higher than even generic; and that omission leaves one in doubt whether he had perhaps come to the conclusion expressed by me that the importance he gave in his earlier paper to the character in question ought not to be accepted without hesitation.

In his general remarks on *Lepidoderma* Brenske expresses the opinion which I also expressed (*loc. cit.*), that the ordinarily accepted subdivision of the "True Melolonthides" cannot be satisfactorily applied to the Australian genera, and he states that although *Lepidoderma* under the ordinary classification would fall among the *Polyphyllides*, he thinks its true place is among the *Leucopholides* (where I placed it). He does not refer to the clypeal character which determined me in the matter, but bases his opinion on the *facies* and on the build of some of the mouth characters. He also mentions a character in *Lepidoderma* as distinguishing it from other *Melolonthid* genera known to him in the hind femora being

narrowed in the basal part (not, as in other genera, of evenly curved outline). I had not observed that character myself; though it is not very strongly marked, the note of its presence is certainly a valuable contribution to the diagnosis of the genus. Brenske finds a reason for the inapplicability to Australian genera of the ordinary classification in the theory that some primitive forms which have disappeared elsewhere have survived in Australia.

Brenske then proceeds to add three new species to the genus, but does not give a formal description of them, merely placing them in a tabular statement of the distinctive characters of the *Lepidodermata* and stating their size and habitat. The habitat of only one of them (*waterhousei*, from Queensland) is exactly known, *lansbergei* being attributed to "Australia" and *glaber* apparently being of altogether doubtful habitat ("Cornwallis Island?"). Without a formal description it is, of course, impossible to identify these species confidently except by comparison with the types, but I have in my collection two species of the genus (both from Queensland) which agree in respect of the characters mentioned in the tabulation with *waterhousei* and *glaber*. As Brenske's memoir is not procurable I subjoin an extract from his tabulation (which includes species from New Guinea and Arou) showing how he differentiates Australian species:—

- | | | |
|------|--|-----------------------------|
| A. | Pronotum smooth, with small dispersed punctures. Elytra likewise nitid, with diffused shallow punctures in which are white scales. Long., 28-31 mm. | glaber, <i>Brenske</i> |
| AA. | Pronotum smooth, with dispersed punctures larger. Elytra closely punctured with numerous raised smooth wrinkles interspersed. The scales are small, not covering the surface. Long., 24 mm. | waterhousei, <i>Brenske</i> |
| AAA. | Pronotum closely punctulate, with smooth raised spaces intermingled. | |
| B. | Elytra very closely punctulate, without coarser punctures intermingled, but with some smooth spaces behind the middle. Scales very close. Long., 27-30 mm. | albohirtum, <i>Waterh.</i> |
| BB. | Elytra very closely and finely punctured with numerous coarser punctures intermingled, with dispersed feeble wrinkles, and a spot on either side behind the middle. The scales are strong but not covering the surface. The pygidium is coarsely wrinkled, sparsely scaled. Long., 32 mm. | lansbergei, <i>Brenske</i> |

LEPIDIOTA.

L. bovilli, sp. nov., Mas. (?) Sat elongata, postice modice dilatata; obscure rufa, antennis tarsis elytrisque plus minusve dilutioribus; squamis albidis, his supra parvis nonnihil setiformibus subæqualiter vix crebre dispositis (in pygidio magis crebre, apice glabro excepto), subtus paullo majoribus magis crebre dispositis, vestita; metasterno haud piloso; capite crebre fortiter ruguloso, clypeo sat alte reflexo antice sat fortiter emarginato; palporum maxillarium articulo apicali sat elongata subcylindrico, supra haud excavato; antennarum articulo 3^o quam 2^{us} quamque 4^{us} manifeste longiori, flabelli lamini quam antennarum articulus basalis subbrevioribus; prothorace quam longiori ut 7 ad 4 latiori, antice haud marginato parum angustato, supra sat crebre (latera versus creberrime) sat fortiter punctulato, lateribus crenulatis paullo pone medium fortiter dilatato-rotundatis, angulis anticis parum productis obtuse rectis posticis (superne visis) acute rectis, basi haud marginata manifeste bisinuata; seutello fere ut pronotum punctulato; elytris crebre sat fortiter nonnihil rugulose punctulatis, costulis bene definitis instructis; pygidio crebre minus fortiter punctulato, ad apicem subito declivi in hac parte nitido nec squamifero tibiis anticis extus fortiter tridentatis; tibiarum posticarum calcaribus sat angustis modico elongatis; segmento ventrali apicali transversim leviter impresso; tarsis posticis quam tibiæ sat brevioribus.

Femina minus angustata, postice magis dilatata, calcaribus posticis magis dilatatis, pronoti disco (exempli typici) paullo minus crebre magis grosse punctulato. Long., $8\frac{1}{2}$ l.; lat., $3\frac{3}{5}$ -4 l.

The sexual characters in this species are very slight. The stronger and less close puncturation of the pronotum of the female may be only an individual variation. In general appearance *L. bovilli* resembles *L. rothei*, Blackb., and *koebeleri*, Blackb., differing from them both, however, by, *inter alia*, its pronotum scarcely narrowed in front and its more strongly emarginate clypeus.

Northern Territory (Port Darwin); sent by the late Dr. Bovill.

L. koebeleri, sp. nov., Mas. Minus elongata, postice sat dilatata; obscure rufa, antennis dilutioribus; sat nitida; squamis albidis, his supra parvis nonnihil setiformibus vix crebre sat æqualiter dispositis, subtus paullo majoribus magis crebre dispositis, vestita; metasterno haud piloso;

capite inæqualiter subgrosse punctulato, clypeo minus fortiter reflexo antice leviter emarginato; palporum maxillarium articulo apicali minus elongato subovali, supra haud excavato; antennarum articulo 3^o quam 2^{us} et quam 4^{us} nonnihil longiori, flabelli laminis quam antennarum articulus basalis vix longioribus; prothorace quam longiori ut 7 ad 4½ latiori, antice haud marginato leviter angustato, supra subinæqualiter sat crebre sat fortiter (latera versus confertim) punctulato, lateribus vix crenulatis postice vix marginatis paullo pone medium fortiter dilatato-rotundatis, angulis anticis minus productis sat rectis posticis (superne visis) acute rectis, basi subtilissime vix perspicue marginata leviter bisinuata; scutello fere ut pronotum punctulato; elytris nisi circa scutellum magis crebre sat rugulose punctulatis manifeste leviter costulatis; pygidio subtilius sat crebre punctulato; tibiis anticis extus sat fortiter tridentatis; tibiaram posticarum calcaribus angustis modice elongatis; segmento ventrali apicali sat æquali; tarsis posticis quam tibiæ sat brevioribus. Long., 7½ l.; lat., 4½ l.
North Queensland; sent to me by Mr. Koebele.

L. rubrior, sp. nov., Fem. Minus elongata, postice sat dilatata; obscure rubra, pedibus plus minusve piceis; sat nitida; supra squamis minutis subsetiformibus pallide fulvis sparsim (in pygidio magis crebre), subtus squamis manifeste majoribus vix setiformibus vix fulvescentibus (in medio abdomine et in pedibus sparsim, alibi crebre) vestita, metasterno haud piloso; capite crebre profunde subgrosse ruguloso, clypeo sat fortiter reflexo, antice profunde emarginato; palporum maxillarium articulo apicali subcylindrico sat elongato, supra haud excavato; antennarum articulo 3^o quam 2^{us} et quam 4^{us} manifeste longiori, flabelli laminis antennarum articulo basali longitudine sat æqualibus; prothorace quam longiori ut 7 ad 4½ latiori, antice marginato sat fortiter angustato, longitudinaliter inæqualiter in medio lævi subelevato, antice fere ut caput sed postice minus crebre punctulato, lateribus fortiter crenulatis paullo pone medium sat fortiter dilatato-rotundatis antice quam postice manifeste magis alte reflexis, angulis anticis sat acutis sat productis posticis (superne visis) obtusis fere rectis, basi marginata vix bisinuata; scutello crebre sat fortiter punctulato; elytris manifeste costulatis (costula externa postice quam ceteræ multo magis perspicua), sat crebre sat rugulose quam pronotum manifeste subtilius punctulatis; pygidio sat crebre subrugulose sat fortiter punctulato, apice emarginato tibiis anticis extus fortiter

tridentatis; tibiaram posticarum calcaribus sat brevibus sat dilatatis; segmento ventrali apicali postice late transversim impresso; tarsis posticis quam tibiæ sat brevioribus. Long., $8\frac{1}{2}$ l.; lat., $4\frac{1}{5}$ l.

This species is easily recognizable by the characters cited in the tabulation.

Queensland. I have no note of the exact locality.

L. suavior, sp. nov., Mas. Minus elongata, postice sat dilatata; castanea, antennarum media parte, palpis, pedibusque plus minusve obscurioribus; squamis ovalibus albidis crebre vestita, squamis in capite elytris pygidioque quam alibi manifeste minoribus; metasterno sparsim piloso; supra crebre minus fortiter punctulata; clypeo in media parte lævi, antice minus fortiter emarginato, modice reflexo; palporum maxillarium articulo apicali breviter late ovali, supra fortiter excavato; antennarum articulo 3^o 2^o sat æquali quam 4^{us} manifeste longiori, flabelli laminis quam antennarum articulus basalis sat longioribus; prothorace quam longiori ut 9 ad 5 latiori, antice sat angustato haud marginato, longitudinaliter inæqualiter in medio lævi subelevato, lateribus leviter crenulatis sat longe pone medium modice dilatato-rotundatis antice quam postice vix magis alte reflexis, angulis omnibus rotundato-obtusis, basi leviter bisinuata haud marginata; scutello in media parte longitudinaliter lævi; elytris subtiliter parum manifeste costulatis; tibiis anticis extus fortiter tridentatis; tibiaram posticarum calcaribus elongatis modice angustis; segmento ventrali apicali æquali; tarsis posticis tibiis longitudine sat æqualibus.

Femine antennarum flabello quam maris sat breviori; calcaribus posticis magis dilatatis; segmento ventrali apicali antice foveis duabus profundis impresso; corpore subtus (exempli typici) minus perspicue squamifero; pygidio apicem versus nitido sparsim punctulato nec squamifero. Long., 10 l.; lat., $5\frac{1}{5}$ l.

The puncturation and scaling of this species is very even, in the sense that there is very little difference in them in the different parts of the insect, beyond that the scales of the dorsal surface are quite evidently a little smaller than those of the ventral segments, legs, etc.

North-West Australia (Roebuck Bay).

L. perkinsi, sp. nov., Mas. Sat elongata, sat parallela; rufo-castanea, antennis dilutioribus; squamis parvis rotundis albidis vestita [in capite pronoto et elytris minus crebre, in pygidio magis crebre, in corpore subtus confertim, in

pedibus (in his squamis paullo majoribus) sparsim]; metasterno sparsim fulvo-piloso; capite crebrius minus fortiter punctulato; clypeo in media parte lævi, modice reflexo, antice sat fortiter emarginato: palporum maxillarium articulo apicali subcylindrico, quam latiori triplo longiori: supra haud excavato; antennarum articulis 2^o-4^o longitudine sat æqualibus, flabelli laminis antennarum articulo basali longitudine sat æqualibus; prothorace quam longiori ut 9 ad 5 latiori, antice subtiliter marginato leviter angustato, supra crebrius subfortiter punctulato, lateribus crenulatis mox pone medium fortiter dilatato-rotundatis antice quam postice vix magis alte reflexis, angulis anticis obtusis nullo modo prominulis posticis (superne visis) acute rectis, basi minus fortiter bisinuata haud continuatim marginata; scutello et elytris fere ut pronotum punctulatis (his suturam versus paullo magis crebre et magis rugulose), elytrorum costulis bene definitis; pygidio crebrius subtilius nonnihil acervatim punctulato; tibiis anticis extus minus fortiter tridentatis (dente summo parum definito); tibiarum posticarum calcaribus angustis sat elongatis, subtus pernitidis; segmento ventrali apicali postice foveatim leviter impresso et ad apicem in medio anguste leviter emarginato: tarsis posticis quam tibiæ parum brevioribus.

Feminæ antennarum flabello quam maris sat breviori; calcaribus posticis dilatatis, subtus opacis ad apicem leviter concavis; segmento ventrali apicali postice profunde semicirculariter late impresso; corpore subtus (exempli typici) vix perspicue squamifero. Long., 10-11 l.; lat., 4½-4¾ l.

Differs from all the preceding by the raised edging of its pronotum being (where it margins the front of the front angles) an extremely fine line not raised above the general surface, together with those angles being quite blunt and not directed forward.

North Queensland: Cairns (Mr. Lea—his No. 8900—and Mr. Perkins).

L. leai, sp. nov., Mas. Minus elongata, postice leviter dilatata; minus nitida; picea, plus minusve rufescens, antennarum et femoribus dilutioribus flabello dilutiori; squamis sat parvis albidis (nonnullis ochraceis intermixtis) crebre vestita (his in pygidio minoribus, in pedibus sparsioribus, in elytris oblongis setiformibus); supra crebre minus fortiter (pygidio subtilius) punctulata; metasterno sparsim fulvo-piloso; clypeo leviter reflexo, antice sat fortiter emarginato; palporum maxil-

larium articulo apicali sat breviter ovali, supra sat fortiter excavato; antennarum articulo 3^o basali longitudine sat æquali quam 4^{us} paullo longiori, flabelli laminis quam antennarum articulus basalis vix brevioribus; prothorace quam longiori ut 11 ad 6½ latiori, antice haud marginato parum angustato, lateribus crenulatis sat longe pone medium leviter dilatato-rotundatis antice quam postice paullo magis alte reflexis, angulis anticis sat rectis posticis (superne visis) acutis retrorsum directis, basi modice bisinuata haud marginata; elytris vix perspicue costulatis; tibiis anticis extus minus fortiter tridentatis; tibiarum posticarum calcaribus angustis elongatis; segmento ventrali apicali æquali; tarsis posticis quam tibiæ parum brevioribus.

Fem. latet. Long., 12 l.; lat., 5¼ l.

The presence of ochraceous scales mixed with the white ones gives this species a very mottled appearance suggestive of the species that I take to be *squamulata*, Waterh.; but in the latter that appearance is even more conspicuous, owing to the scales being notably larger, of rounded form, and those of ochraceous colour more numerous (especially on the elytra). On the ventral segments, however, the ochraceous scales are almost wanting in the latter, while in *L. leai* the lateral parts are almost entirely clothed with them.

Western Australia.

L. frenchi, sp. nov., Mas. Sat elongata, sat parallela; obscure ferruginea, antennis palpisque dilutioribus; leviter pruinosa; squamis minutis albidis vestita [in capite pronoto et elytris sparsius, in pygidio magis crebre, in corpore subtus creberrime, in pedibus (in his squami paullo majoribus) sparsim]; metasterno coxisque posticis fulvo-pilosis; capite crebre fortiter punctulato, clypeo leviter reflexo, antice sat fortiter emarginato; palporum maxillarium articulo apicali subcylindrico, quam latiori fere triplo longiori, supra haud excavato; antennarum articulo 3^o quam 2^{us} et quam 4^{us} nonnihil longiori, flabelli laminis quam antennarum articulus basalis vix longioribus; prothorace quam longiori ut 11 ad 6½ latiori, antice marginato leviter angustato, supra subtiliter sat crebre nonnihil acervatim punctulato, lateribus crenulatis mox pone medium sat fortiter dilatato-rotundatis antice quam postice multo magis alte reflexis, angulis anticis sat rectis posticis (superne visis) subacutis nonnihil retrorsum directis, basi modice bisinuata haud continuatim marginata; scutello et elytris fere ut pronotum punctulatis, his perspicue costulatis; pygidio crebre subtilissime punctulato; propygidio difformi; tibiis

anticis extus sat fortiter tridentatis; tibiaram posticarum calcaribus elongatis, minus angustis; segmento ventrali apicali æquali; tarsis posticis quam tibiæ sat brevioribus. Long., 13 l.; lat., $5\frac{2}{3}$ l.

Femina quam mas minus parallela, magis lata; illius antenarum flabello vix breviori, tarsis robustioribus et paullo brevioribus; pygidio postice in medio tuberculo parvo instructo et ad apicem dente minuto armato; tibiaram posticarum calcaribus brevioribus magis dilatatis, calcare longiori apicem versus subtus concavo.

This species differs from all other *Lepidiotæ* known to me by the structure of its propygidium. Apart from that character it is near *L. negatoria*, Blackb., but differing from it by, *inter alia*, notably closer and finer puncturation of dorsal surface (pygidium very much more, instead of less, closely punctured than the elytra); prothorax much less narrowed in front with sides as viewed from above much less strongly arched. Differs from *caudata*, Blackb., and *deceptrix*, Blackb., by base of pronotum not continuously margined, and, *inter alia*, from the former by very much finer sculpture of dorsal surface, and from the latter by punctures of pronotum very much finer, punctures of elytra much closer, prothorax notably wider in front and having hind angles much less acute. The structure of the propygidium is very peculiar. That segment is very strongly and widely emarginate in the middle and is on two planes; its front part is not punctured and the hind edge of this front part is more or less reflexed and defined; behind the hind edge of the front part the segment becomes declivous—almost vertical—and this narrow declivous hind piece is punctured and furnished with very fine whitish scales.

Queensland (Cairns); male from Mr. French; female from Mr. Lea (his No. 13011).

L. deceptrix, sp. nov., Fem. Robusta, postice manifeste dilatata; rufo-ferruginea; supra squamis minutis albidis sparsim vestita; subtus squamis minutis albidis vestita (in media parte sparsim, latera versus confertim); metasterno et coxis posticis pilis elongatis pallide fulvis dense vestitis; capite crebre subfortiter punctulato; clypeo sat alte reflexo, antice sat fortiter emarginato; palporum maxillarium articulo apicali subcylindrico, quam latiori triplo longiori, supra haud excavato; antenarum articulo 3^o quam 2^{us} manifeste (quam 4^{us} haud) longiori, flabelli laminis quam antenarum articulus basalis vix longioribus; prothorace quam longiori ut 23 ad 13 latiori, antice marginato sat fortiter angustato, supra minus

crebre sat fortiter nonnihil acervatim punctulato, lateribus crenulatis mox pone medium fortiter dilatato-rotundatis antice quam postice multo magis reflexis, angulis anticis obtuse rectis posticis (superne visis) fortiter acutis divergentibus, basi marginata sat fortiter bisinuata; scutello fere ut pronotum punctulato; elytris sparsim subtilius punctulatis, obsolete costulatis; pygidio sparsius subtiliter punctulato, ad apicem in medio dentiformi; tibiis anticis extus sat fortiter tridentatis; tibiaram posticarum calcaribus modice dilatatis opacis; segmento ventrali apicali vix impresso. Long., 12 l.; lat., $6\frac{3}{4}$ l.

This is the species that I formerly regarded as the female of *L. caudata*, Blackb. (Trans. Roy. Soc., S.A., 1890, p. 85). The subsequent examination of more numerous specimens of *Lepidiota* has satisfied me that the type of *caudata* (which I regarded as a male) is a female, and consequently that the differences which I regarded as sexual are specific.

Queensland.

L. caudata, Blackb. Sat elongata, postice minus dilatata; piceo-ferruginea, nonnihil iridescens; supra squamis minutis albidis sparsim vestita; subtus squamis minutis albidis vestita (in media parte et in pedibus sparsim, latera versus confertim); metasterno pilis elongatis pallide fulvis dense vestitis; clypeo crebre fortiter punctulato, minus alte reflexo, antice sat fortiter emarginato; fronte subgrosse punctulato; palporum maxillarium articulo apicali subcylindrico, quam latiori fere triplo longiori, supra haud excavato; antennarum articulo 3^o quam 2^{us} manifeste (quam 4^{us} nonnihil) longiori, flabelli lamina antennarum articulo basali longitudine sat æqualibus; prothorace quam longiori ut 12 ad 7 latiori, antice minus fortiter angustato marginato, supra minus crebre sat fortiter vix acervatim punctulato, lateribus crenulatis mox pone medium sat fortiter dilatato-rotundatis antice quam postice multo magis alte reflexis, angulis anticis obtuse rectis posticis (superne visis) sat acute rectis nec divergentibus, basi marginata sat fortiter bisinuata; scutello fere ut pronotum punctulato; elytris sparsius minus subtiliter punctulatis, sat manifeste costulatis; pygidio crebre rugulose nec grosse punctulato, ad apicem in medio dentiformi; tibiis anticis extus sat fortiter tridentatis; tibiaram posticarum calcaribus modice dilatatis minus nitidis; segmento ventrali apicali pone apicem profunde semicirculariter impresso; tarsis posticis quam tibiæ harum tertia parte breviori. Long., 12 l.; lat., $6\frac{1}{4}$ l.

Maris antennarum flabello quam feminae vix longiori; coxis posticis pilosis; tibiaram posticarum calcaribus nitidis sat angustis; pygidio quam feminae paullo minus crebre punctulato, postice inermi; segmento ventrali apicali sat æquali; forma magis angusta magis parallela. Long., 12 l.; lat., $5\frac{2}{3}$ l.

When I described this species I erroneously believed the type to be a male and *L. deceptrix* to be its female. There is now no doubt of their being females of two species. I have therefore redescribed them both. A comparison of the descriptions will indicate numerous slight differences, but the most conspicuous differences are: the hind angles of prothorax divergent in *deceptrix*, together with, in that species, dorsal surface non-iridescent and of lighter colour, hind coxæ distinctly pilose in female, and elytra and pygidium distinctly more finely punctulate. The male described above was given to me some time ago by Mr. Lea (his No. 5535), and is certainly the male of this species (Brenske's notes on the spurs of the hind tibiæ being assumed correct).

Queensland.

L. townsvillensis, sp. nov., Mas. Modice elongata, postice minus dilatata; rubro-ferruginea; supra (pygidio excepta) haud squamosa; subtus et in pygidio squamis minutis albidis vestita (his in pygidio sparsis, in corpore subtus in media parte sparsissimis latera versus confertis; sat nitida; metasterno coxisque posticis fulvo-pilosis; capite grosse punctulato; clypeo sat alte reflexo, antice leviter emarginato; palporum maxillarium articulo apicali ovali, quam latiori circiter duplo longiori, supra profunde excavato; antennarum articulo 3^o quam 2^{us} vix quam 4^{us} haud longiori, flabelli laminis quam antennarum articulus basalis duplo longioribus; prothorace quam longiori ut 9 ad $5\frac{1}{2}$ latiori, antice sat fortiter angustato marginato, supra coriaceo et sparsius subgrosse punctulato, utrinque pone medium fovea magna et fere ad medium altera minore impresso (his oblique positis), lateribus leviter crenulatis mox pone medium minus fortiter dilatato-rotundatis antice quam postice multo magis alte reflexis, angulis anticis rotundato-obtusis posticis (superne visis) obtusis, basi marginata sat fortiter bisinuata; scutello fere ut pronotum punctulato; elytris fere ut pronotum sed multo magis leviter punctulatis, vix perspicue costulatis; pygidio minus fortiter sat crebre subrugulose punctulato; tibiis anticis extus tridentatis, dente summo subobsoleto; tibiaram posticarum (his ad apicem haud dilatatis) calcaribus nitidis sat gracilibus spiniformibus; segmento ventrali apicali sat anguste

minus perspicue emarginato; tarsis posticis quam tibiæ vix brevioribus. Long., 9-10 l.; lat., $4\frac{2}{5}$ - $4\frac{1}{2}$ l.

This species is probably near *L. crinita*, Brenske, but is clearly distinct from it by numerous differences—among others, the quite strongly bisinuate base of its pronotum, the absence of hairs and scales on its dorsal surface, and its elytra with scarcely any indication of longitudinal costæ, which are faintly traceable here and there only from certain points of view. The flabellum of the antennæ is about equal in length to the five preceding joints together. The conspicuous foveæ on the pronotum, being exactly similar in the two specimens before me, seem likely to be more than a merely accidental character. I do not think the specimens are abraded. It should be noted that the puncturation of the dorsal surface becomes distinctly finer near the lateral margins than in the middle parts.

Queensland (Townsville). From Mr. Perkins.

L. gilesi, sp. nov., Mas. Elongata, sat augusta, postice minus dilatata; rubro-ferruginea; minus nitida; supra pilis minutis albidis setiformibus in capite et elytris sparsim, in pronoto confertim, vestita; pygidio ventreeque pilis brevibus vestitis; metasterno coxis posticis et pedibus longe pallide fulvo-pilosis; femoribus posticis autem squamis albis sat crassis sparsim vestitis; capite crebre inæqualiter sat grosse ruguloso; clypeo modice reflexo, antice parum emarginato; palporum maxillarium articulo apicali sat dilatato, supra excavato; antennarum articulo 3^o quam 2^{us} haud (quam 4^{us} vix) longiori, flabelli laminis quam antennarum articulus basalis fere triplo longioribus; prothorace quam longiori ut 8 ad $5\frac{1}{2}$ latiori, antice sat fortiter angustato marginato, supra confertim subtilius ruguloso, areis nonnullis præsertim in media parte glabris nitidis instructo, lateribus nonnihil crenulatis mox pone medium rotundatis parum dilatatis antice quam postice multo magis alte reflexis, angulis anticis rotundato-obtusis posticis (superne visis) fere rotundatis, basi subtiliter marginata minus fortiter bisinuata; scutello fere ut elytra punctulato; his subfortiter sat crebre ruguloso-punctulatis, parum manifeste costulatis; pygidio crebre subtilius ruguloso; tibiis anticis extus fortiter tridentatis; tibiarum posticarum calcaribus modice angustis, nec a basi ad medium dilatatis; segmento ventrali apicali simplici; tarsis posticis quam tibiæ vix brevioribus. Long., 9 l.; lat., 4 l.

North-West Australia (Giles); sent by Mr. Carter (his No. 12).

L. negatoria, sp. nov., Mas. Elongata; sat parallela; ferruginea, nonnihil picescens, elytris antennis tarsisque dilutioribus; sat pruinosa; supra squamis minutis albidis sparsim vestita; subtus squamis minus minutis albidis vestita (in media parte, et in pedibus, sparsim, latera- versis confertim); metasterno coxisque posticis pilis elongatis pallide fulvis dense vestitis; capite crebre fortiter punctulato; clypeo minus alte reflexo, antice sat fortiter emarginato; palporum maxillarum articulo apicali subcylindrico, quam latiori triplo longiori, supra- haud excavato; antennarum articulo 3^o quam 2^{us} et- quam 4^{us} vix longiori, flabelli laminis quam antennarum articulis basalis manifeste longioribus; prothorace quam longiori ut 11 ad 6½ latiori, antice marginato fortiter angustato, supra sparsius subtilius nonnihil acervatim punctulato, lateribus leviter crenulatis mox pone medium fortiter dilatato-rotundatis antice quam postice multo magis alte reflexis, angulis anticis obtuse rectis posticis (superne visis) acutis retrorsum directis, basi modice bisinuata haud continuatim marginata; scutello et elytris fere ut pronotum punctulatis, his perspicue costu- latis; pygidio sparsius subtiliter punctulato; tibiis anticis extus sat fortiter tridentatis; tibiarum posticarum calcaribus nitidis angustis spiniformibus; segmento ventrali apicali æquali; tarsis posticis quam tibiæ parum brevioribus. Long., 13 l.; lat., 5½ l.

This species is near *L. deceptrix*, Blackb., and *caudata*, Blackb., but differs from both by its pronotum not margined at the base. From *caudata* it differs also by, *inter alia*, the acute hind angles of its prothorax (which is much more strongly narrowed in front) and the very much finer and sparser puncturation of its pygidium. From *deceptrix* it differs by its prothorax very evidently more strongly narrowed in front and by the finer and much less close puncturation of its pronotum (about 20 instead of about 30 punctures in the length of the segment).

Queensland (Port Mackay).

A. Metasternum pilose.

B. A well-defined nitid beading all across front of pronotum, and front part of lateral margins of pronotum strongly reflexed and with strong reflexed margins continued round front of angles.

C. Base of pronotum with a continuous raised beading preceded by a distinct transverse stria.

D. Front angles of pronotum strongly and sharply defined.

E. Basal angles of pronotum sub- spiniform and divergent ... *deceptrix*, Blackb.

EE. Basal angles of pronotum not as in E.	caudata, <i>Blackb.</i>
DD. Front angles of pronotum obtusely rounded.	
E. Pronotum sparsely punctured	townsvillensis, <i>Blackb.</i>
EE. Pronotum confluently punctured	gilesi, <i>Blackb.</i>
CC. Base of pronotum not with a continuous distinct edging.	
D. Pronotum sparsely punctured (about 20 punctures in its length). Metasternum densely albedo-pilose	negatoria, <i>Blackb.</i>
DD. Pronotum notably more closely punctured. Metasternum thinly pilose.	
E. Propygidium as two planes	frenchi, <i>Blackb.</i>
EE. Propygidium normal ...	perkinsi, <i>Blackb.</i>
BB. Front of pronotum not continuously margined, or not as B.	
(2)C. Middle tooth of front tibiæ much nearer to apical than to basal one	darwini, <i>Blackb.</i>
D. Clypeus feebly emarginate. Scutellum feebly punctured	squamulata, <i>Waterh.</i>
E. Hind angles of pronotum sharp	leai, <i>Blackb.</i>
EE. Hind angles of pronotum roundly obtuse	suavior, <i>Blackb.</i>
AA. Metasternum not pilose.	
B. Pronotum quite strongly narrowed in front.	
C. Clypeus strongly emarginate (a line across clypeus at back of emargination at least no further from clypeal suture than from furthest front of clypeus).	
D. Pygidium very finely and confluently punctured (elytral costæ well defined)	grata, <i>Blackb.</i>
DD. Pygidium much less finely and closely punctured (elytral costæ very feeble).	
E. Pronotum distinctly margined both at base and apex ...	rubrior, <i>Blackb.</i>
EE. Pronotum distinctly margined neither at base nor apex ...	degener, <i>Blackb.</i>
CC. Clypeus very feebly emarginate.	
D. Elytra very closely punctured ...	rothei, <i>Blackb.</i>
DD. Elytra less closely punctured.	
E. Pronotum very coarsely rugulose	rufa, <i>Blackb.</i>
EE. Pronotum not as E.	koebelei, <i>Blackb.</i>
BB. Pronotum very wide in front ...	bovilli, <i>Blackb.</i>

(2) The table as drawn up by Mr. Blackburn was evidently intended to be rewritten, as many of the words were abbreviated, some notes not intended for publication were on it, and there is no CC. to correspond with the present one, nor any DD. Still I think it will be found useful as now given.—A. M. LEA.

MACROPHYLLIDES.

This aggregate stands in Lacordaire's classification as the 7th "subtribe" of the *Melolonthides*, the *Melolonthides* being treated by him as the first "Tribe" of the second "Legion" (*Lamellicornes Pleurostictiques*) of the "Family" *Lamellicornes*. As, however, a "subtribe" (*Systellopides*) has been added in the Tribe since the date of Lacordaire's work, and is (rightly, I think) placed as its first member, the *Macrophyllides* become the 8th subtribe. Of the eight subtribes three are not as yet known to occur in Australia, and therefore this subtribe is the 5th as far as Australian *Melolonthides* are concerned. I have already discussed this classification more fully in former papers (*e.g.*, Trans. Roy. Soc., S.A., 1905, p. 276), and now merely summarize the outline for the sake of convenience. A tabular statement of the characters of the subtribes will be found in the memoir just referred to. It should be noted, however, that in the statement the *Macrophyllides* stand as the *last* of the subtribes known to be Australian, whereas in the following pages of this present memoir I am referring an Australian species to the 8th of Lacordaire's subtribes (the 9th including the *Systellopides*)—*viz.*, the *Pachypodides*, and that that subtribe should therefore be added after the *Macrophyllides*. Lacordaire distinguishes the *Pachypodides* from the other subtribes by its "mouth organs partly atrophied." The *Systellopides* also have mouth organs partly atrophied, but differ from the *Pachypodides* by, *inter alia*, their labrum on the plane of the clypeus projecting forward from that organ.

Of known Australian *Melolonthid* species only one appertains to the *Macrophyllides*, *viz.*, *Othnonius batesi*, Olliff. There can, however, be little doubt that the Australian insect on which Erichson founded his genus *Holophylla* (without naming the species) is a *Macrophyllid*, and is distinct from *Othnonius batesi*. I have discussed that genus in a former paper (Trans. Roy. Soc., S.A., 1911, pp. 181, etc.), in removing it from the true *Melolonthides*, and have nothing fresh to be added now concerning it.

PACHYPODIDES.

ZIETZIA.

When I described this genus (Trans. Roy. Soc., S.A., 1894, p. 205) I attributed it to the *Macrophyllides*, but my subsequent study of the Australian *Melolonthides* has made me very doubtful for some time past whether I was right in placing it there, on account of its simple claws and its facies. The fact is that at the time I described it I had the

misfortune to break my dissections of the mouth parts and was not able to furnish details of them, beyond such as I could gather from inspection of the fragments. A small fragment of a maxilla had a small tooth, and so I merely stated of the maxilla that it was "toothed," and on that ground considered it excluded from the *Pachypodides* and excluded from that aggregate I could only regard it as a *Macrophyllid* aberrant in facies and in respect of its claws. I have now made a more successful dissection, with the result of considering it an aberrant *Pachypodid*. The outer lobe of its maxillæ is not altogether atrophied, as Lacordaire states those of the *Pachypodides* to be, but it is extremely feeble—a mere short, straight, ciliated projection, which, however, becomes corneous at the extreme apex, and is there bifid, so as to simulate two minute teeth, which in a fragmentary maxilla I took to be apices of a larger tooth. In all other respects the mouth parts agree well with those of the *Pachypodides*, the mentum being very small without a visible ligula and the labial palpi having their apical joint cylindric and about three times as long as the preceding joints (which are extremely minute) together. I feel no doubt that this very remarkable insect is a *Pachypodid*, aberrant to the extent of having the outer lobe of its maxillæ a little more developed than is usual in that aggregate.

This seems to be the first true *Pachypodid* recorded from Australia, for although Erichson referred to the aggregate a genus which he characterized under the name *Prochelyna*, Dr. Sharp has pointed out the probability that that genus (of which, however, he had not seen a representative) ought to be placed in his "*Systellopides*," and in this I have no doubt of his correctness, as I have before me an insect recently taken by my son, Mr. J. S. Blackburn (and also discussed in this paper), which is almost certainly *Prochelyna heterodoxa*, Burm. (Erichson did not describe a species of the genus), and it is certainly a *Systellopid*.

I have already referred to the characters and position of the *Pachypodides* in this present memoir under the heading "*Macrophyllides*." This is the last of the *subtribes* of *Melolonthides* known at present to inhabit Australia.

RUTELIDES (Second Tribe of *Melolonthides*).

The essential characters distinguishing this Tribe from the other Tribes of *Melolonthides* are shown in a tabular statement in a former paper of this series (Trans. Roy. Soc., S.A., 1905, p. 276). The *Rutelides* are fairly numerous in Australia, and include many of our largest and most beautifully coloured *Melolonthid* species. I do not, however, pro-

pose to deal with them in this Revision of the Australian *Melolonthides*, because an eminent European student (Dr. F. Ohaus, of Hamburg) has made them the special object of his investigation. He has published already (Stett. ent. Zeit., 1904, pp. 57, etc.) a most interesting "Revision der *Anoplognathiden*" (a subtribe of *Rutelides* to which nearly all the known Australian species of the Tribe appertain), and is at present—as he informs me—proceeding with his work on the remaining subtribes. I therefore gladly refer Australian students of this aggregate to his valuable treatises, and for the present, at any rate, abstain from dealing with the matter more particularly.

DYNASTIDES.

The classification of the Australian genera of this Tribe (which is the third of the Tribes into which Lacordaire divides his second "Legion" of *Lamellicornes*—*vide* Trans. Roy. Soc., S.A., 1905, pp. 275, etc.) cannot be satisfactorily ordered in accordance with that set forth by Lacordaire. That author reduces below the level of even generic rank a character which, as far as the Australian *Dynastides* are concerned, appears to me to be the primary one by which the Tribe should be divided into two main aggregates, *viz.*, the structure of the apex of the posterior tibiæ which is either (*a*) ciliate or (*b*) non-ciliate. In this Tribe it is particularly difficult to find available generic characters which are neither sexual nor such as involve the dissection of the mouth organs—both of them, no doubt, of great importance (especially the former), but both of them highly inconvenient for practical purposes; the structure of the posterior tibiæ, however, is easily observed, and divides the Australian genera into two aggregates, all in one of which resemble each other in facies much more than they resemble any genus in the other aggregate. M. Lacordaire's classification must be discussed here, in order to show the objection to its use for Australian genera. He separates from all the rest of the Tribe two small subtribes characterized one by the structure of the mandibles, the other by the position of the base of the labial palpi. The former of those is not known to be Australian, and therefore need not be discussed here. To the latter he attributes *Cryptodon* and (conjecturally) *Semanopterus* of Hope (which he calls, probably by a clerical error, *Semanotus*, making no remark on the change of name). I have dissected a number of species of *Semanopterus*, and find that the labial palpi are inserted as Lacordaire conjectures them to be, under the edge of the mentum, so that the basal joint is more or less concealed; but inasmuch as the subtribe

(*Phileurides*) to which this decidedly obscure character would refer *Semanopterus* is treated as containing genera both with ciliate and non-ciliate posterior tibiæ, it does not appear to me a natural arrangement in respect of the Australian *Dynastides* to regard *Semanopterus* (including *Asemantus*) and *Cryptodus* as representing an aggregate of equal rank with one containing all the other genera, as would have to be done if Lacordaire's classification were strictly adhered to, especially since there is no other conspicuous character that I have been able to discover that would suggest *Semanopterus* being widely distinct from several other genera of those having the posterior tibiæ ciliate. As regards *Cryptodus* there is so little resemblance between its mouth organs and those of *Semanopterus* (beyond the bare fact that the labial palpi are not entirely exposed in either), and the two are so ultra-dissimilar in facies and in almost all characters that I have no doubt they ought to be placed in distinct primary divisions of the Tribe. My want of knowledge of *Phileurides* occurring in other countries than Australia disqualifies me for the task of criticising the contents of that aggregate in general, but I find it hard to believe that genera with posterior tibiæ truncate and ciliate ought to be associated with genera having those tibiæ digitated and non-ciliate, and still harder to believe that species so differing from each other ought to be placed in the same genus, as Lacordaire places species which he attributes to the genus *Phileurus*.

After distinguishing the two subtribes referred to above from the rest of the *Dynastides*, Lacordaire divides the remainder into subtribes founded on the structure of the front tibiæ of the male. It may well be, and probably is, the case that this is in reality of great importance in a natural classification, but (as Mr. Arrow has pointed out—Tr. Ent. Soc., Lond., 1908) characters appertaining to one sex only are objectionable—in the sense of "inconvenient," no doubt, he means. The reason of that, I take it, is simply that it prevents generic apportionment of species of which only one sex is known; but there seems to be no reason for saying that it does not, in the scheme of Nature, represent a divergence as fundamental as that connected (say) with the form of the mentum. My limited knowledge (and I admit it is limited) of *Dynastides* outside Australian forms seems to point to the probability that the presence of sexual characters in the front tibiæ is much more than a trivial character; but I agree that, so long as there are numerous species of which one sex only is known, the character is unworkable, and therefore that M. Lacordaire's aggregates founded on it should be rejected for the present. In one of these aggregates M.

Lacordaire places three subtribes, only one of which (*Oryctides*) is known as Australian, and he distinguishes that subtribe from the other two by its presenting sexual characters in the head and prothorax. That particular character, so far as concerns Australian *Dynastides* known to me, need not be discussed here, inasmuch as the subtribes without sexual characters in either front tibiæ or head or prothorax are not known to occur in Australia, but its classificatory value is certainly discounted by the extraordinary variability of development in the sexual structure of the head and prothorax within the limits of a genus or even of a species (some males of *Dasygnathus*, for example, having head and pronotum very little, and others enormously, different from those segments in the female).

M. Lacordaire divides the *Dynastides* having sexual characters in the front tibiæ into two subtribes (distinguished from each other by non-sexual characters), but as only one of these (the "true *Dynastides*") is known, or likely to be Australian, their differences need not be discussed in this memoir. The following, then, is M. Lacordaire's arrangement of the *Dynastides* so far as concerns those of his subtribes known to be Australian:—

- | | |
|---|------------------------|
| A. Labial palpi inserted on the sides of
the mentum. | |
| B. Front tibiæ similar in the two sexes | Oryctides |
| BB. Front tibiæ sexually elongate in
the males | true <i>Dynastides</i> |
| AA. Labial palpi inserted in the internal
face of the mentum | Phileurides |

The first of the above subtribes (*Oryctides*) includes in Lacordaire's arrangement nearly all the *Dynastid* genera of Australia, and is subdivided into four "Groups" (all of them Australian). Here for the first time the structure of the posterior tibiæ finds a place in the tabulations, three groups being distinguished from the other group (true *Oryctides*) by having those organs truncate and ciliate at their apex, though for some unaccountable reason he places in the true *Oryctides* *Dasygnathus*, which has posterior tibiæ strongly ciliate. The three groups with ciliate posterior tibiæ are distinguished by the presence of sexual characters in the antennæ (*Oryctomorphides*) and the feebly (*Pentodontides*) or strong (*Pimeloides*) triangular form of the basal joint of the hind tarsi. The antennal sexual character (though no doubt an extremely important one) is, like other sexual characters, unsatisfactory, at any rate for the present. As regards the distinction, *inter se*, of the two Groups not having sexual characters in the antennæ by the more or less triangular form of the basal joint of the hind tarsi there are too great differences in that

respect within the limits of a genus to justify the importance that Lacordaire assigns to it. For example, *Cheiroplatys* is placed in the Group having that joint feebly triangular and *Horonotus* in the other Group, but there is really very little difference between the degree of triangularity in some species of *Cheiroplatys* and some of *Horonotus*. This same character moreover is variable with sex, the males (in at least some species) of *Pimelopus*, for instance, having the basal joint of the hind tarsi quite evidently less strongly dilated at the apex than their females. The result of all this is that a female *Dynastid* cannot be confidently referred to its Group by the use of Lacordaire's subtribal or group characters, and the same remark may be applied to Burmeister's classification, at any rate in respect of Australian species, that author also basing his main aggregates on sexual characters.

The classification of the *Dynastides*, excluding characters that either are sexual or cannot be ascertained without dissection, is no doubt extremely difficult, and some characters that one would naturally turn to as hopeful are found to fail when a long series of species are examined. The form of the mandibles is one of those, the presence of teeth or notches on the external outline being very conspicuous in some mandibles and entirely wanting in others; but it is certainly not strictly and invariably a generic character, the greatest possible diversity existing within the limits of *Isodon* (for example) in the form of the external outline of those organs; in the species which I take to be *I. pecuarius*, Reiche (for instance), the external edge of the mandibles is strongly dentate, while in the species that I have no doubt is *I. australasica*, Hope, the external edge is not even distinctly sinuate, although there is an obtuse projection directed forward at the apex—not on the lateral margin—which is, no doubt, what Lacordaire refers to when he says "*mandibules terminées en dehors par une dent seule large et obtuse.*" So again with the greater or less *projection* of the mandibles; it varies either specifically or according to their attitude when the insect died. In *Novapus* a generic character is asserted "*mandibulæ crassæ porrectæ,*" which is the case with all my specimens of *N. crassus*, Shp. (the typical species), but in the closely allied *N. adelaida*, Mihi, the appearance of the mandibles is scarcely different from that in *Isodon australasica*, Hope.

The presence and form of organs of stridulation again is not always generic. In *Isodon puncticollis*, Macl., they are present as two short lines of a transverse rugæ, in *I. australasica* they are wanting, in an undescribed species before me which I hesitate to separate from *Isodon* they are present

as two rugate carinæ running the whole length of the propygidium. If this and the last-mentioned character were insisted on as generic *Isodon*, as it now stands, would need to be broken up into four genera, and still further division would be necessary in it if the sexual characters of the tarsi were taken into account.

The number of transverse carinæ on the posterior tibiæ would suggest itself as likely to be a character of generic rank; but, again, it falls short of more than specific value, for in some genera (notably *Pimelopus*) species with posterior tibiæ transversely bicarinate are quite closely allied with others in which those tibiæ are only unicarinate.

Even in the mouth organs there is similar uncertainty. M. Lacordaire records variation in the number of teeth in the external lobe of the maxillæ in genus after genus; in all the genera in which I have dissected the mouth organs of any considerable number of individuals I have found that the number of teeth in the outer lobe of the maxillæ varies with the species.

When all these difficulties in the way of classification have been considered there seem to be but few characters left from which a better result can be looked for, and I am obliged to acknowledge that the best scheme I can suggest for the arrangement of the Australian *Dynastides* is unsatisfactory to the extent of failing to associate together, in some cases, species that probably ought to stand near each other in a natural arrangement, which, I believe, would be one that should treat sexual characters as of at least secondary importance. In the scheme that I propose to follow I have excluded sexual characters as, for the present, unworkable; but in some instances have added, in the tabulation of characters,⁽³⁾ some sexual peculiarities in brackets (especially where they distinguish the female) that seem sufficiently marked and constant to be useful.

As already indicated, I think the Australian *Dynastides* should be divided into two main aggregates, in the former of which the hind margin of the posterior tibiæ is fringed with ciliæ or (rarely) short spines, and is more or less widely truncate on its lower face, while in the latter it is non-ciliate and non-truncate. The former of these includes nearly all the Australian genera.

The former of these aggregates I propose to divide into two secondary aggregates distinguished by the structure of the clypeus, which is best observed from a point obliquely in

(3) This tabulation was not with the papers ready for publication.—A. M. LEA.

front of that organ. In the first of these secondary aggregates the free outline of the clypeus is seen to consist of three distinct lines (the sides and the front), of which the middle (front) line is usually shorter than the others and always notably uneven—either raised as a conspicuous lamina or notched in the middle or dentiform at its extremities. In the genera that I regard as forming the other secondary aggregate the free outline of the clypeus is usually a continuous curve, the appearance of sides and front as three distinct lines being exceptional (scarcely existent outside *Dasygnathus* and *Adoryphorus*), but in either case the free outline in its front is level (or all but level, at most slightly sinuous) in the sense of not being raised in any part as a lamina (as in some *Isodontes*) nor toothed (as in some *Isodontes*, etc.) nor arched upward (as in various *Semanopteri*, etc.) nor notched in the middle (as in *Horonoti*, etc.). In this secondary aggregate, moreover, the clypeus (when its outline is not a regular curve such that the front can hardly be considered distinct from the sides) is never conspicuously narrowed in front, its front in no case being much narrower than its base, while in the former secondary aggregate the width of the clypeus in front exceeds that of half its width at its base in no genus, I think, except *Horonotus*, which genus, however, the conspicuous notch in the middle of the front of the clypeus assigns without doubt to the former secondary aggregate.

Mr. Arrow (Ann. Nat. Hist., 1911, p. 156) proposes a new generic name—*Metanastes*—for two species, one of which is my *Pentodon australis*.

BUPRESTIDÆ.

NEOSPADES.

In his paper on the Classification of the *Buprestidæ*, M. Kerremans placed this genus beside *Cisseis*—which is certainly its right place—and distinguished it from the latter by its antennæ dentate only from the fifth joint, adding a note that he had not seen a member of the genus, and therefore had taken the distinctive character as stated by the author. That character is not, however, the essential one, although the diagnosis of *Neospades* perhaps justified M. Kerremans in his use of it. In the diagnosis it was stated as a second distinctive character that the 5th antennal joint is the first that is “distinctly” dentate. At the time I had seen only one species of the genus, which I believed with hesitation to be *Coræbus chrysoptygius*, Germ. I have since seen other species (two of which I have described) and have increased

my doubt of the identity of *chrysoxygius*, Germ., with the type *Neospades*, as the acceptance of that identity would involve a greater instability of markings than I have found in other species of the genus. I feel, however, no doubt about *chrysoxygius* being a *Neospades*. In the type of the genus—which I may call *chrysoxygius*, Blackb. (? Germ.)—the 4th antennal joint is decidedly triangular, intermediate in form between the 3rd and 5th (which I intended to express by calling it “not distinctly” of the serrate series); but with very much more numerous species of *Cisseis* before me than I had in 1887, I am satisfied that a satisfactory generic distinction cannot be founded on that antennal character since the 4th antennal joint is certainly in some species of *Cisseis* not more serrate than in some of *Neospades*. Nevertheless the tendency in *Neospades* is distinctly to a less dilated 4th antennal joint [in one species *N. (Buprestis) cruciatus*, Fab., that joint is quite simple] than in *Cisseis*.

It is, however, in respect of the characters mentioned first in the diagnosis (those of the tarsi and especially the claws) as distinctive from *Cisseis* that the essential difference is to be found. Under *Cisseis* there now stand species differing from each other so much in their tarsal and claw characters that I have no doubt other genera still remain to be cut out of that aggregate; but at any rate there is a wide difference between *Neospades* and *Cisseis* in respect of tarsi and claws. Apparently *C. duodecimmaculata*, Fab., is the type of *Cisseis*. Compared with *Neospades* its tarsi are seen to be moderately elongate and but little compressed, with the basal two joints together much longer than the claw joint, and the claws are of the type which Lacordaire in dealing with the *Lamiides* calls “divaricate,” and are shortly bifid at the apex; while in *Neospades* the tarsi are very short and very strongly compressed, with the claw joint not much shorter than the basal two joints together and the claws very strongly of the type which Lacordaire calls “divergent” (the two almost parallel with each other) and so deeply bifid that from a certain point of view the joint appears somewhat as if there were four almost equal and almost parallel claws. In facies, too, *Neospades* differs notably from *Cisseis*, especially in respect of colouring, all the species with tarsi as described above having elytra with at least two bright and well limited metallic colours, which is at most very feebly approximated in any *Cisseis* known to me.

Neospades, then, is thus differentiated from *Cisseis*:—
“Tarsi very short and very strongly compressed; claws of the divergent type, almost parallel with each other and very deeply bifid.”

As far as I know the following names are all that have been given to species of *Neospades*, viz.:—(*Buprestis*) *cruciatus*, Fab.; (*Coræbus*) *chrysopygius*, Germ.; (*Cisseis*) *apicalis*, Macl.; (*Cisseis*) *dimidiata*, Macl.; (*Cisseis*) *cupri-fera*, Gestro; *N. lateralis*, Blackb., and *simplex*, Blackb.; (*Cisseis*) *splendida*, Kerr.

It may be mentioned here that the claws of *Ethon* are like those of *Neospades*, but the tarsi of the former are longer and not, or but little, compressed, resembling those of *Cisseis*.

GERMARICA.

Mr. Carter has stated (Proc. Linn. Soc., N.S.W., 1909, p. 122) of my *G. casuarinæ*:—"I have little doubt but that this is the insect described as *Aphanisticus liliputanus*, Thoms., but the entirely misleading and inadequate description is a strong justification for Mr. Blackburn's re-description." If Mr. Carter has compared an authentic specimen of *G. casuarinæ* with Thomson's type, I suppose there is nothing more to be said in the matter; but if not it may be noted that Thomson's description is misleading indeed if it was founded on a specimen of the insect I described. Thomson's type was from New South Wales (mine from South Australia), has elytra at apex "*subtruncata et biacuta*" (the elytra of my species are rounded at the apex), and is scarcely more than half the size of *G. casuarinæ*; Thomson calls it "the smallest *Buprestid* known to us." I may add that I have numerous specimens of a *Germarica* from New South Wales of the size that Thomson attributes to *liliputanus* (with elytra, however, not at the apex agreeing with Thomson's description), and differing from *casuarinæ* by, *inter alia*, its notably narrower and more elongate form.

ELATERIDÆ.

PARACREPIDOMENUS.

In characterizing this genus Dr. Schwartz does not refer to the sexual characters of its species, nor does he mention the sex of the two species he describes, which are both known to me as occurring on the Dividing Range of Victoria. The sexes do not present any very noticeable external distinctions except in the antennæ, which are shorter in the female (equalling in length about the first nine joints of those of the male in *P. fasciculatus* and in *P. linearis* about the first ten joints), and in the prothorax, which is (conspicuously in *fasciculatus*, less so in *linearis*) less sinuate on the sides, and carrying its width further forwards towards the apex. The tumidity and coarse sculpture of the apical ventral seg-

ment of *fasciculatus* is evidently a specific, not a sexual, character. The specimens described by Dr. Schwartz appear to be males.

Dr. Schwartz states that *Crepidomenus filiformis*, Cand., must be referred to this genus, but in describing his two new species mentioned above he does not differentiate them from *filiformis*. However, it may be inferred that they differ from that species by the third joint of their antennæ longer than the fourth, for he attributes that character to them both in describing them, and in the diagnosis of the genus he states that the third antennal joint is either exactly equal to, or longer than, the fourth; and as he recognizes only the three species the third antennal joint must be exactly equal to the fourth in the species that he regards as *filiformis*. That is the case in respect of the insect that I have myself believed to be *filiformis*.

Nevertheless, it now appears that my identification of Candèze's species was, according to its author, not correct. Many years ago I sent to Dr. Candèze specimens of what I regarded as his *C. filiformis*, on which he did not write me any remarks, confirmatory or otherwise. Lately, however, I have acquired the 6th part (1896) of Candèze's "Elaterides nouveaux" which I had not previously seen, and I find it stated there that the species I sent to the author is a new one closely allied to *filiformis*, and which he describes under the name *sulcicollis*. He erroneously attributes it to Adelaide, doubtless through that being my place of residence. Its *habitat*, however, is Victoria—the *habitat* of *filiformis* also. As I have a fairly extensive collection of Victorian *Elateridæ*, including numerous *Paracrepidomeni*, from various localities in that State, and Candèze refers to his having seen *filiformis* from Victoria in four different collections, it is improbable that that species is not before me. Candèze differentiates *sulcicollis* from *filiformis* as being less pubescent, with the prothorax of the male more elongate and parallel, and with the median sulcus of the pronotum not abbreviated. As I find in the series of specimens which I have attributed to *filiformis* varying differences (in respect, sometimes of one, sometimes of another, sometimes of all, of those characters) among individuals taken in a single locality, I cannot accept *sulcicollis* as even a well-marked variety of the older species. Dr. Schwartz, when he formed the genus *Paracrepidomenus*, seems to have overlooked *sulcicollis*—at any rate, he made no mention of it.

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

PART X.

By ARTHUR M. LEA.

[Read September 12, 1912.]

Subfamily OTIORHYNCHIDES.

HACKERIA VIRIDIVARIA, Lea.

Mr. H. Elgner has recently taken this beautiful weevil on Darnley Island, in Torres Straits.

Subfamily LEPTOSIDES.

MANDALOTUS FOVEATUS, n. sp.

♂. Black; antennæ, tarsi, and trochanters more or less red. Densely clothed in parts with muddy-grey scales, with fairly numerous and evenly distributed suberect setæ.

Head with dense, concealed punctures. Rostrum acutely carinate throughout. Antennæ moderately long, first joint of funicle distinctly longer than second. *Prothorax* about as long as wide, sides almost evenly rounded, but base slightly wider than apex; with fairly large and round, somewhat flattened granules, each with a setiferous puncture. *Elytra* with moderately-rounded shoulders, sides parallel to beyond the middle; with regular rows of large, more or less concealed punctures; alternate interstices feebly raised. *Metasternum* and basal segment of abdomen with a large deep fovea, common to both; abdomen with granules at sides. *Legs* rather long; front coxæ moderately separated; femora stout; tibiæ with more or less distinct granules, the first pair denticulate on their lower edge. Length (excluding rostrum), 4-6 mm.

♀. Differs in having the antennæ shorter, prothorax not quite as long as wide, elytra slightly wider than prothorax instead of the exact width of same, metasternum and abdomen not foveate, the latter with more distinct and evenly-distributed granules, legs shorter and femora thinner.

Hab.—New South Wales: Guyra (H. J. Carter).

All the (seven) specimens before me appear to be abraded, so that the prothoracic granules are conspicuous. Should this character, however, be natural the species in my table would be associated with *seticollis* and *reticulatus*;

from the latter it is distinguished by its much larger size, different shape and colour, etc.; from the former by the much less distances between the coxæ. But, regarding the granules as normally more or less obscured, then, as the front coxæ are not widely although very distinctly separated, it would be associated with *subglaber*, *cellaris*, and *spurcus*, from all of which it is readily distinguished by the abdomen. In size and outlines it approaches *piliventris*, but that species has the coxæ more distant from each other, abdomen of male less excavated and prothoracic granules smaller.

At the base of the elytra on one specimen there are two obscurely whitish spots of scales, so it is probable that on well-preserved specimens the clothing would be variegated.

MANDALOTUS BICARINATUS, n. sp.

♂. Black; antennæ and tarsi more or less red, femora and tibiæ in parts obscurely diluted with red. Densely clothed with muddy-grey scales, feebly variegated in places with dingy-white. With rather short, semi-decumbent setæ.

Head wide, punctures normally concealed. Rostrum short and stout; scrobes extending backwards almost to eyes; carina vaguely traceable through clothing. Antennæ moderately long; first joint of funicle stouter and slightly longer than second. *Prothorax* moderately transverse, sides strongly and evenly rounded; with dense, round, flattened, and normally partially-concealed granules. *Elytra* rather short, at base as wide as widest part of prothorax, sides feebly dilated to beyond the middle, and then coarctate to apex; with regular rows of rather large, but more or less concealed punctures; alternate interstices very feebly raised. *Metasternum* flat across middle. Abdomen with basal segment very feebly depressed in middle, a feebly-curved and shining carina occupying one-third of its apex, a second but smaller carina at apex of second segment. *Legs* rather short; front coxæ moderately separated. Length, 3-3½ mm.

♀. Differs in being wider, elytra subcordate, abdomen without carinæ, the basal segment gently convex, and the legs and antennæ somewhat shorter.

Hab.—Tasmania: Hobart, under logs (A. M. Lea).

In general appearance like very small specimens of *blackburni*, but abdomen with two carinæ; the second one is certainly less distinct than the first, but, as it is traceable on the three males before me, I presume it is constant. In size, and to a certain extent in appearance, it is fairly close to *bryophagus*, but, apart from the carinæ, it differs in having the apex of the first abdominal segment incurved to the middle, and the front coxæ not touching.

On each of three specimens before me there is a moderately distinct longitudinal patch of obscurely-whitish scales on each side of the prothorax, on two other specimens these patches are ochreous. The sides of the sterna and abdomen are sometimes supplied with rather distinct whitish patches.

MANDALOTUS TENUICORNIS, n. sp.

♂. Blackish-brown; appendages more or less reddish. Densely clothed with pale dingy-greyish or subochreous scales, feebly mottled with whitish scales in places; with rather short, semi-decumbent setæ.

Head wide; sculpture normally entirely concealed. Rostrum short, carina scarcely traceable through clothing. Antennæ decidedly longer and thinner than usual, passing middle of elytra; scape distinctly curved; funicle with two basal joints as long as the rest combined, first thicker, but not longer than second; club briefly ovate. *Prothorax* decidedly transverse, sides rather strongly dilated to near base; with large, round, flat, feebly-elevated granules, normally almost entirely concealed. Elytra oblong-cordate, widest at about middle; with regular rows of large, almost-concealed punctures; interstices just perceptibly alternately elevated, and of even width except towards sides. *Meta-sternum* shorter than usual. Abdomen long, basal segment gently concave, its apex straight, fifth slightly longer than third and fourth combined, somewhat elevated but slightly impressed in middle. *Legs* rather long; front coxæ touching; femora stout; tibiæ almost straight. Length, $2\frac{1}{2}$ -3 mm.

♀. Differs in being larger and wider, elytra widest beyond the middle, abdomen nowhere concave, the apical segment not elevated, and the legs shorter.

Hab.—Victoria: Warrnambool (H. W. Davey); Tasmania: Ulverstone (A. M. Lea).

Readily distinguished, from others of the genus, by the long thin antennæ, with the combined lengths of the first and second joints fully half the total length of the funicle.

MANDALOTUS RUFIPES, n. sp.

Of a rather dingy reddish-brown, appendages paler. Rather lightly clothed with fine scales (almost setæ) closely applied to derm, interspersed with some suberect and rather fine setæ.

Head with dense partially-concealed punctures. Rostrum moderately long; carina indistinct. Antennæ moderately long; scape lightly curved; first joint of funicle stouter but scarcely longer than second. *Prothorax* almost as wide as

long, base wider than apex, but widest at about one-third from apex, where the sides are subangularly dilated; surface very uneven. *Elytra* at base as wide as widest part of prothorax, slightly and somewhat irregularly dilated to beyond the middle; with rows of large, but in places interrupted, punctures; suture thickened posteriorly; third interstice thickened about base, with a distinct tubercle about middle and another beyond same, and again thickened near apex; fifth interstice with two small tubercles posteriorly; some of the others somewhat thickened or subtuberculated in places. *Metasternum* gently concave. Abdomen moderately large, basal segment somewhat convex, its apex strongly incurved to middle. *Legs* moderately long; front coxæ moderately separated; femora stout; tibiæ rather short, near apex widely and gently emarginate. Length, $2\frac{2}{3}$ mm.

Hab.—Tasmania: Waratah, in moss (A. M. Lea).

I am unaware as to the sex of the type, but its comparatively narrow form, with emarginated tibiæ, would appear to be masculine features; although these seem negated by the convexity of the abdomen. But, in any case, the species should be readily distinguished by its upper-surface. In my table it would be associated with *coatesi*, which is a larger species with elytral tubercles smaller and differently disposed, and front coxæ more widely separated, etc. In general appearance it is not close to any previously described species.

The surface of the pronotum appears to be covered with small tubercles and irregular granules, but I have not abraded the type to examine it more in detail.

MANDALOTUS LATUS, n. sp.

Blackish-brown, antennæ and tarsi more or less reddish. Very densely clothed with pale-greyish scales, variegated with ochreous; with rather numerous suberect setæ.

Head wide; derm entirely concealed. Eyes smaller and more prominent than usual. Rostrum moderately long; median carina scarcely traceable through clothing. Antennæ moderately long; scape rather suddenly thickened at apex; first joint of funicle slightly longer and stouter than second. *Prothorax* almost twice as wide as long; sides strongly rounded, base not much wider than apex; surface uneven, and with dense, but normally-concealed punctures. *Elytra* short and wide; base strongly and evenly arcuate; shoulders thickened, sides feebly dilated to about apical third, thence strongly narrowed to apex; with rows of large, but almost-concealed punctures; alternate

interstices irregular, the third with a rather large tubercle just before summit of posterior declivity, and another between it and apex, fifth with a rather large tubercle, so placed that with the two on the third they form an equilateral triangle; elsewhere with feeble tubercular swellings. *Abdomen* with basal segment feebly convex. *Legs* comparatively short and stout; front coxæ touching. Length, 5 mm.

Hab.—Tasmania: Mount Wellington, in moss (A. M. Lea).

The type is probably a female. I have described it, however, as its unusually dense clothing, and conspicuous post-median tubercles, render it very distinct.

The femora are distinctly ringed with whitish scales, and the tubercles about the summit of the posterior declivity are supplied with dark scales; but otherwise there are no distinct markings, the ochreous and grey obscurely running into each other.

MANDALOTUS INCISUS, Lea.

Dr. Ferguson has taken at Blackheath (New South Wales) some specimens that are in better condition and larger (up to $6\frac{1}{2}$ mm.) than the types. They all have whitish rings on the legs, dull-white spots at the sides of the abdomen, and an ochreous spot at the middle of the base of the prothorax.

MANDALOTUS SEVERINI, Lea.

A well-marked specimen of this species was recently taken from under a chip near the springs on Mount Wellington. Its prothorax has several sooty spots on each side, so disposed as to cause an appearance as of longitudinal stripes, outside of which the clothing is more or less ochreous; there is also a small round dark spot on each side of the middle. On the elytra many of the punctures are ringed with white. The head and rostrum are feebly striped. The apical half of the front tibiæ (as also those of the type) are armed with some small teeth on their lower surface.

MANDALOTUS SABULOSUS, Lea.

Recently taken by Mr. Carter at Eden (New South Wales).

MANDALOTUS NIGER, Lea.

The male of this species has the inner edge of the hind tibiæ traversed by from 15 to 20 carinæ; rather feeble towards the apex, but very pronounced towards the base. From certain directions they are remarkably distinct; but from most directions they are quite invisible.

Subfamily CRYPTORHYNCHIDES.

The new genera proposed here are all more or less closely allied to *Poropterus*.

NEODECILAUS, n. g.

Head large, convex, not at all concealed. *Eyes* depressed, almost circular, finely faceted. *Rostrum* moderately long and wide, curved; with a shallow groove on each side above scrobe. *Antennæ* rather stout; scape inserted nearer base than apex of rostrum and shorter than funicle; basal joint of the latter elongate; club ovate, subcontinuous with funicle. *Prothorax* transverse, sides moderately rounded, base very feebly bisinuate, constriction absent, ocular lobes obtuse. *Scutellum* absent. *Elytra* subovate, outline almost continuous with that of prothorax. *Pectoral canal* moderately deep and wide, terminated between intermediate coxæ. *Mesosternal receptacle* feebly raised, walls equal throughout, emargination semicircular; slightly cavernous. *Metasternum* less than half the length of the following segment; episterna narrow. *Abdomen* large, sutures distinct; two basal segments large, first not much longer than second, its apex incurved, intercoxal process moderately wide; third and fourth combined the length of fifth and slightly shorter than second. *Legs* rather short; posterior coxæ not touching elytra; femora sublinear, edentate, not grooved; posterior terminated before apex of abdomen; tibiæ rather short, third joint wide and deeply bilobed. *Ovate*, convex, squamose, non-tuberculate, apterous.

The mesosternal receptacle appears to be truly open, but on probing it is felt to be slightly cavernous. The genus is allied to *Decilaus*, from which it may be readily distinguished by the finely-faceted eyes. It appears also to be allied to *Coptomerus*, but in that genus the posterior femora are said to be dentate. In general appearance both the species described below resemble the members of *Aonychus*, but the tarsi, metasternum, rostrum, etc., are utterly different. The sexes are easily distinguished; the ♂ has the rostrum clothed almost to apex, whilst in the ♀ it is shining and clothed only on each side at base; the eyes also are rather larger in the ♂ than in the ♀.

Clothing black and white picus, n. sp.
Clothing of various shades of grey gratus, n. sp.

NEODECILAUS PICUS, n. sp.

Blackish-brown, antennæ and tarsi somewhat paler. Closely covered with black scales, a stouter one in each elytral puncture; almost snowy-white scales condensed into small

patches on each side at base of rostrum, each side of apex of prothorax and at base and apex along middle, four spots at base of elytra (on third and seventh interstices) and rather numerous small ones (often composed of but two or three scales) elsewhere, and especially beyond the middle; on the legs rather large patches at base and apex of femora, and at apex of tibiæ; under-surface with white scales.

Head regularly convex, with dense but rather small and concealed punctures. Rostrum the length of prothorax, sides rather strongly incurved to middle, base once and one-half the width of apex; with rather strong but concealed punctures to apex in ♂; basal third only in ♀ strongly punctate, elsewhere finely punctate and shining. Funicle with first joint as long as second and third combined, third to seventh transverse. *Prothorax* moderately transverse; with dense, rather small, round, clearly-cut but partially-concealed punctures. *Elytra* scarcely twice the length of prothorax and at base scarcely wider, widest at about the middle, gently rounded and nowhere parallel-sided; with series of moderately large, distant punctures, each of which is almost filled by a scale; interstices not separately convex and considerably wider than punctures. *Under-surface* with rather small, concealed, and not very dense punctures. Length, $4\frac{2}{5}$ mm.; rostrum, $1\frac{1}{8}$ mm.; width, $2\frac{1}{4}$ mm.

Hab.—Queensland (J. Faust): Endeavour River (Macleay Museum).

The scales are soft and round, and, with a little trouble, each is individually traceable. Several specimens under examination are entirely without white scales except at base of rostrum; in others (males) almost the entire rostrum is clothed with white scales, and there is almost a continuous median line of white scales on the prothorax. The small postmedian spots on the elytra are very variable in number and disposition.

NEODECILAUS GRATUS, n. sp.

Blackish-brown, antennæ and tarsi somewhat paler. Densely clothed with soft scales, varying from a dull-white to a dark smoky-grey; prothoracic scales larger (except than those in punctures) and looser than on elytra. Length, 4 mm.; rostrum, 1 mm.; width, 2 mm.

Hab.—Queensland: Cairns (Macleay Museum).

I can find no structural differences whatever between this and the preceding species, except that the body of the present species is a trifle wider and that the eyes are slightly larger in both sexes. The clothing, however, is very different, both as regards colour and density. In *gratus* the paler scales

clothe the under-surface and legs (except at apex of femora and base of tibiæ), form three lines on prothorax (the lateral ones sometimes indistinct), and cause the elytra to appear speckled. In *picus* the prothoracic punctures, although covered by the scales, are very decidedly traceable; in *gratus*, on the contrary, they are entirely concealed by the scales, which there are larger and looser. The clothing of *gratus* is peculiarly soft and pretty, whilst that of *picus* is strongly contrasted black and white.

CEDILAUS, n. g.

Head large, partially concealed. *Eyes* small, convex, ovate, widely separated, coarsely faceted. *Rostrum* rather short, wide, sides incurved to middle, very feebly curved. *Scape* inserted nearer apex than base of rostrum, the length of funicle; two basal joints of funicle elongate; club ovate, subcontinuous with funicle. *Prothorax* convex, transverse, base truncate, sides rounded, apex feebly produced, constriction feeble; ocular lobes obtuse. *Scutellum* not traceable. *Elytra* briefly ovate, sides and apex rounded. *Pectoral canal* deep and wide, terminated between four anterior coxæ. *Mesosternal receptacle* strongly and suddenly raised in front, emargination strongly transverse, cavernous. *Metasternum* much shorter than the following segment; episterna not traceable posteriorly, but the triangular inner projection very largely developed. *Abdomen* large, sutures straight and distinct; first segment as long as the three following combined, intercoxal process very wide and truncate, third and fourth combined slightly longer than second or fifth. *Legs* moderately long; posterior coxæ touching elytra; femora deeply grooved, edentate, almost equal in width throughout, posterior not extending to apex of abdomen; tibiæ compressed, straight beneath, each with a large triangular projection near the base; tarsi short, third joint wide and deeply bilobed, fourth long and thin. *Ovate*, convex, squamose, nontuberculate.

The tibiæ are very remarkable, and would appear to denote an approach to *Psepholax*, whilst the polished sides and strongly-elevated mesosternal receptacle would seem to lead more towards *Idotasia*. I may, therefore, very likely be wrong in associating the genus with *Poropterus*, but, at any rate, most of the characters denote affinity with *Decilaus*. The metasternal episterna are also very remarkable, each posteriorly is not traceable, but its anterior inner projection becomes so largely developed that it is almost as long as the basal segment of the abdomen; it is besides plated with shining yellowish scales, so that its extent is easily seen.

Having only one specimen under examination I have not been able to see whether the wings are present or not, but the species appears to be apterous.

CEDILAUS AMBIGUUS, n. sp.

Piceous-brown and shining through clothing, legs and antennæ red. Moderately-densely clothed with loose scales, varying from dingy-yellow to sooty-brown, and interspersed with longer suberect scales; flanks of elytra glabrous; under-surface, legs, head, and rostrum rather sparsely clothed; metasternal episterna densely clothed with shining yellowish scales.

Head convex; coarsely punctate; eyes prominent. Rostrum as wide at apex as at base, sides incurved to middle; coarsely but subseriatly punctate. First joint of funicle noticeably longer and stouter than second, the rest transverse. *Prothorax* rather widely transverse, apex more than half the width of base; with rather large, round, deep punctures; with a depressed and highly-polished median line, which disappears before apex. *Elytra* wider than prothorax and about twice as long, widest before middle, not much longer than wide; punctate-striate, punctures oblong and not very distinct; striæ moderately deep; interstices scarcely convex, the first narrower, the eighth wider than the others, all wider than striæ. *Under-surface* with moderately dense and large punctures. *Femora* densely punctate; each of the tibiæ with a large outer triangular extension, that of the anterior basal, of the intermediate at basal third, and of the posterior just before middle. Length, $2\frac{3}{4}$ mm.; rostrum, $\frac{3}{4}$ mm.; width, $1\frac{2}{3}$ mm.

Hab.—New South Wales (Macleay Museum).

Only one specimen of this remarkable weevil has been under observation. The club is slightly paler than the preceding joints of the funicle, not darker, as is usually the case.

HOPLODECILAUS, n. g.

Head rather large, convex, partially concealed. Eyes small, briefly ovate, widely separated, coarsely faceted. Rostrum rather short and stout, feebly curved. Scape inserted nearer apex than base of rostrum, shorter than funicle; basal joint of the latter elongate; club large, its outline continuous with that of funicle. *Prothorax* convex, transverse, sides rounded, base truncate, apex produced, constriction feeble, lobes obtuse. *Scutellum* absent. *Elytra* truncate at base, ovate, convex, shoulders, sides, and apex rounded. *Pectoral canal* deep and wide, terminated between intermediate coxæ. *Mesosternal receptacle* feebly raised, walls narrow and semicircular; slightly cavernous. *Meta-*

sternum considerably shorter than the following segment; episterna narrow but distinct and almost parallel-sided throughout, the anterior inner projection absent. *Abdomen* moderately large, sutures distinct, that between first and second curved; first as long as the two following combined, intercoxal process wide; third and fourth combined about equal in length to second or fifth. *Legs* rather short; posterior coxæ touching elytra; femora distinctly grooved, dentate, posterior terminated before apex of abdomen; tibiæ compressed, straight or feebly bisinuate beneath; tarsi rather short, third joint wide and deeply bilobed, fourth elongate. Ovale, convex, nontuberculate, apterous.

In this genus, which is undoubtedly very close to *Decilaus*, the shape of the metasternal episterna is very remarkable, each being almost parallel-sided throughout and with the anterior inner projection entirely absent. From *Decilaus* it is distinguished by the shape of the metasternal episterna and by the dentate femora; from the preceding genus, to which it also appears to be close, it is distinguished by the mesosternal receptacle, metasternal episterna, and femora.

HOPLODECILAU MARMORATUS, n. sp.

Black, shining, more or less mottled with red or testaceous; antennæ pale-red. Sparsely clothed with whitish scales, longer and denser on under-surface and legs than elsewhere.

Head convex; densely and coarsely but equally punctate; ocular fovea not traceable. Rostrum shorter than prothorax, increasing in width from base to apex; rather coarsely punctate, but along middle with an interrupted shining impunctate space. Basal joint of funicle as long as second and third combined, third to seventh transverse and closely united. *Prothorax* moderately transverse, with dense, moderately large, round punctures; with a feebly-impressed median line. *Elytra* not twice the length of prothorax, widest at about middle, the outline subcontinuous with that of prothorax; with series of large, suboblong, deep, subapproximate punctures, of almost equal size throughout; interstices the width of or slightly wider than punctures, themselves finely punctate. *Under-surface* moderately densely punctate. *Femora* stout, densely punctate, feebly but rather acutely dentate. Length, 3 mm. (vix.); rostrum, $\frac{2}{3}$ mm.; width, $1\frac{1}{2}$ mm.

Hab.—Western Australia: Albany (R. Helms).

The head is dark-brown and darker than the rostrum; the prothorax is black, except at apex and along middle: the base, sides, and beyond middle of the elytra are more or

less mottled; the abdomen and legs are stained in places with piceous. The clothing of the upper-surface is very sparse and indistinct.

IMALIODES SCITULUS, n. sp.

♂. Black, antennæ almost black. Head and rostrum (almost to apex), prothorax and legs with dense whitish-grey scales, a few tufts of similar scales on elytra; elytra at base and a distinct subtriangular patch on each side of apex, and the greater part of the under-surface, with white scales.

Head with rather small concealed punctures; eyes finely faceted. Rostrum moderately curved; apical fourth densely punctate, behind antennæ coarsely punctate and with four grooves and three ridges, which, however, are more or less concealed. Antennæ inserted nearer apex than base of rostrum; second joint of funicle distinctly longer than first. *Prothorax* as long as wide, basal two-thirds subparallel, apex rounded, base feebly bisinuate; feebly impressed along middle; with small punctures which are concealed by clothing. *Elytra* wider than prothorax at base, which is almost truncate, with the shoulders not produced, widest before middle; with series of large, subquadrate punctures, wider than the interstices; these (especially the second) are in places subtuberculate; each separately rounded and produced at apex. *Metasternum* depressed along middle, the depression continued on to abdomen. *Femora* stout (but thinner than in *subfasciatus* or *terreus*), feebly dentate. Length, $6\frac{1}{2}$ mm.; rostrum, 2 mm.; width, $3\frac{1}{4}$ mm.

♀. Differs in having the rostrum smoother and shining, the punctures smaller, and the scales not continued beyond the middle, and the antennæ inserted at a greater distance from the apex.

Hab.—New South Wales: Illawarra, Kurrajong (Macleay Museum).

The prothorax as long as wide, with the sides subparallel for part of their length, and each elytron separately rounded at apex, render this a very distinct species. It appears to be close to *nodulosus*, which, however, is said to have a scutellum and the elytra sulcate-punctate. I have described the best-preserved specimen; two others have the scales of a uniform pale dingy-brown and almost without a trace of the very distinct basal and apical patches of white scales on the elytra of the type.

IMALIODES OVIPENNIS, n. sp.

Black, scapes and claws dingy-red. Densely clothed with suberect scales, confused amongst small mud-like ones, all of a uniform shade of dingy-brown.

Head with coarse concealed punctures; eyes finely faceted. Rostrum the length of prothorax, feebly curved, sides incurved to middle, coarsely and irregularly punctate, a feeble shining impunctate line along middle. Scape inserted almost in exact middle of rostrum, the length of three basal joints of funicle; of the latter the first joint is distinctly longer than the second, the others are transverse. *Prothorax* slightly transverse, base almost truncate; with moderately large but almost entirely-concealed punctures. *Elytra* ovate, as deep as wide, rather suddenly elevated above prothorax, shoulders not projecting and no wider than prothorax, widest at about middle; seriate punctate or foveate, punctures subquadrate, close together, partially obscured by clothing. Punctures of *under-surface* concealed. *Legs* long; femora with dense partially-concealed punctures, finely but acutely dentate, posterior just passing apex of elytra. Length, $4\frac{4}{5}$ mm.; rostrum, $1\frac{1}{2}$ mm.; width, $2\frac{2}{3}$ mm.

Hab.—Queensland: Barron Falls (A. Koebele), Cairns (Macleay Museum).

In outline much like *nigricornis*, but the legs longer and thinner and the clothing very different.

IMALIODES FRATER, n. sp.

Dark blackish-brown, antennæ and tarsi dull-red. Densely clothed with suberect stout ochreous-brown scales; a feeble but distinct median fascia of paler scales on the elytra, the convex side of which is directed towards the base; each elytral puncture containing a scale, and outlined by scales, except beneath the fascia and towards base.

Funicle with the second joint longer but not much thinner than first. Length, $5\frac{3}{4}$ mm.; rostrum, $1\frac{3}{4}$ mm.; width, $2\frac{3}{4}$ mm.

Hab.—Queensland: Mount Dryander (type in Mr. A. Simson's collection).

Remarkably close in appearance to *edentatus*, but larger, the clothing paler and with a feeble elytral fascia. The principal difference, however, lies in the funicle. In this species the second joint is distinctly longer than the first and not much thinner, the two combined being as long as the rest combined; in *edentatus* the second joint is shorter and much thinner than the first, and the two combined are shorter than the rest combined. I can find no other structural differences, but the punctures of the elytra are more clearly defined than in *edentatus*.

ANCHITHYRUS CALIGINOSUS, n. sp.

Piceous-brown, antennæ dull-red. Not very densely (denser on legs than elsewhere) clothed with fawn-coloured scales.

Head densely but indistinctly punctate. Rostrum the length of prothorax, sides distinctly incurved to middle; with large, dense punctures, larger towards base and leaving an impunctate line along middle. Scape the length of three basal joints of funicle; of these the first is slightly longer than second, whilst none of the others are distinctly transverse. *Prothorax* with dense and rather strong punctures, except at apex, the interspaces feebly granulate. *Elytra* ovate, fully twice the length of and at base no wider than base of prothorax, widest at about middle; with series of large subquadrate punctures, each separated by a rounded ridge; interstices narrower than punctures and with small clusters of small granules. *Abdomen* rather coarsely but indistinctly punctate; intercoxal process rather narrow, third and fourth segments combined about equal to second or fifth; sutures of all deep. *Legs* densely punctate; posterior femora slightly passing elytra. Length, 6 mm.; rostrum, 2 mm.; width, $3\frac{1}{2}$ mm.

Hab.—Queensland: Cairns (Macleay Museum).

In certain lights the elytra, when seen from behind, appear to be supplied with numerous transverse ridges; the interstices are much narrower than the punctures, and not continuously convex, but each is raised at the corner of and depressed in the middle of each puncture, the raised spaces being crowned with a few small granules (becoming very feeble towards the sides), so that each puncture is bounded on its four corners by clusters of feeble granules.

ANCHITHYRUS RETICULATUS, n. sp.

Almost black, antennæ dull-red. Rather densely (except on rostrum) clothed with stout, subspathulate, reddish fawn-coloured scales, becoming subsetose on legs: a few darker scales at apex of prothorax.

Head with dense indistinct punctures. Rostrum almost the length of prothorax, sides distinctly incurved to middle; basal third coarsely punctate, elsewhere shining and with scattered and comparatively small punctures. Scape the length of four basal joints of funicle; of these the first is considerably stouter but not much longer than second, the others are transverse. *Prothorax* with dense and large but almost-concealed punctures. *Elytra* ovate, about twice the length of prothorax, but at base no wider; sides strongly

rounded; with series of large subquadrate deep punctures, each of which is separated by a rounded ridge; interstices much narrower than punctures. *Abdomen* indistinctly but rather coarsely punctate; third and fourth segments combined slightly longer than second or fifth; intercoxal process rather narrower; sutures of all the segments deep. *Legs* long; posterior femora passing elytra for about one-fourth their length. Length, $3\frac{2}{3}$ mm.; rostrum, 1 mm.; width, 2 mm.

Hab.—Queensland: Cairns (Macleay Museum).

In appearance close to the preceding species; but besides being much smaller it may be readily distinguished by the entire absence of granules. Each elytral puncture appears to be surrounded by four ridges that are thickened at the intersecting corner; towards the sides, however, the transverse ridges become very feeble. The eyes are smaller and with larger facets, and the scales are considerably larger than in either the preceding species or in *muticus*. The specimen described appears to be ♀.

POROPTERELLUS, n. g.

Head rather large, partially concealed. Eyes small, ovate, widely separated, coarsely faceted. Rostrum short, wide, and almost straight. Scape inserted nearer apex than base of rostrum, the length of funicle; two basal joints of funicle elongate; club large and briefly ovate. *Prothorax* convex, base truncate, sides and apex rounded, apex produced, constriction feeble; ocular lobes obtuse. *Scutellum* not traceable. *Elytra* ovate. *Pectoral canal* deep and wide, terminated between four anterior coxæ. *Mesosternal receptacle* wide, raised in front, emargination feebly semicircular; cavernous. *Metasternum* much shorter than the following segment; episterna not traceable. *Abdomen* moderately large; two basal segments large, the suture between them traceable at sides only, first as long as second and third combined, intercoxal process very wide (wider than third segment), third and fourth combined the length of second or fifth. *Legs* moderately long; posterior coxæ touching elytra; femora moderately thin, feebly dentate, not grooved, posterior curved and passing elytra; tibiæ compressed, almost straight; tarsi not very thin, third joint moderately wide, deeply bilobed, fourth elongate. Subelliptic, convex, squamose, apterous.

Close to *Poropterus*, but the femora dentate, suture between first and second abdominal segments not continuous and mesosternal receptacle differently shaped. The club is unusually large. The specimen described below looks from above

very much like a small *Poropterus*; its head is flat, except the basal portion, which is glabrous and with a slight bluish iridescence.

POROPTERELLUS INTERCOXALIS, n. sp.

Black, opaque; antennæ and tarsi dull-red. Not very densely clothed with stout, suberect, brown scales, on the prothorax confined to the punctures, except for four feeble fascicles across middle, and two still more feeble ones at apex; elytra irregularly clothed, the sides almost naked, with feeble fascicles in places; each puncture of under-surface containing a scale; legs rather densely clothed. Head between eyes and base of rostrum feebly clothed.

Head rather large, flattened and punctate between eyes, basal portion bald, lightly punctate and with a faint-bluish iridescence, with a feeble median impression, and which is traceable to base; eyes separated from head by a feeble groove posteriorly. Rostrum shorter than prothorax, apex as wide as base, sides feebly incurved to middle, base and sides rather coarsely but not densely punctate, apex moderately-densely punctate; along middle smooth and shining. *Prothorax* as long as wide; with rather large, round, non-confluent punctures. *Elytra* wider than and not twice the length of prothorax, base truncate, shoulders rounded, widest before middle; with series of large, round, deep punctures, of almost equal size throughout; interstices regular, convex, narrower than punctures. *Metasternum* with a shallow elliptic impression on each side. Basal segment of abdomen with two curved series of punctures; those of the first very large and subbasal, but at sides curved round coxæ, those of the second subapical and not continuous to sides; suture between first and second segments deep at sides, marked in middle by a large puncture or fovea, and not traceable elsewhere; second segment with a row of rather large punctures. *Femora* coarsely punctate, feebly dentate, posterior strongly curved and passing elytra for about one-fifth of their length; fourth joint of tarsi noticeably longer than first. Length, 4 mm.; rostrum, 1 mm.; width, 2 mm.

Hab.—Queensland: Cairns (Macleay Museum).

The abdominal punctures are very remarkable. The ocular fovea is scarcely distinguishable amidst the surrounding punctures. On the middle of each elytron of the type there is a small and indefinite patch of pale scales.

GLYPTOPOROPTERUS, n. g.

Head large and partially concealed. Eyes ovate, widely separated, very finely faceted. Rostrum moderately long and

wide, almost straight. Scape inserted nearer apex than base of rostrum, slightly shorter than funicle; two basal joints of the latter elongate; club ovate, subcontinuous with funicle. *Prothorax* subconical, base bisinuate, constriction shallow, ocular lobes almost rectangular. *Scutellum* absent. *Elytra* briefly subovate, base trisinuate. *Pectoral canal* deep and wide, terminated between four anterior coxæ. *Mesosternal receptacle* strongly and suddenly raised, emargination widely transverse; cavernous. *Metasternum* very short; episterna somewhat curved and very narrow, widened and rounded but without an inner projection anteriorly. *Abdomen* not very large; basal segment as long as the three following combined, its suture with second deep at sides but fine across middle, intercoxal process wide; three apical segments depressed, the third and fourth combined shorter than second or fifth, second sloping and slightly longer than fifth. *Legs* long and thin; posterior coxæ touching elytra; femora linear, not grooved, edentate, posterior passing elytra; tibiæ rounded and almost straight; tarsi rather short, third joint wide and deeply bilobed. Ovate, convex, squamose, tuberculate, apterous.

Closely allied to *Poropterus*, but the eyes are very finely faceted, the mesosternal receptacle strongly raised, and the metasternal episterna traceable; from *Microporopterus* it is readily distinguished by the long legs, the posterior femora of which considerably pass the apex of the elytra.

Poropterus sharpi, Faust, and *P. cucullata*, Heller (for specimens of these species I am indebted to Dr. Heller), from New Guinea should be referred to this genus.

GLYPTOPOROPTERUS ASPER, n. sp.

Black, antennæ and claw-joints almost black. Densely clothed with small thin grey scales; under-surface and legs with longer and rather numerous scales scattered about.

Head flat between eyes, but the ocular fovea rather deep; with small and irregular granules; punctures indistinct. Rostrum slightly shorter than prothorax, sides incurved to middle; densely but not very coarsely and almost regularly punctate. Scape inserted very slightly in advance of the middle, the length of six basal joints of funicle; of the latter the first joint is slightly shorter than the second, the fifth and sixth are feebly, whilst the seventh is moderately transverse. *Prothorax* about as long as wide, base slightly bisinuate, sides rather strongly rounded, apex produced, bluntly bifurcate and about one-third the width of base; with numerous small shining granules scattered about and crown-

ing four tubercles that are transversely placed in middle; punctures concealed. *Elytra* considerably (but not suddenly) wider than prothorax, and much less than twice its length, not much longer than wide; punctures large but (except at sides) much obscured by granules and tubercles; with moderately small, numerous, shining granules scattered about and crowning tubercles; of these there are about thirty altogether. *Abdomen* indistinctly punctate. *Femora* indistinctly punctate and granulate, posterior passing elytra for about one-third their length. Length, 10 mm.; rostrum, $3\frac{1}{2}$ mm.; width, $5\frac{1}{2}$ mm.

Hab.—New South Wales (type in Macleay Museum).

A short, broad species, which should be easily recognized by the number of tubercles and the shining and numerous granules: the elytral tubercles are sometimes of considerable size: three on the third interstice, one (postmedian) on the fifth, and one humeral, being the largest; others, however, almost approach them in size. The clothing is almost setose in character. In general appearance it is moderately close to *sharpi* (from New Guinea), but differs in being shorter and broader, the elytral tubercles considerably larger, and the granules of both prothorax and elytra smaller and less crowded together.

ILLIDGEA, n.g.

Head large, partially concealed; ocular fovea distinct. Eyes ovate, widely separated, moderately faceted. Rostrum rather short and stout, curved. Antennæ rather stout; scape inserted almost in exact middle of rostrum, shorter than funicle; two basal joints of funicle elongate; club briefly ovate, its sutures more or less oblique. *Prothorax* convex, base truncate, sides rounded, constriction deep, ocular lobes obtuse. *Scutellum* small. *Elytra* not much wider than prothorax, posterior declivity abrupt. *Pectoral canal* deep and wide, terminated between four anterior coxæ. *Mesosternal receptacle* transverse, rather strongly raised in front, emargination widely transverse, cavernous. *Metasternum* much shorter than the following segment; episterna not traceable. *Abdomen* moderately large, sutures deep and straight; first segment as long as second to fourth combined, intercoxal process rather narrow, second just perceptibly longer than third, third and fourth combined equal to fifth. *Legs* long; posterior coxæ touching elytra; femora sublinear, neither grooved nor dentate, posterior passing elytra; tibiæ scarcely compressed, almost straight; tarsi stout, third joint not much wider than long, bilobed to basal fourth, fourth elongate. Elliptic, strongly convex, squamose, fasciculate, tuberculate, apterous.

Allied to *Poropterus*, but the three intermediate segments of the abdomen equal or almost so, and with the sutures of the club oblique. *Hexymus*, to which it is also allied, has distinct metathoracic episterna.

ILLIDGEA 16-TUBERCULATA, n. sp.

Black, subopaque, antennæ and claws almost black. Upper-surface rather sparsely clothed with distinct reddish-brown adpressed scales, becoming more numerous and subfasciculate on tubercles; those of the two anterior and of two of the median prothoracic tubercles sooty; legs rather densely squamose, on the femora sooty and brown scales intermingled, on apex of femora and on the tibiæ the scales are almost entirely sooty.

Head large, base depressed, indistinctly punctate; ocular fovea large. Sculpture of rostrum concealed by clothing but evidently coarsely punctate. Scape noticeably shorter than funicle; first joint of the latter longer and stouter than second, third and fifth subglobular, sixth and especially the seventh strongly transverse. *Prothorax* about as long as wide, sides rounded, base narrowly depressed; each side of apex with a small fasciculate tubercle, four tubercles across middle, the lateral ones small, the median ones large, rounded, and almost double; along middle an opaque median carina, indistinctly terminated in front, but posteriorly forming a distinct scutellar lobe. *Scutellum* longer than wide. *Elytra* scarcely wider than prothorax, and not twice as long; shoulders excavated to receive the posterior angles of the prothorax; with two transverse series consisting of four large rounded tubercles, the first at about one-fourth from base, the second at summit of posterior declivity, a small tubercle on each side just below summit; with a number of mixed, small, and moderately large, distant punctures, becoming very small posteriorly and larger and seriatly arranged on the sides. *Metasternum* and abdomen with small sparse punctures, the apical segment, however, densely punctate. Posterior *femora* passing elytra for about one-third their length. Length, 9 mm.; rostrum, 3 mm.; width, 4 mm.; depth, 4 mm.

Hab.—Queensland: Brisbane (R. Illidge); New South Wales: Wentworth Falls (A. Simson).

The clothing of the specimen described appears to be in perfect preservation, it is dense only on the scutellum, tubercles, legs, and apical segment of abdomen. The tubercles in the middle of the prothorax are impressed in the middle so that they appear to be double; this appearance is enhanced by the clothing of the anterior portion being darker than that

of the posterior. The elytral tubercles appear to be on the third and fifth interstices, the largest being on the third at the summit of the posterior declivity (this part is fully as long as the part preceding it); the tubercles entirely interrupt the sequence of the punctures, so that these are seriate in arrangement only on the sides and posteriorly.

OMYDAUS SUBFASCICULATUS, n. sp.

Moderately densely clothed with ochreous-brown scales, the elytra with sooty scales subfasciculate in arrangement.

Head coarsely punctate; with a narrow median carina; eyes not very finely faceted. Rostrum inflated near (but not at) base; basal half coarsely punctate, and with a distinct median carina, apical half shining and with small punctures. Scape the length of funicle; first joint of the latter distinctly longer than second. *Prothorax* feebly convex, sides very feebly rounded, base bisinuate but apparently widely and rather deeply emarginate; with a moderately distinct median carina; with dense large and round but somewhat irregular punctures; posterior angles produced beyond the median lobe. *Elytra* somewhat angular, shoulders produced; with series of large, deep, oblong punctures, becoming smaller towards sides and much smaller towards apex; interstices punctate, the alternate ones distinctly raised, except posteriorly. *Under-surface* with large punctures. Second abdominal segment very decidedly elevated above third. *Tibiæ* striated, the anterior strongly trisinate beneath. Length, 8 mm.; rostrum, 2 mm. (vix.); width, $3\frac{1}{2}$ mm.

Hab.—New South Wales: Galston (A. M. Lea).

In appearance nearer *fuliginosus* than any here described, but this is in consequence of the raised elytral interstices; otherwise they are very distinctly separated by the rostrum, abdomen, base of prothorax, tibiæ, etc. The rostrum is thinner and less parallel-sided than in any of the others except of the following species. The fascicles on the elytra are confined to the third and fifth interstices except at summit of posterior declivity. In consequence of the subapical tooth of the anterior tibiæ being rather large, and the tibiæ themselves feebly dentate in the middle, they are strongly trisinate beneath.

OMYDAUS CONTRACTUS, n. sp.

Moderately-densely clothed with stoutish scales, varying from a dingy-grey to sooty-black, and subfasciculate on elytra.

Head rather coarsely punctate; with a distinct median carina; eyes comparatively coarsely faceted. Rostrum sud-

denly bent near base, much wider near (but not at) base than elsewhere; basal third coarsely punctate, apical two-thirds highly polished and almost impunctate. Antennæ rather thin; scape the length of funicle. *Prothorax* feebly convex, sides moderately rounded, suddenly decreasing to apex and rather strongly to base, base feebly sinuate; with a moderately distinct median carina not continuous to base; disc with three distinct subcircular impressions: one on each side of middle, the other in middle of base; with rather large, round, shallow punctures; posterior angles about rectangular. *Elytra* elongate-subcordate, base trisinate, median sinus very feeble, the others small and semicircular; with series of large, deep, oblong punctures, becoming smaller towards the sides, and much smaller posteriorly; alternate interstices scarcely visibly raised. *Under-surface* coarsely punctate. Second abdominal segment decidedly raised above third. *Tibiæ* indistinctly striated, the anterior not very distinctly bisinuate beneath, subapical tooth rather indistinct; tarsi thinner than usual. Length, 7 mm.; rostrum, 2 mm.; width, $3\frac{1}{4}$ mm.

Hab.—New South Wales: Richmond River (A. M. Lea).

The outline of this species is strongly suggestive of *Exithius cariosus*; the sides of the prothorax and elytra rather rapidly decrease to their junction; the elytra at their base are considerably narrower than the widest part of the prothorax, whilst in all the other species they are at least as wide.

OMYDAUS IMPRESSICOLLIS, n. sp.

Clothing much as in the preceding species.

Head coarsely and irregularly punctate; median carina not traceable; eyes rather finely faceted. Rostrum coarsely and irregularly punctate, punctures dense but finer in front of antennæ than elsewhere. Antennæ stout; scape noticeably shorter than funicle. *Prothorax* slightly longer than wide, feebly convex, base strongly bisinuate, basal two-thirds subparallel; with a distinct median carina on apical three-fourths; disc with shallow but distinct depressions; with dense, large, round, somewhat irregular punctures. *Elytra* with the sides subparallel from basal fifth to apical third; with series of large, deep, suboblong punctures, becoming smaller, rounder, and deeper at sides, and much smaller posteriorly; alternate interstices irregularly elevated and feebly granulate. *Under-surface* coarsely punctate. *Tibiæ* striated, each much wider at than close to apex, anterior feebly bisinuate beneath, the subapical tooth rather small, the terminal hook unusually long. Length, 9 mm.; rostrum, $2\frac{1}{2}$ mm.; width, $3\frac{3}{4}$ mm.

Hab.—New South Wales (Macleay Museum).

The narrowest of the genus. I cannot find the least trace of a carina on the head of the specimen described, but this is probably a character that is not to be too strictly relied upon, as in *oblongopunctatus* one specimen has the head carinate, whilst another has not. The depressions on the prothorax, although not very deep, are sufficiently distinct; there are three subbasal ones, and a semicircular one (at its posterior end rather deeper than elsewhere) on each side of the carina.

OMYDAUS CONFUSUS, n. sp.

Clothing somewhat as in *oblongopunctatus*.

Head coarsely punctate; with a feeble median carina; eyes moderately faceted. Rostrum almost parallel-sided; coarsely punctate on basal half, not very coarsely on apical. Antennæ rather stout; scape noticeably shorter than funicle. Shape much as in *oblongopunctatus*, but rather narrower; the *prothorax* with larger and deeper punctures and the median carina more pronounced; the *elytra* with smaller punctures, much less clearly defined and more or less confluent. Length, $7\frac{1}{2}$ mm.; rostrum, $1\frac{1}{2}$ mm.; width, $2\frac{1}{3}$ mm.

Hab.—New South Wales: Tamworth (A. M. Lea).

Close to *oblongopunctatus* but smaller and narrower, and with different punctures. The elytral interstices are feebly connected in places, causing feeble transverse subtubercular spaces; the anterior tibiæ are not very strongly bisinuate, and are without the median tooth of *oblongopunctatus*, the sub-apical tooth, however, is rather distinct.

PSEUDOMYDAUS, n. g.

Eyes rather small, coarsely faceted. Rostrum rather stout. Scape much shorter than funicle, inserted almost in middle. *Prothorax* longer than wide. *Elytra* more than twice the length of prothorax. *Abdomen* with the second segment almost as long as the two following combined, its suture with first deep at sides only and curved across middle. *Legs* moderately long; femora stout, edentate. Other characters as in *Omydaus*.

The species described below is not unlike a small variety of *Omydaus impressicollis*, but the characters given above are so much at variance with those of *Omydaus* that it certainly should not be placed in that genus.

PSEUDOMYDAUS TENUIS, n. sp.

Black, antennæ and tarsi of a dingy-red. Moderately-densely clothed with reddish-brown and rather elongate scales, on the prothorax one in each puncture; elytra in addition

with minute scales on the interstices, a distinct oblique fascia of whitish scales at summit of posterior declivity, and a small round spot of similar scales on third interstice at one-third from base; under-surface and legs with denser and longer clothing than on upper-surface.

Long, thin, and subparallel. *Head* moderately large, somewhat coarsely and irregularly punctate; ocular fovea wide, but shallow and indistinct. Rostrum rather stout, the length of prothorax, moderately curved, sides feebly incurved to middle, base (but not extreme base) wider than apex; coarsely punctate throughout, but behind antennæ the punctures subseriate in arrangement. Antennæ rather stout; scape inserted just perceptibly nearer apex than base, the length of the three following joints; first joint of funicle slightly stouter and longer than second, third to seventh subcylindrical and feebly transverse; club briefly ovate. *Prothorax* slightly longer than wide, base strongly bisinuate, basal four-fifths subparallel, towards apex suddenly but not largely narrowed; with dense and moderately large and round but rather shallow punctures; surface somewhat uneven; with a feeble median carina; walls slightly inwardly oblique. *Elytra* not much wider than and about twice and one-half the length of prothorax, sides subparallel, apex widely rounded and not much narrower than base, base strongly trisinuate, shoulders produced; with series of large, round, deep, subapproximate punctures, not much smaller posteriorly than elsewhere; interstices punctate, indistinctly and very feebly granulate, narrower than series of punctures, the alternate ones slightly raised. *Pectoral canal* deep and wide, terminated at base of anterior coxæ. *Meso-sternal receptacle* raised in front, sides oblique, apex much wider than base and almost truncate; cavernous. *Meta-sternum* moderately large, but considerably shorter than the following segment; densely punctate; episterna rather narrow, each with a series of punctures. *Abdomen* long and coarsely punctate, two basal segments depressed in middle in ♂, feebly convex in ♀, first as long as second and third combined, intercoxal process wide and almost truncate, second almost as long as third and fourth combined and considerably longer than fifth. *Femora* stout, edentate, indistinctly (the anterior not at all) grooved, posterior scarcely extending to apical segment, densely punctate; tibiæ rather short, in addition to the terminal hook each with a small subapical tooth; tarsi rather narrow, third joint not much wider than second and bilobed for scarcely half its length, fourth long, thin, and setose. Length, $6\frac{1}{2}$ mm.: rostrum, $1\frac{1}{2}$ mm.; width, $2\frac{1}{2}$ mm.

Hab.—New South Wales: Burrawang (T. G. Sloane), Illawarra (Macleay Museum).

A long, thin species, somewhat like the European *Plinthus caliginosus*. The prothorax is flattened, but is rendered uneven by rather feeble depressions: at the base three of these are distinct, the median one divides on each side of the median line and is continued on each side to near apex, the lateral ones are traceable to about the middle. The subapical tooth of the anterior tibiæ in the ♂ is rather large.

I have described the clothing of the most distinctly marked specimen; of two others under examination one has the elytra almost uniformly clothed, whilst the other has the small whitish spots absent and the postmedian fascia just traceable.

POROPTERINUS, n. g.

Head almost concealed by prothorax. Eyes ovate, widely separated, coarsely faceted. Rostrum moderately long and not very stout, curved. Scape inserted closer to apex than base of rostrum, shorter than funicle; second joint of funicle elongate, the first joined to the scrobe by a small lateral node at the base; club ovate, subcontinuous with funicle. *Prothorax* transverse, constriction deep and continuous across summit, ocular lobes obtuse, base bisinuate. *Scutellum* distinct. *Elytra* wider than prothorax, shoulders produced, sides strongly arcuate towards apex. *Pectoral canal* deep, terminated between four anterior coxæ, encroached upon by the anterior pair. *Mesosternal receptacle* V-shaped, depressed in front; open. *Metasternum* shorter than the following segment; episterna rather narrow. *Abdomen* large; two basal segments large, first scarcely as long as second and third combined, its suture with second curved at middle, third and fourth combined longer than second or fifth, their sutures deep and wide. *Legs* moderately long; femora moderately stout, neither grooved nor dentate, posterior not extending to apex of abdomen; tibiæ slightly compressed, bisinuate beneath; tarsi slender, almost glabrous above, third joint not much wider than second but deeply bilobed, fourth elongate; claws rather long and thin. Subovate, depressed, squamose, apterous.

A remarkable genus, which belongs to the *Poropterus* group; it is not close to any with which I am acquainted. The mesosternal receptacle sloping downwards (instead of upwards) to the front is a most unusual feature; the first joint of the funicle is also remarkable.

POROPTERINUS TRILOBUS, n. sp.

Blackish-brown, antennæ and tarsi of a rather pale-red. Very densely clothed with muddy-grey and sooty scales (which entirely conceal the punctures), interspersed with stouter and

suberect scales, which form feeble fascicles on the alternate interstices of the elytra.

Head with dense but concealed punctures. *Rostrum* densely punctate but punctures concealed except in front of antennæ; scrobes deep in front but abruptly turned beneath, at sides scarcely traceable to eyes. *Funicle* with the first joint stouter and considerably shorter than second, third to seventh transverse. *Prothorax* transverse; divided into three lobes by the deep anterior constriction, and a still deeper and wider median depression, basal lobes larger than the anterior one; with dense, deep, and rather large punctures, which are entirely concealed, as is also a feeble carina along the middle of the median depression. *Elytra* considerably wider than prothorax and more than twice as long, widest near base, then slightly diminishing in width to apical two-thirds, which are strongly arcuate; seriate-punctate, punctures large, subquadrate, entirely concealed, third, fifth, and seventh interstices decidedly elevated and causing the base to appear multisinuate, the third and fifth broken up into feeble tubercles beyond the middle. *Under-surface* evidently with large punctures, but which are entirely concealed, as are also the sutures of the metasternal episterna. *Posterior femora* (although somewhat longer than the others) not extending to apex of penultimate segment. Length, $6\frac{3}{4}$ mm.; rostrum, $1\frac{1}{2}$ mm.; width, $3\frac{1}{4}$ mm.

Hab.—New South Wales: Cootamundra, Forest Reefs (A. M. Lea).

The strong impressions on the prothorax (dividing it into three distinct lobes) and the peculiar shape and sculpture of the elytra give this species a remarkable appearance, so that, although the derm and punctures are hidden, the species is a very distinct one. The four specimens under examination were taken from under very old logs.

POROPTERCULUS, n. g.

Head convex, not concealed. *Eyes* rather large, ovate, not very widely separated, rather coarsely faceted. *Rostrum* moderately long and rather wide, feebly curved; a shallow groove on each side above scrobe. *Antennæ* moderately stout; scape inserted nearer apex than base of rostrum, the length of funicle; basal joint of the latter rather long; club ovate, subcontinuous with funicle. *Prothorax* transverse, sides rounded, base almost truncate, constriction not traceable, ocular lobes obtuse. *Scutellum* small. *Elytra* ovate, shoulders rounded. *Pectoral canal* deep and wide, terminated between front and intermediate coxæ. *Mesosternal receptacle* feebly raised, crescent-shaped, emargination widely transverse;

cavernous. *Metasternum* short; episterna narrow but traceable throughout. *Abdomen* with straight sutures; first segment as long as second and third combined, intercoxal process rather narrow, third and fourth combined slightly longer than second and fifth. *Legs* moderately long; posterior coxæ almost touching elytra; femora not stout, grooved, edentate, posterior terminated before apex of abdomen; tibiæ rather long and almost straight; tarsi moderately long, third joint wide and deeply bilobed, fourth elongate. Elongate-ovate, strongly convex, striate, squamose, winged.

Evidently belongs to the *Poropterus* group, but I know of no closely related genus.

PROPTERCULUS SUBNITIDUS, n. sp.

Piceous-brown and somewhat shining, antennæ and tarsi paler. Not densely clothed with depressed and suberect sooty scales, intermingled with a few white ones, and which are more numerous on the under-surface than elsewhere.

Head convex; indistinctly punctate. Rostrum the length of prothorax, sides very feebly incurved to middle; basal half with coarse, partially-concealed punctures; apical half shining and moderately punctate, an impunctate line along middle. First joint of funicle obconical, the length of second and third combined and much wider, third to seventh transverse. *Prothorax* lightly transverse, base not much wider than apex; with dense, round, deep, clearly cut, non-confluent punctures, suddenly becoming much smaller on apical fourth. *Elytra* not much wider than, about once and two-thirds the length of, and outline subcontinuous with, that of prothorax; punctate-striate, punctures indistinct, although rather large; interstices regular, convex, shining, slightly narrower than striæ. *Abdomen* with dense, round, deep, clearly-cut, scarcely-concealed punctures. *Femora* with dense but rather small punctures, posterior extending to apical segment. Length, $2\frac{1}{4}$ mm.; rostrum, $\frac{2}{3}$ mm.; width, 1 mm.

Hab.—Western Australia: King George Sound (Australian Museum).

The elytral punctures are indistinct, except towards the sides, but are not concealed by the clothing, which is almost absent, except posteriorly.

PTEROPOROPTERUS, n. g.

Head convex, partially concealed. Eyes ovate, very finely faceted. Rostrum not very long and rather wide, lightly curved, a shallow groove on each side above scrobe. Antennæ moderately stout; scape shorter than funicle, inserted nearer

apex than base of rostrum; two basal joints of funicle moderately long; club ovate. *Prothorax* as long as wide, sides rounded, base bisinuate, constriction slight, ocular lobes almost rectangular. *Scutellum* minute. *Elytra* ovate, convex, each separately rounded at base. *Pectoral canal* deep and wide, terminated between four anterior coxæ. *Mesosternal receptacle* raised, almost crescent-shaped, emargination rather widely transverse; cavernous. *Metasternum* short; episterna not traceable. *Abdomen* with distinct sutures; first segment rather large, as long as second and third combined, apex incurved, intercoxal process rounded and rather narrow; third and fourth combined the length of fifth and slightly shorter than second. *Legs* rather long; posterior coxæ touching elytra; femora feebly grooved, edentate, posterior just passing elytra; tibiæ rounded, almost straight; tarsi rather short, third joint wide and deeply bilobed. Elongate-ovate; strongly convex, squamose, nontuberculate, winged.

Allied to *Poropterus*, but winged, the elytra separately rounded at the base, the eyes very finely faceted, and the femora feebly grooved.

PTEROPROPTERUS LACUNOSUS, n. sp.

Of a rather dark reddish-brown. Moderately-densely (dense on legs and rostrum) clothed with large, soft, dingy, whitish scales; prothorax and elytra, in addition, with stout, suberect, sooty setæ.

Head and rostrum coarsely punctate, but punctures scarcely traceable. Rostrum the length of prothorax, sides incurved to middle; punctures unconcealed only at extreme apex. Scape inserted two-fifths from apex of rostrum, the length of six basal joints of funicle; first joint of funicle stouter and almost twice the length of second, fourth to sixth feebly, seventh strongly transverse. *Prothorax* convex, base lightly bisinuate, apex produced and rounded: with dense, round, and rather large, but shallow punctures. *Elytra* elongate-ovate, not much wider than and about twice the length of prothorax; with regular series of large, subquadrate, clearly-defined and crowded, but not confluent, punctures: interstices much narrower than punctures, each appearing as a series of feeble granules (a granule at each corner of a puncture). *Under-surface* coarsely but not clearly punctate. Length, 6 mm.; rostrum, $1\frac{2}{3}$ mm.; width, $2\frac{2}{3}$ mm.

Hab.—Queensland: Cairns (Macleay Museum).

On the elytra the clothing (except on shoulders and posterior declivity) is almost confined to the interstices, on the

prothorax it forms a feeble (but distinct) median line and a much more feeble line on each side. The dark setæ are confined to the upper-surface, but (except those at apex of prothorax) are almost invisible elsewhere than from the side. The sides of the prothorax appear granulate through the clothing, but this appearance is caused by the sides of the punctures being partially exposed; on the elytra, however, there are true granules, each of which bears a seta; the interstices between puncture and puncture (on the elytra) are actually wider (though less pronounced) than between row and row.

TENTEGIA QUADRISERIATA, n. sp.

Black, legs piceous-brown, antennæ paler. Clothing as in *anopla*.

Head with irregular punctures. *Rostrum* with large round punctures, arranged in four regular series behind antennæ, but without leaving elevated ridges. *Prothorax* with dense, round, large, shallow punctures; apex more produced than usual, with the extreme apex feebly notched and the constriction less pronounced; a feeble median carina from apex to behind middle. *Elytra* subcordate; subtuberculately produced behind shoulders; with series of very large punctures or foveæ, becoming larger at sides and smaller towards apex; interstices with shining somewhat distant granules, largest in vicinity of shoulders, third, fifth, and seventh scarcely visibly raised but with more distinct granules than the others. *Sterna* densely and irregularly punctate. Two basal segments of abdomen with round shallow foveæ, those on the second forming two complete rows. *Femora* edentate, with large shallow punctures, posterior just passing apex of elytra; tibiæ grooved, lower subapical tooth distinct but upper obsolete; third tarsal joint noticeably wider than second and rather deeply bilobed. Length, 5 mm.; rostrum, $1\frac{1}{4}$ mm.; width, $3\frac{1}{4}$ mm.

Hab.—Queensland: Cairns, Rockhampton (Macleay Museum).

The shape (in consequence of the feeble notch at apex of prothorax) resembles that of the species belonging to *Microporopterus*; the femora are stouter with the third tarsal joint wider than usual.

TENTEGIA TORTIPES, n. sp.

Black, legs and antennæ piceous. Clothed with yellowish stout setæ or setose scales, very sparse on elytra, where, however, there are small and obscure patches of small white scales, and which are sparsely and irregularly distributed.

Head with dense and round but (for the genus) small punctures. *Rostrum* densely punctate between antennæ and apex, without distinct punctures behind antennæ, but with five very distinct carinæ, the median one of which is perfectly straight, but the others slightly waved. *Prothorax* with dense, short, shining ridges of unequal lengths; the sides punctate. *Elytra* subcordate, base almost perfectly straight, sides scarcely inflated behind shoulders; punctate-striate, the striæ wide and rather shallow, the punctures (except towards sides, where they are rather large) small, distant, and comparatively indistinct; interstices feebly shining and with small (almost seriate) punctures, the second and fourth not quite continuous to base, but the second feebly raised near base and the fourth very distinctly raised about summit of posterior declivity, the others there being but little raised; declivity itself abrupt and almost inwardly oblique. *Sterna* irregularly and not coarsely punctate. *Mesosternal receptacle* with very thin walls. Two basal segments of abdomen with (for the genus) small and not at all foveate punctures, those on the second in two very irregular series. *Legs* (especially the posterior) longer and thinner than usual; femora edentate, with shallow punctures, the posterior strongly arcuate; tibiæ with eight distinct grooves, with a feeble subapical tooth below but a very distinct one above, posterior very decidedly curved both longitudinally and outwardly; third tarsal joint wider than second and rather deeply bilobed. Length, $7\frac{1}{2}$ mm.; rostrum, $2\frac{1}{2}$ mm.; width, 5 mm.

Hab.—Northern Territory: Port Darwin (type in Macleay Museum).

A remarkable species: the elytra without granules, the fourth interstice very decidedly raised, the posterior declivity very abrupt, the punctures of the two basal segments of abdomen comparatively small, long and crooked hindlegs, etc. Only the sides of the prothorax are distinctly punctate, the disc being covered with numerous short shining ridges of unequal lengths (becoming granules towards apex), but with a more or less inwardly oblique trend, the whole being reminiscent of *Neomelanterius carinicornis*. The length given is that of a straight line from apex of prothorax to apex of elytra, but along the curve of the back the distance between the same points is $13\frac{1}{2}$ mm.

ANILAUUS COSTIROSTRIS, n. sp.

♂. Reddish-brown, antennæ and tarsi paler. Moderately densely and uniformly clothed with short, stout scales, interspersed with longer and suberect ones, varying from dingy-grey to sooty, but giving the surface a dingy-brown appearance.

Head with dense but almost concealed punctures. Rostrum coarsely punctate throughout, but especially at base, behind antennæ with three very distinct, shining, slightly-waved ridges; wider at apex than at base. Funicle with the first joint stouter and slightly longer than second. *Prothorax* almost twice as wide as long; with coarse, deep, partially concealed punctures; with a narrow (slightly dilated in middle), shining median carina. *Elytra* not much longer than wide; with series of rather large, rounded punctures; interstices gently convex, wider than punctures near suture, but not as wide as sides. *Under-surface* and *legs* coarsely punctate. Length, $3\frac{1}{2}$ mm.; rostrum, $1\frac{1}{3}$ mm.; width, $2\frac{1}{2}$ mm.

♀. Differs in having the rostrum longer and thinner, wider at base than at apex, less coarsely punctate but punctures more distinct, the three basal costæ wider and much less distinct, and the antennæ slightly nearer the middle.

Hab.—Queensland: Endeavour River, Cairns (Macleay Museum).

Differs from *sordidus* in being differently and much less densely clothed, prothorax wider and more suddenly contracted anteriorly; elytral interstices regular, and the whole body rather more depressed. The teeth of the four posterior femora are slightly larger, whilst those of the posterior are not quite so large as in *sordidus*.

MYRTERIS NASUTA, n. sp.

♀. Dingy-black, rostrum piceous-brown, antennæ red. Clothing as in *caligata* but much sparser, except on the legs and metasternal episterna.

Head densely punctate. Rostrum very long and thin, terminated considerably beyond posterior coxæ, its apex scarcely dilated; with distinct but rather small punctures and which are evenly and sparsely distributed, except that they become coarse on the flanks near apex. Antennæ very thin; scape inserted slightly nearer base than apex; two basal joints of funicle equal in length. *Prothorax* as in *caligata* except that the tubercular elevations are less pronounced, more numerous and irregular, and the excavated portion of each larger, so that they frequently look like small elevated rings; with a median carina which is elevated in front and traceable to base. *Elytra* as wide as long, depressed along suture; with almost regular series of large punctures, the interstices with a few feeble hollow tubercles, appearing like slightly-raised rings, and few of which are seta-bearing. *Pectoral canal* extending to apex of basal segment of abdomen.

Abdomen with foveæ as in *caligata*, but of larger size. Length, 7 mm.; rostrum, $4\frac{1}{3}$ mm.; width, 4 mm.

Hab.—Queensland: Mount Dryander (type in Mr. A. Simson's collection).

This species differs from *caligata* in having the rostrum longer (it is actually longer than the greatest elytral width), thinner, less dilated at apex, and with smaller punctures, the antennæ inserted nearer base than apex (all possibly sexual characters) with the two basal joints of the funicle equal in length, prothorax differently sculptured, elytra with smaller, much sparser, and hollower tubercles, very few of which are seta-bearing; but in particular by the pectoral canal extending to the apex of the basal segment of the abdomen instead of terminating before its middle. The species strongly resembles *caligata*, and I may be wrong in regarding it as new; if it is a female of *caligata*, then the two specimens of that species that are known to me must be males, although they have every appearance of being females.

MYRTESIS PULLATA, n. sp.

♂. Dingy-black, rostrum piceous-brown, antennæ red. Densely clothed with pale muddy-brown setose scales, mingled (especially on prothorax) with ochreous ones.

Head densely punctate. Rostrum comparatively stout, terminated just before abdomen, parallel-sided except near apex; with large punctures close together, in four series behind antennæ, in front more crowded and irregular. Antennæ thin; scape inserted two-fifths from apex, two basal joints of funicle equal. *Prothorax* densely and coarsely punctate, with numerous feeble and hollow tubercular elevations: with a distinct and slightly shining carina, which is continuous to base and apex. *Elytra* as wide as long, not depressed along suture: with series of large punctures or foveæ, which are sometimes almost hidden by the clothing; interstices with almost regular series of small hollow shining granules: across the median half with feeble and feebly fasciculate tubercles. *Pectoral canal* terminated at abdomen. Two basal segments of *abdomen* with very large punctures or foveæ, forming three irregular rows on the first and two on the second. Length, $5\frac{1}{2}$ mm.; rostrum, 2 mm.; width, $3\frac{3}{4}$ mm.

♀. Differs in having the rostrum much longer ($2\frac{1}{2}$ mm.) and thinner, terminated at abdomen, punctures much smaller and crowded together; antennæ thinner, scape inserted in exact middle of rostrum and club more elongate.

Hab.—Queensland: Mount Dryander, Burdekin River (types in Mr. A. Simson's collection).

This is the only species in which I am acquainted with both sexes. The clothing and tubercles are different to those of *nasuta* and *caligata*, and the pectoral canal is shorter; the most readily seen difference, however, is the absence of a sutural depression. The type male and female have been returned to Mr. Simson, a second female being retained by myself.

TETENGIA, n. g.

Head rather large, partially concealed. Eyes ovate, not very widely separated, coarsely faceted. Rostrum rather short and stout, feebly curved. Antennæ stout, scape shorter than funicle, inserted nearer base than apex; two basal joints of funicle elongate, the others transverse and increasing in width; club stout, continuous with funicle. *Prothorax* widely transverse, base truncate, sides at base excavated to receive femora, constriction absent; ocular lobes very obtuse. *Scutellum* absent. *Elytra* closely applied to, with the outline continuous with, that of prothorax. *Pectoral canal* deep and wide, terminated between intermediate coxæ. *Mesosternal receptacle* very feebly raised in front and depressed at the sides, walls equal throughout, emargination semicircular; cavernous. *Metasternum* much shorter than the following segment; episterna rather narrow but distinct throughout. *Abdomen* moderately large; first segment as long as the three following combined, second depressed below first, its sutures straight, third and fourth combined distinctly longer than second or fifth, their sutures deep and wide. *Legs* short and stout; femora deeply grooved to receive tibiæ, edentate, posterior terminated before apex of abdomen; tibiæ very wide, outer edge strongly rounded and thin, inwardly excavated to receive tarsi; tarsi rather short and stout, third joint not much wider than second and not bilobed to base, fourth long and very thin; claws feeble. Briefly ovate, feebly convex, nontuberculate, apterous.

The shape of the prothorax, abdomen, and legs render this a highly remarkable genus; its true position I am very doubtful of, but it appears to approach *Tentegia*.

TETENGIA SOLENOPA, n. sp.

Blackish-brown or dark-brown; prothorax pale, antennæ red. Prothorax moderately-densely clothed with ochreous scales, with a few white ones in small spots; elytra with whitish scales, not very densely distributed, and frequently condensed into small spots, second interstice at apex with similar scales to those on prothorax.

Head with dense, regular and not very large punctures; each eye encircled by a narrow impression. *Rostrum* coarsely punctate in ♂, moderately coarsely in ♀. *Prothorax* almost twice as wide as long, sides strongly but not suddenly rounded, apex less than half the width of base; with dense, round, uniform, clearly-defined punctures; a very feeble impunctate space along middle. *Elytra* not much longer than wide, very little wider than prothorax, widest immediately behind base, thence gently and continuously rounded to apex; striate-punctate, punctures deep oblong and feebly connected; interstices flat, wider than striæ, rather densely punctate, third to seventh terminating separately instead of the third and seventh and fourth and sixth being conjoined; flanks of basal half inwardly oblique curved and polished. *Under-surface* with punctures increasing in size, from rather small on the mesosternal receptacle, to large on the first segment of abdomen; second segment of the latter strongly and suddenly depressed below first, with a series of very large punctures becoming foveæ (four) in the middle; third and fourth each with a row of small punctures, fifth densely punctate. *Legs* densely punctate; femora oblong, thin at base, their grooves running out at the base, posterior not extending to apical segment; tibiæ lightly striated. Length, 4 mm.; rostrum, 1 mm.; width, 3 mm.

Hab.—Western Australia: King George Sound (Austrian Museum), Bridgetown (A. M. Lea).

The punctuation of the under-surface is remarkable. Owing to the peculiar interstices each elytron appears to be supplied with a preapical callus, although such is not the case. The ciliation of the ocular lobes is silvery and remarkably short. The clothing appears to be easily abraded.

TEPALICUS, n. g.

Head excavated towards base, partially concealed. Eyes rather coarsely faceted. *Rostrum* long, thin, and curved. *Antennæ* moderately thin; scape inserted nearer apex than base of rostrum, the length of funicle; two basal joints of the latter elongate; club elongate-ovate, subcontinuous with funicle. *Prothorax* transverse, sides lightly rounded, base bisinuate, walls vertical, constriction slight, ocular lobes obtuse. *Scutellum* minute. *Elytra* subcordate, considerably wider than prothorax. *Pectoral canal* deep and narrow, terminated between intermediate coxæ. *Mesosternal receptacle* scarcely raised, walls not stout and of equal thickness throughout, emargination U-shaped; cavernous. *Metasterum* short; episterna narrow but distinct throughout and divided from the

middle by deep sutures. *Abdomen* moderately large, sutures distinct, that between first and second segments feeble but traceable across middle, first as long as second and third combined, intercoxal process not very wide; third and fourth combined longer than second or fifth. *Legs* moderately long; posterior coxæ touching elytra; femora not stout, feebly grooved, edentate, posterior just passing elytra; tibiæ feebly compressed, almost straight; tarsi long, thin, and shining, third joint very little wider than second and bilobed for about half its length, fourth elongate. Ovale, moderately convex, squamose, nontuberculate, apterous.

Closely allied to *Paleticus*, but the femora feebly grooved and edentate, the mesosternal receptacle U-shaped; the abdomen with the apical segments not suddenly narrowed by elytra, the suture between first and second traceable across middle, and the combined length of the third and fourth greater than that of the second or fifth.

TEPALICUS SEMICALVUS, n. sp.

Black, antennæ and tarsi of a rather pale-red. Densely clothed with muddy-brown scales, thickly interspersed with dark fawn-coloured erect scales that form feeble fascicles on the prothorax and elytra.

Head slightly convex, semicircularly depressed towards and naked at base; ocular fovea not traceable. Rostrum long, rather strongly curved, parallel-sided; with strong punctures in grooves on basal half, apical half polished and minutely punctate. Scape inserted at apical third; second joint of funicle considerably longer than first, the others transverse. *Prothorax* moderately transverse, base strongly bisinuate; punctures small, sparse, and entirely concealed; from middle to apex a distinctly elevated but narrow and squamose carina. *Elytra* subcordate, about once and one-half the width and twice and one-half the length of prothorax, base trisinate, shoulders rounded, behind shoulders subparallel to apical third; with rather large round punctures, not very close together, and subgeminatè in arrangement, becoming very small posteriorly; alternate interstices irregularly and very feebly raised. *Metasternum* with a transverse median impression, notched in the middle anteriorly. Intercoxal process of abdomen with a semicircular impression on each side; punctures (if present) entirely concealed. Length, 7 mm.; rostrum, $2\frac{1}{2}$ mm.; width, 4 mm.

Hab.—Queensland: Cairns (Macleay Museum).

In appearance this species rather strongly resembles *Paleticus frontalis*. The prothorax could scarcely be called

fasciculate, as the erect scales, though thickly distributed, are nowhere in small patches; on the elytra the fascicles are almost confined to the third, fifth, and seventh interstices; the stout scales are very thickly distributed on the legs.

OUROPOROPTERUS, n. g.

Head moderately large, not visible from above. Eyes ovate, widely separated, finely faceted. Rostrum moderately long and rather thin, moderately curved; a shallow groove on each side above scrobe. Antennæ thin; scape inserted nearer apex than base of rostrum, the length of funicle; two basal joints of funicle elongate; club ovate, subcontinuous with funicle. *Prothorax* transverse, subconical, sides rounded, base bisinuate, constriction feeble, ocular lobes obtuse. *Scutellum* small. *Elytra* subovate, base very little under than base of prothorax and trisinuate. *Pectoral canal* deep and moderately wide, terminated between four anterior coxæ. *Mesosternal receptacle* U-shaped, walls of equal thickness throughout but rather strongly raised posteriorly; feebly cavernous. *Metasternum* considerably shorter than the following segment; episterna narrow. *Abdomen* rather large; sutures distinct; first segment not much longer than second, its suture with it curved, intercoxal process rather narrow, second slightly longer than third and fourth combined and considerably longer than fifth. *Legs* not very long; femora not grooved, indistinctly dentate, posterior terminated before apex of abdomen; tibiæ compressed, feebly bisinuate; tarsi moderate, third joint wide and deeply bilobed, fourth moderately long but not thin. Elliptic, convex, squamose, tuberculate, apterous.

Very close to *Emethylus*, from which it differs, especially in the shoulders and absence of wings; the ocular lobes are also much less prominent, and the mesosternal receptacle is differently shaped. The latter organ is decidedly raised, but slopes *down* to the front instead of *up*, as is usually the case; seen from behind (or when probed) it appears to be cavernous, but when viewed from in front it appears to be almost open.

OUROPOROPTERUS DIURUS, n. sp.

♂. Dark reddish-brown, antennæ and claw-joints somewhat paler. Very densely and almost uniformly clothed, with rather stout, dark fawn-coloured scales, subfasciculate at apex of prothorax, and absent only at extreme apex of rostrum.

Head with dense, small, entirely-concealed punctures. Rostrum the length of prothorax, base noticeably wider than apex, sides incurved to middle; densely and rather coarsely

punctate, punctures concealed except at apex. Scape inserted at apical third; first joint of funicle as long as second and third combined. *Prothorax* moderately transverse, apex produced and bluntly bifurcate; with small and rather sparse and dense and minute punctures, all of which are concealed. *Elytra* about thrice the length of prothorax and at base very little wider, widest before middle, base lightly trisinate, sides strongly rounded, towards apex strongly arcuate, each separately produced at apex; with series of rather large and rounded, or subquadrate punctures, becoming smaller posteriorly; interstices in places subtuberculate, the alternate ones feebly raised; suture on basal half with small, shining granules. *Under-surface* with minute, concealed punctures. *Femora* densely punctate, minutely dentate, posterior just passing apex of third abdominal segment. Length, 8 mm.; rostrum, 2 mm.; width, $4\frac{1}{6}$ mm.

♀. Differs in having the rostrum rather longer and thinner, squamose at base only, shining and lightly punctate elsewhere, and the scape inserted two-fifths from apex of rostrum.

Hab.—New South Wales: Illawarra (Macleay Museum).

There are about eighteen small tubercles on the elytra, nearly all of which are placed about the middle. The femoral teeth are acute, but very small, and are invisible from all directions until the clothing is removed.

BRACHYPOROPTERUS VERMICULATUS, n. sp.

Black, apex of rostrum almost black, antennæ and claw-joints pale-red. Very densely clothed with fawn-coloured scales, paler on posterior declivity and darker on three apical segments of abdomen than elsewhere; elongate stout scales scattered about (rather thickly on the under-surface and legs) and forming numerous feeble fascicles on prothorax and elytra.

Head very feebly convex; punctures concealed; forehead feebly bisinuate. Rostrum the length of prothorax, sides feebly incurved to middle; basal half with coarse concealed punctures, apical half shining and with moderately strong punctures. Scape inserted slightly nearer apex than base of rostrum, not much shorter than funicle; first joint of funicle slightly longer than second, seventh transverse. *Prothorax* lightly transverse; with a number of tubercular elevations all of the same height near apex forming a feeble O, at base forming a feeble M (but the median V very distinct), a small tubercle on each side of middle and three moderately long ones on each flank; punctures concealed except a few on flanks. *Elytra* not much wider than prothorax and not twice as long, deeper than wide; posterior declivity steep and longer

than the rest of elytra, crowned on each side with an obtuse transverse tubercle; third and fifth interstices distinctly raised from base to basal third (less distinctly raised near apex); with several feeble tubercles about middle, a distinct oblique one on fifth interstice; with series of rather large round punctures, not very close together, and more or less interrupted by tubercles; a few small, shining, sutural granules on basal half. Punctures of *under-surface* entirely concealed. Posterior *femora* extending almost to apex of abdomen. Length, $6\frac{2}{3}$ mm.; rostrum, $2\frac{1}{2}$ mm.; width, $3\frac{2}{3}$ mm.

Hab.—New South Wales: Clarence River (Macleay Museum).

The elongate tubercular elevations and short deep elytra give this species a most peculiar appearance. It differs from *apicigriseus* in having much paler and more uniform clothing. The rostrum longer, eyes smaller and rather more coarsely faceted, posterior declivity considerably longer, pectoral canal longer and terminating at hindmargin of middle coxæ instead of in a somewhat more advanced position, mesosternal receptacle narrower and second segment of abdomen not transversely impressed, etc.

EURYPOROPTERUS TENUIFASCIATUS, n sp.

Black, antennæ (club infusate) and claw-joints of a rather pale-red. Moderately densely clothed with small, round, brown scales; on prothorax a few elongate ones scattered about and moderately dense at sides and apex, each side of middle with a small, round, whitish spot; each elytral puncture with a moderately large scale, longer and paler scales scattered about, and, to the naked eye, appearing to form an oblique row of three small dots on each elytron; a distinct and very narrow white oblique fascia on each side, at summit of posterior declivity, extending from sixth interstice almost to suture. Under-surface, head, and basal half of rostrum sparsely squamose, pectoral canal moderately squamose; legs feebly ringed. Ciliation silvery and unusually minute.

Head very feebly convex; forehead widely and shallowly but distinctly bisinuate; indistinctly punctate; ocular fovea small and round. Rostrum the length of prothorax, sides lightly incurved to middle; with very feeble series of rather small punctures; apical half shining. Funicle with the second joint distinctly longer than the first, none of the others transverse. *Prothorax* rather strongly transverse, posterior angles produced; surface uneven from rather large scattered punctures; feebly (more distinctly at base) de-

pressed along the middle: across middle with several very feeble tubercular elevations. *Elytra* wider than prothorax and (along middle) about twice as long, not much longer than wide; shoulders oblique and produced on to prothorax; with several feeble tubercular elevations, more noticeable on third interstice than elsewhere; suture towards base with a few depressed shining granules; with series of large (moderately small posteriorly), round, rather deep, and distant punctures; interstices not separately convex. *Mesosternal receptaculæ* as long as wide, each side strongly emarginate (or foveate). *Abdomen* with small sparse punctures; first segment as long as the three following combined, intercoxal process with a foveate impression on each side; suture between first and second segments deep at sides, in middle with a large transverse fovea: second as long as third and fourth combined. *Femora* distinctly grooved, the four anterior with a thin but acute and distinct tooth, posterior just passing apex of elytra. Length, 6 mm.; rostrum, $1\frac{3}{4}$ mm.; width, $3\frac{1}{2}$ mm.

Hab.—New South Wales (A. M. Lea).

The mesosternal receptacle and abdomen are at variance with the other species of the genus, but the insect is so evidently allied to *annulipes* that it was thought advisable not to generically separate it. The specimen described (probably a female) is from the Tweed or Richmond River; it was put aside in spirits with some duplicates for over four years without apparent injury to the remarkable clothing. Near the base of the elytra there is a short groove, formed by punctures, such as is often seen behind the posterior coxæ.

EXITHIUS FERRUGINEUS, n. sp.

Very densely clothed with ochreous-brown scales of a uniform tint throughout, except that the scutellum bears whitish scales. Fascicles on each of the elytral tubercles and six on prothorax.

Head densely and somewhat rugosely punctate; forehead very distinctly but not deeply trisinate. Rostrum shining; coarsely punctate at base, densely but not coarsely elsewhere. Antennæ inserted almost in exact middle. *Prothorax* feebly transverse, sides moderately rounded, towards apex rather suddenly and strongly narrowed; with dense concealed punctures. *Elytra* not twice the length of prothorax; shoulders strongly projecting; posterior declivity abrupt, its summit crowned by four rather large tubercles placed in a line; elsewhere (but especially on the third and fifth interstices) with a few small tubercles; with series of concealed punctures. Two basal segments of *abdomen* with dense, round punctures.

All the *femora* very acutely and distinctly dentate. Length, $5\frac{2}{3}$ mm.; rostrum, $1\frac{2}{3}$ mm.; width, 3 mm.

Hab.—Tasmania (type in Mr. A. Simson's collection).

The specimen described appears to be a female. The species resembles the preceding one, especially as regards the shoulders, but the clothing is very different, the prothorax is less transverse, the elytra are much shorter (in consequence of the posterior declivity being very abrupt), and the tubercles are differently disposed and less uniform in size; the femoral teeth are also considerably larger and more acute.

EXITHIUS CONSPICIENDUS, n. sp.

Densely clothed with dingy-brown scales; prothorax with a very distinct patch of large, soft, pale, rounded scales, commencing at the middle of the base, curved round and terminating in the median fascicle on each side of the middle. Prothorax with six fascicles, each elytral tubercle feebly fasciculate.

Head coarsely punctate but not at base; forehead very distinctly and moderately deeply trisinate. Rostrum shining; densely but not very coarsely punctate (except at base) in ♂, almost impunctate (except at base) in ♀. *Prothorax* moderately transverse, sides rounded, with dense concealed punctures. *Elytra* almost truncate at base; the alternate interstices with small tubercular elevations; with series of large (almost concealed) punctures. Two basal segments of *abdomen* with dense round punctures. *Femora* not very distinctly punctate. Length, 5 mm.; rostrum, $1\frac{1}{3}$ mm.; width, $2\frac{1}{2}$ mm.

Hab.—Tasmania (Macleay Museum): Hobart (L. Rodway, H. H. D. Griffith, R. A. Black, and A. M. Lea); Mount Wellington (A. M. Lea).

The shape of the patch of pale scales on the prothorax is remarkable.

Two specimens differ in being smaller (4 mm.), in having the patch of scales on the prothorax snowy-white, and (very feebly) narrowly continued to apex, each side with a narrow pale stripe; the scutellum is white; each shoulder is white, the whole of the posterior declivity for the width of three interstices on each side with a triangular lateral extension near the summit is white, and the femora are very decidedly ringed. I cannot regard these specimens, however, as representing more than a variety.

EXITHIUS LOCULOSUS, n. sp.

Densely clothed with soft, sooty scales. Prothorax and elytra with the usual fascicles.

Head densely punctate; forehead not trisinate. Rostrum wider at base than at apex; base coarsely punctate, elsewhere (except at sides) rather sparsely and finely punctate. Antennæ inserted nearer base than apex. *Prothorax* moderately transverse, subtriangular, owing to the sides decreasing in width from near base; with rather larger punctures than usual. *Elytra* not much wider than prothorax, just perceptibly widest about middle, thence arcuate to apex, which is truncate; base feebly trisinate; each with about ten small tubercular elevations, most of which are beyond the middle; with series of large subquadrate punctures or foveæ, wider than the interstices and in places only slightly obscured. Two basal segments of *abdomen* with dense, round, deep punctures. *Femora* scarcely visibly dentate. Length, $5\frac{1}{4}$ mm.; rostrum, $1\frac{1}{3}$ mm.; width, $2\frac{1}{3}$ mm.

Hab.—New South Wales: Galston (D. Dumbrell).

The build of this species is suggestive of *Microporopterus*, the femoral teeth are traceable with great difficulty and only from behind; the punctures of the abdomen are unusually deep and those of the elytra large.

EXITHIUS SCULPTILIS, n. sp.

♂. Sparsely clothed with dingy-brownish scales, with pale scales along the middle of the prothorax and rather denser there than elsewhere. Prothorax with six fascicles (the two median ones white); elytra scarcely fasciculate.

Head coarsely punctate between eyes; forehead shallowly but distinctly trisinate. Rostrum slightly wider at apex than at base; with unusually large punctures, subseriately arranged behind antennæ, in front of antennæ the punctures are larger than usual but much smaller than those behind them. Antennæ inserted one-third from apex of rostrum; scape shorter (but not by much) than funicle. *Prothorax* as long as wide, with large but not very numerous punctures or foveæ; with a moderately distinct, but short, median carina. *Elytra* strongly convex, subovate, widest just beyond middle, apex feebly rounded; with large punctures or foveæ, becoming small posteriorly but much larger (and also more distinct) on the sides; third and fifth interstices each with two feeble tubercular elevations: one at basal third and one at summit of posterior declivity. Two basal segments of *abdomen* with very large round punctures. *Femora* edentate; narrowly grooved. Length, $4\frac{1}{4}$ mm.; rostrum, 1 mm.; width, 2 mm.

Hab.—New South Wales (Macleay Museum).

The clothing and punctures are very different to those

of the other species here described, the scape is unusually long, the body is strongly convex and comparatively narrow, and the femora are edentate; so that I may be wrong in referring it to *Exithius*—it is, at any rate, very closely allied to that genus.

EXITHIUS INAMABILIS, n. sp.

Moderately densely clothed with sooty and muddy-grey scales, irregularly distributed, and forming feeble fascicles on elytra, but not on prothorax.

Head densely punctate; forehead not trisinate. Rostrum subopaque in ♂, shining in ♀, rather thinner than usual; base and sides with coarse punctures, elsewhere not coarsely or densely punctate. Antennæ inserted almost in exact middle. *Prothorax* moderately transverse, sides strongly rounded; with dense, round, shallow, partially-concealed punctures. *Elytra* briefly subovate, widest just beyond middle, base feebly trisinate; all the interstices slightly convex and each feebly produced at base; with series of large punctures, becoming not much smaller posteriorly. *Meso-sternal receptacle* very feebly and not suddenly elevated; densely punctate. Abdomen with dense, round punctures. *Femora* stouter than usual; rather feebly dentate. Length, 4 mm.; rostrum, $1\frac{1}{3}$ mm.; width, 2 mm.; variation in length, $3\frac{1}{2}$ - $4\frac{1}{2}$ mm.

Hab.—New South Wales: Forest Reefs (A. M. Lea).

A short broad species, having the rostrum rather longer than usual and the prothorax without fascicles; on one specimen that has been entirely abraded each elytral puncture appears to be bounded by four minute granules, and which give the elytra a curious appearance, but these granules are usually not traceable.

EXITHIUS BREVIS, n. sp.

Black, antennæ and tarsi dull-red. Densely clothed with large, soft, sooty-brown scales, that on the prothorax and elytra form feeble fascicles.

Head densely and confusedly punctate; forehead not trisinate. Rostrum the length of prothorax; sides feebly incurved to middle; densely and coarsely punctate, punctures concealed except on apical fourth. Scape inserted in exact middle of rostrum; first joint of funicle stouter but scarcely longer than second. *Prothorax* moderately transverse, sides strongly rounded, apex about half the width of base; with dense, round punctures, becoming smaller anteriorly. *Elytra* about once and one-third the width and about twice the length of prothorax, slightly longer than wide; with series of

large, suboblong punctures, which are more or less concealed; interstices narrower than punctures, themselves lightly punctate. *Under-surface* with dense, round, regular punctures. *Mesosternal receptacle* not suddenly raised. *Femora* stout, very feebly dentate. Length, $4\frac{1}{2}$ mm.; rostrum, $1\frac{1}{5}$ mm.; width, $2\frac{1}{4}$ mm.

Hab.—New South Wales: Forest Reefs (A. M. Lea).

A short, broad species, closely allied to the preceding one, from which it may be distinguished by its greater width, denser clothing, much more irregular punctures of head, and stouter and more coarsely punctured rostrum.

EXITHIOIDES, n. g.

Head large, feebly convex, partially concealed. Eyes ovate, widely separated, coarsely faceted. Rostrum comparatively short and wide, feebly curved; a shallow groove on each side above the scrobe. Scape inserted nearer apex than base of rostrum, the length of funicle; two basal joints of the latter elongate; club ovate, subcontinuous with funicle. *Prothorax* subquadrate, constriction slight; ocular lobes obtuse. *Scutellum* small. *Elytra* oblong-ovate. *Pectoral canal* deep and wide, terminated immediately behind anterior coxæ. *Mesosternal receptacle* raised, almost as long as wide, sides incurved to base, ridged along middle, emargination widely transverse; cavernous. *Metasternum* rather short; episterna not traceable. *Abdomen* moderately large, sutures straight; basal segment as long as the three following combined, intercoxal process rather narrow; third and fourth depressed below, and their combined length slightly less than that of second or fifth. *Legs* moderately long; posterior coxæ touching elytra; femora feebly grooved, edentate, posterior terminated before apex of abdomen; tibiæ lightly compressed, almost straight; tarsi rather thick, third joint very little wider than second and deeply bilobed, fourth rather long and thin. Oblong-elliptic, convex, squamose, non-tuberculate, winged.

Allied to *Exithius*, but the abdominal sutures straight and the body winged.

EXITHIOIDES PUNCTATUS, n. sp.

Black, opaque, antennæ and tarsi dull-red. Sparsely (the legs moderately densely) clothed with sooty-brown scales; base and posterior declivity of elytra with dense pale scales; under-surface with a few pale scales. *Prothorax* with four very feeble fascicles, elytra with several feeble fascicles and with four distinct (but still feeble) ones crowning the summit of posterior declivity.

Head feebly convex; densely punctate throughout; basal portion scaleless but opaque, separated from the scaly portion by a very feeble semicircular impression. Rostrum shorter than prothorax, sides incurved to middle; densely and rather coarsely punctate and opaque throughout, punctures larger and arranged in four feeble rows behind antennæ, with a very feeble median ridge on basal half. Scape inserted at apical third; first joint of funicle slightly longer than second, the others transverse. *Prothorax* moderately convex, almost as long as wide, sides moderately rounded, base truncate and not much wider than apex; with dense, large, round, deep punctures; with a short and very indistinct median carina. *Elytra* slightly wider than prothorax and about once and one-half its length; parallel-sided and cylindrical from near base to apical third; with dense, large (twice the size of those on prothorax), round, deep, closely approximate, but non-confluent punctures or foveæ, becoming smaller posteriorly; a few small feebly-shining granules on suture near base. Two basal segments of *abdomen* with large, round, deep punctures, larger on second than on first; fifth densely punctate. Length, $4\frac{1}{2}$ mm.; rostrum, $1\frac{1}{5}$ mm.; width, 2 mm.

Hab.—New South Wales: Glen Innes (A. M. Lea).

The punctures on both prothorax and elytra are perfectly regular, but on the latter they are so large and close together that the interspaces between them do not form regular interstices (except towards the sides), each being surrounded by a ring of more or less even thickness.

EUFAUSTIA, n. g.

Head rather large, strongly convex, not concealed. Eyes large, briefly ovate, widely separated, finely faceted. Rostrum wide, dilated at apex, curved throughout; scrobes shallow, continuous to but very feeble at lower edge of eyes, anterior portion visible from above. Antennæ moderately stout; scape inserted slightly before base of scrobe and slightly nearer apex than base of rostrum, shorter than funicle; two basal joints of funicle elongate; club ovate, rather large, much wider than funicle. *Prothorax* obcordate, apex and sides rounded, base feebly bisinuate; constriction scarcely traceable; ocular lobes very feeble. *Scutellum* small but convex and distinct. *Elytra* subtriangular, base truncate except for the shoulders. *Pectoral canal* wide, terminated between intermediate coxæ. *Mesosternal receptacle* transverse, walls thin and abruptly vertical throughout; open. *Metasternum* large, slightly longer than basal segment of abdomen; episterna rather narrow. *Abdomen* moderately

large, first segment just perceptibly longer than fifth but considerably longer than second, its suture with second moderately distinct at sides only; third and fourth with distinct and moderately deep sutures, their combined length slightly more than that of second and less than that of fifth. *Legs* (especially the anterior) long; coxæ large, the posterior touching elytra; femora stout, subclavate, not grooved, dentate, posterior passing elytra; tibiæ compressed, arched at base, feebly bisinuate beneath, in addition to the terminal hook with an obtuse subapical tooth; tarsi feebly clothed, basal joint considerably longer than second and third combined, third short, wide, and deeply bilobed, fourth long and thin; claws moderate. Elliptic, moderately convex, feebly clothed, winged.

This remarkable and extremely distinct genus is dedicated to the memory of the late Herr Johannes Faust, of Libau, Russia, the well-known specialist on *Curculionidæ*.

In a tabulation the genus should be placed near *Onidistus*, which, indeed, appears to be its nearest ally, although the shape of the rostrum, mesosternal receptacle, prothorax, and elytra are utterly different. The most noticeable features of the only known species are the long anterior legs, acutely dentate femora, long basal joint of tarsi, very wide (especially at apex) rostrum, with apex of scrobes visible and the peculiarly-distributed highly-polished granules.

EUFUSTIA MIRABILIS, n. sp.

Black, subopaque; rostrum and legs brownish-red, antennæ (club excepted) paler. Sparsely clothed with thin white scales, sparser on disc of prothorax and elytra than elsewhere; in addition the sides are clothed with flat, indistinct scales; ciliation of ocular lobes unusually long.

Head densely punctate, flat between eyes; ocular fovea deep but smaller than many of the surrounding punctures. Rostrum shorter than prothorax, sides dilated to base and apex, at the middle allowing scrobes to be seen from above; densely but not coarsely punctate, each side of apex with a shallow impression. Mandibles large and strong but not projecting. Scape the length of five basal joints of funicle; of these the first is almost as long as second and third combined, the second almost as long as third and fourth combined, the third is longer than the fourth, the fifth and sixth are feebly, the seventh strongly transverse; club narrowly joined to funicle. *Prothorax* slightly longer than wide, middle of base with a shining scutellar lobe; with minute shining granules scattered about, except along middle;

densely punctate, the punctures rather small and towards the base and sides concealed. *Elytra* not more than twice the length of prothorax; shoulders produced and shining; near base and scutellum with about fourteen highly-polished granules or small tubercles of irregular size; with series of small and distinct punctures, behind nearly every one of which is a small shining granule, the first row is straight, the second slightly, and the third decidedly curved about the middle; interstices with very small punctures and with small, shining, irregularly and sparsely distributed granules. *Metasternum* slightly concave. *Abdomen* with the first segment feebly concave, raised above, and its suture with second concealed across the middle, except when viewed directly from behind, fifth, and the third and fourth at sides, rather densely punctate. Each of the four posterior *femora* with a small and acute tooth, of the anterior with a large and very acute tooth, all transversely rugulose; apical half of anterior tibiae obsoletely dentate or serrate beneath, basal half of intermediate with a very narrow compressed space above. Length, 7 mm.; rostrum, $1\frac{3}{4}$ mm.; width, $3\frac{1}{8}$ mm.

Hab.—New South Wales: Richmond River (A. M. Lea).

At a glance the surface appears to be almost glabrous. The shining granules and small tubercles at the base of the elytra are usually different on each elytron and are not alike in the three specimens under examination; the largest, however, is always on the third interstice. From certain directions the abdomen appears to be supplied with a feeble plate like in *Amydala* and its allies. The rostrum is not twice as long as its width at the apex.

ONIDISTUS SUBFORNICATUS, n. sp.

Dark blackish-brown, antennæ (club excepted) and tarsi pale-red. Densely clothed with minute muddy-grey scales which entirely conceal the derm; prothorax with stout, brown, curved, setose scales, each arising from a puncture; elytra with similar scales on the interstices, but which are often scarcely traceable when viewed from above.

Head very distinctly quadri-impressed; excavated between eyes. Rostrum comparatively stout; rather coarsely (for the genus) punctate at base and leaving a distinct shining carina behind the antennæ (punctures and carina less noticeable in ♀ than in ♂). Antennæ as in *araneus*, except that they are rather stouter. *Prothorax* with rather strong and rather dense, equally distributed punctures, which, however, are entirely concealed. *Elytra* striate-punctate, punctures very large (almost foveate) on basal third, becoming

smaller and compressed posteriorly, but still distinctly traceable through clothing, with, or without, small, shining, sutural granules. *Mesosternal receptacle* U-shaped, slightly cavernous. *Metasternum* slightly more than half the length of the following segment. *Wings* present. Length, $6\frac{1}{3}$ mm.; rostrum, $1\frac{2}{3}$ mm.; width, 3 mm.; variation in length, $5\frac{1}{2}$ - $6\frac{1}{2}$ mm.

Hab.—Queensland: Cairns (Macleay Museum).

Appears to be an abundant species, judging by the number of specimens in the Macleay Museum. It is abundantly distinct from *nodipennis* and *araneus* by the shape of the mesosternal receptacle and the strong (although concealed) prothoracic punctures; in shape it is intermediate. The clothing is much denser, and of a slightly different shade of colour to that of *araneus*.

This species agrees fairly well with Mr. Pascoe's description of *odiosus*, except that the elytra are not callose towards the base, and that the punctures are not distinct, being in fact closer together than usual. But if the locality given for *odiosus* (King George Sound) is correct (a subject, however, that appears to me to be doubtful judging by the distribution of *Onidistus* and its allies) there should be no liability to confound the two species.

PSEUDONIDISTUS, n. g.

Head partially concealed, forehead trisinuate. Eyes large, ovate, moderately faceted. Rostrum moderately long and rather thin, each side with a shallow groove above the scrobe. Antennæ thin; scape inserted nearer apex than base of rostrum, longer than funicle; two basal joints of funicle elongate; club ovate, moderately large. *Prothorax* transverse, base bisinuate, sides rounded, apex feebly produced, constriction slight, ocular lobes obtuse. *Scutellum* not traceable. *Elytra* cordate. *Pectoral canal* rather shallow and not very wide, wider between coxæ than in front, terminated between intermediate coxæ. *Mesosternal receptacle* transverse, sides produced, hinder margin semicircular; open. *Metasternum* much shorter than the following segment; episterna narrow but distinct throughout. *Abdomen* moderately large, sutures distinct, first segment as long as the two following combined, intercoxal process wide; third and fourth combined slightly longer than second and considerably longer than fifth. *Legs* long; posterior coxæ touching elytra; femora stout, subpedunculate, acutely dentate, not grooved, posterior passing elytra; tibiæ somewhat compressed, thin, bisinuate beneath;

tarsi long and very thin, third joint longer than wide and not much wider than second, bilobed to basal fourth. Convex, squamose, fasciculate, apterous.

Closely allied to *Onidistus*, from which it differs in the forehead being tri- instead of quadri-sinuate, the scutellum absent, and the shape of the mesosternal receptacle; the outline of the latter is much the same as that of the copper-plates that decorate the breasts of many aboriginal kings.

PSEUDONIDISTUS CORDATUS, n. sp.

Black, antennæ, tarsi, and tibial hooks of a rather pale-red. Densely clothed with muddy-brown scales, which are more or less thickly interspersed with stout, suberect, paler (sometimes darker) scales; prothorax with four dark fascicles across middle; clothing of under-surface and legs much the same, but the stout scales more elongate. Head between eyes and basal half of rostrum densely clothed.

Head bald, shining and impunctate except between eyes, forehead trisinate, the median excavation deeper and more distinct, but not as wide as the lateral ones; these narrowly margin the eyes. Rostrum slightly longer than prothorax, moderately curved, feebly decreasing in width from base to middle; basal half evidently coarsely punctate, but punctures concealed; with a distinct, shining, median carina; apical half polished and impunctate. Antennæ inserted two-fifths from apex of rostrum; two basal joints of funicle subequal in length, third to sixth subglobular, seventh transverse. *Prothorax* moderately transverse, convex; with rather dense and large, round punctures; base feebly bisinuate. *Elytra* cordate, considerably wider than and about twice the length of prothorax; shoulders, sides, and apex rounded; with series of large, round, deep, somewhat irregular punctures, very large on basal half of disc, and becoming smaller on the sides and posteriorly; alternate interstices irregularly thickened and feebly raised; four or five granules on each side of suture towards the base. *Metasternum* with an irregular series of rather large punctures on each side, a subcariniform process behind each side of the receptacle. Basal segment of abdomen with a semicircular row of large punctures (the inner one on each side decidedly foveate) margining the coxæ; second depressed below first, its basal half (except at sides) with moderately large, irregular punctures, apical segment with dense and rather large punctures. *Femora* with large curvilinearly triangular teeth, those of the anterior largest. Length, 5 mm. (vix.); rostrum, $1\frac{1}{2}$ mm.; width, $2\frac{1}{2}$ mm.

Hab.—Queensland: Cairns (Macleay Museum), Mulgrave River (Henry Hacker).

The punctures (except on sides of elytra), foveæ, and granules are entirely concealed by the clothing. On abrasion the derm of the prothorax is seen to be opaque, whilst that of the elytra is shining; the punctures of the latter, though smaller posteriorly than elsewhere, are still of considerable size there, fully as large as those of the prothorax.

PALETONIDISTUS, n. g.

Head moderately large; forehead trisinuate; ocular fovea deep. Eyes moderately large, subovate, rather finely faceted. Rostrum moderately long and rather thin, curved, with a shallow groove on each side above the scrobe. Scape not the length of funicle, inserted nearer apex than base of rostrum; two basal joints of funicle elongate; club briefly ovate. *Prothorax* moderately convex, walls almost vertical, base bisinuate, sides and apex moderately rounded. *Scutellum* absent. *Elytra* subovate, much wider than prothorax. *Pectoral canal* deep and rather narrow, terminated between four anterior coxæ. *Mesosternal receptacle* raised, longer than wide, ridged along middle, emargination semicircular; cavernous. *Metasternum* very short; episterna narrow but traceable throughout. *Abdomen* rather large; two basal segments large, suture between them rather feeble but traceable throughout; first as long as second and third combined, intercoxal process wide, third and fourth combined the length of fifth and slightly shorter than second. *Legs* rather long; posterior coxæ not touching elytra; femora subclavate, acutely dentate, not grooved, posterior not extending to apex of body; tibiæ thin and compressed, bisinuate beneath, tarsi long, thin, and polished above, third joint not much wider than second but deeply bilobed, claws thin. Elliptic-ovate, convex, squamose, tuberculate, apterous.

Allied to *Paleticus* and *Onidistus*, from both of which it may be distinguished by the shape of the mesosternal receptacle.

PALETONIDISTUS TRISINUATUS, n. sp.

Black, opaque; antennæ and tarsi red and shining. Densely clothed with muddy scales, interspersed with longer and stouter but almost unicolourous scales, becoming subfasciculate on tubercles; under-surface sparsely clothed. Head and basal half of rostrum with large and moderately-dense scales.

Head moderately convex, basal portion visibly punctate; forehead distinctly but not deeply trisinuate; ocular fovea

rather deep and narrow. Rostrum almost the length of prothorax; basal half coarsely punctate and along middle feebly carinate; apical half shining and finely punctate. Scape noticeably shorter than funicle; of the latter the first joint is slightly longer and thicker than the second, the second to sixth are almost cylindrical, and the seventh is as long as wide. *Prothorax* as long as wide, apex not suddenly narrowed, sides rather feebly rounded, depressed along middle, the depression more distinct on apical third than elsewhere; with dense, round, and deep but not very large punctures, and which are more or less concealed. *Elytra* about twice and one-half the length of prothorax and at base considerably wider, widest just beyond middle; each side strongly lessened on apical third, each feebly separately rounded at apex; shoulders produced; each with about nine, small, rounded tubercles; three sub-basal and six about summit of posterior declivity; a small shining elevation on each side of the scutellar region; with series of large, round, deep, more or less distant punctures, which become small posteriorly, and are more or less concealed. *Under-surface* almost without punctures, except for a row of rather large ones across metasternum and a similar row on basal segment of abdomen. *Legs* rather long; femora each with a large, triangular, acute tooth (equal in all), posterior extending almost to apex of abdomen. Length, 7 mm.; rostrum, $1\frac{2}{3}$ mm. (vix.); width, $3\frac{1}{2}$ mm.

Hab.—New South Wales (A. M. Lea).

There appears to be a feeble inpunctate space along the middle of the prothorax. The clothing on the specimen described appears to be partially abraded, but the species is so distinct that I have not hesitated to describe it.

ECILDAUS, n. g.

Head moderately large, partially concealed; forehead trisinate. Eyes small, ovate, widely separated, coarsely faceted. Rostrum rather short and thick, strongly bent at base; scrobes wide, shallow, and highly polished; a shallow groove on each side above them. Antennæ stout; scape inserted nearer base than apex of rostrum and shorter than funicle; two basal joints of the latter subelongate, the others transverse; club ovate. *Prothorax* moderately or not at all transverse, sides rounded, base almost truncate, disc flattened, constriction shallow, ocular lobes obtuse. *Scutellum* absent. *Elytra* subovate, base lightly trisinate and suddenly (but not by much) wider than prothorax. *Pectoral canal* deep and wide, terminated between hinder part of anterior coxæ. *Meso-sternal receptacle* raised, longer than wide, emargination widely

transverse; cavernous. *Metasternum* less than half the length of the following segment; episterna rather narrow. *Abdomen* with straight sutures; two basal segments rather large; first as long as second and third combined, intercoxal process moderately wide; third and fourth combined slightly longer than second or fifth. *Legs* short; posterior coxæ touching elytra; femora stout, outwardly curved on apical half, grooved, edentate, posterior terminated before apex of abdomen; tibiæ short, curved at base only; tarsi rather short, moderately wide or rather narrow, feebly or not at all clothed above and shining, third joint very little wider than, or about once and one-half the width of second, fourth thin and rather long. Elliptic-ovate, moderately convex, squamose, non-tuberculate, apterous.

One of the few genera in which the tarsi are variable, in *glabricornis* they are almost as in *Methidrysis*, whilst in the others they are feebly (but very decidedly) clothed above, with the third joint distinctly wider than the second. The forehead is trisinate, the median sinus being very wide; the lateral ones rather deeply margin the eyes; the polished base of the head looks as if an iron cap had been drawn over that portion of it, this is especially noticeable in *personatus*. Although four specimens are under examination, the metasternal episterna cannot be distinctly seen in any (on account of the clothing), they appear, however, to be rather narrow. The three species described below are closely allied in general appearance.

Tarsi glabrous on upper surface, head feebly carinate	... ..	glabricornis
Tarsi not entirely glabrous, head not carinate.		
Emargination of forehead encroached upon by punctures	... ..	melancholicus
Emargination of forehead not encroached upon	... ..	personatus

ECILDAUS PERSONATUS, n. sp.

Black, antennæ and tarsi red. Densely clothed with large, soft, sooty-brown scales, obscurely spotted with scales of a lighter shade of brown, more noticeable on shoulders than elsewhere; tarsi distinctly clothed.

Head convex, shining, and lightly punctate, except on anterior two-fifths; forehead trisinate, the median sinus much wider than the lateral ones. Rostrum shorter than prothorax, base wider than apex, sides incurved to middle; basal half with coarse, concealed punctures, apical half shining, but rather strongly punctate. Second joint of funicle just perceptibly longer than first. *Prothorax* feebly transverse; with

dense, round, partially-concealed punctures. *Elytra* about once and one-half the length of prothorax; striate-punctate, punctures rather large but concealed; interstices regular and wider than striæ. Punctures of *under-surface* concealed; basal segments of abdomen slightly concave in middle. *Femora* widely grooved, posterior not extending to apical segment. Length, 4 mm.; rostrum, 1 mm.; width, 2 mm.

Hab.—Queensland: Cape Upstart (A. Simson).

Two specimens under examination, each of which appears to be ♂.

ECILDAUS MELANCHOLICUS, n. sp.

Black, antennæ and tarsi dull-red. Densely clothed with moderately large, soft, sooty-brown scales, very obscurely speckled with lighter brown ones; tarsi distinctly clothed.

Head shining and lightly punctate on basal third; elsewhere coarsely punctate; forehead trisinate, but the sinuations slightly interrupted by punctures. Rostrum shorter than prothorax, base wider than apex, sides incurved to middle; coarsely punctate throughout (except for a median space between antennæ) but punctures concealed on basal half, apical half shining. First joint of funicle slightly longer than second. *Prothorax* moderately transverse; with dense (but not confluent), round, shallow, clearly-cut punctures; with a short and very feeble median carina. *Elytra* as in the preceding species. *Under-surface* (except that the abdomen is flat) and *legs* as in the preceding species. Length, $4\frac{1}{2}$ mm.; rostrum, 1 mm. (vix.); width, 2 mm.

Hab.—New South Wales: Forest Reefs (A. M. Lea).

ECILDAUS GLABRICORNIS, n. sp.

Black, antennæ and tarsi red and shining. Clothing much as in the preceding species, except that the tarsi are glabrous above.

Head glabrous but rather coarsely punctate on basal third, punctures elsewhere concealed; forehead trisinate, the sinuations slightly encroached upon by punctures; with a very feeble median carina. Rostrum slightly shorter than prothorax, base considerably wider than apex, sides incurved to middle; coarsely punctured throughout, punctures on basal third concealed, but leaving a feeble median carina visible; elsewhere shining. First joint of funicle longer than second. *Prothorax* as long as wide, with dense (but not confluent), round, shallow, clearly-cut punctures; with a narrow, wavy, median carina, traceable from near base to near apex. *Elytra* as in the two preceding species. *Abdomen* with dense, round, concealed punctures; basal segments feebly concave in

middle. *Femora* densely punctate; posterior extending to apical segment. Length, $4\frac{3}{4}$ mm.; rostrum, 1 mm. (vix.); width, 2 mm. (vix.).

Hab.—New South Wales: Forest Reefs (A. M. Lea).

In appearance close to the preceding species, but at once distinguished by the prothorax being as long as wide, and by the tarsi. The antennæ, except the apical joints of the club, are glabrous and polished. The median prothoracic carina is sufficiently distinct; in the preceding species it is much shorter and traceable with difficulty. Where the elytral clothing has been removed the interstices are seen to be narrow and waved, although they are evidently regular throughout.

NOTOCALVICEPS, n. g.

Head of moderate size, not concealed; forehead strongly quadrisinuate; bald and highly polished except between eyes. Eyes large, ovate, rather widely separated, finely faceted. Rostrum long, thin, and curved, each side with a rather deep groove above the scrobe. Antennæ rather thin; scape inserted nearer apex than base of rostrum, the length of funicle; two basal joints of funicle elongate; club elongate-ovate, its joints oblique. *Prothorax* transverse, sides rounded, base bisinuate, constriction feeble but continued across summit; ocular lobes obtusely rounded. *Scutellum* transversely oblong, distinct. *Elytra* much wider than prothorax, base lightly trisinuate. *Pectoral canal* deep and narrow, terminated between intermediate coxæ. *Mesosternal receptacle* feebly raised, U-shaped, walls equal throughout; cavernous. *Metasternum* slightly but noticeably shorter than the following segment; episterna distinct throughout. *Abdomen* moderately large, sutures deep; first segment not as long as second and third combined, its suture with second curved, intercoxal process rather narrow; third and fourth rather large, their combined length considerably more than that of second or fifth. *Legs* long and rather thin; posterior coxæ not touching elytra; femora dentate, not grooved, posterior passing elytra or not; tibiæ feebly compressed, almost straight; tarsi thin, first and fourth joints equal in length, third moderately wide and deeply bilobed; claws long and very thin. Subovate, convex, squamose, punctate, nontuberculate, apterous.

Allied, but not very closely so, to *Methidrysis*; indeed, but for the situation of the forehead, I should have imagined it as being widely removed from *Paeticus*. There are a number of species, belonging to allied genera, in which the hinder part of the head is more or less shining, but in the two species

described below the base of the head is highly polished and entirely bald.

Posterior femora passing elytra; prothoracic punctures more or less confluent . . . punctipennis, *n. sp.*
 Posterior femora not extending to apex of abdomen; prothoracic punctures not confluent rarus, *n. sp.*

NOTOCALVICEPS PUNCTIPENNIS, *n. sp.*

Black, subopaque; antennæ, tarsi, and tibial hooks dull-red. Not very densely clothed with stout reddish-brown scales; on the prothorax one in each puncture, on the elytra forming feeble decumbent clusters on the interstices, suture with minute scales, each puncture with a small scale, a distinct patch of pale scales on each side at apex; abdomen with sparse elongate scales; legs rather densely clothed. Head between eyes (elsewhere perfectly bald) and basal half of rostrum sparsely squamose.

Head highly polished (except between eyes) and finely but distinctly punctate; forehead strongly quadrisinuate, the median excavations deeper and narrower than the lateral ones, and separated by a distinct ridge, the lateral excavations margining the eyes; between eyes rather coarsely punctate; the ocular fovea rather deep and large. Rostrum long and thin, feebly decreasing in width from base to apex; basal third subopaque, subseriate punctate and with a very distinct, narrow, shining, median carina; apical two-thirds polished and finely punctate. Scape inserted at about two-fifths from apex of rostrum; two basal joints of funicle subequal, none of the others transverse. *Prothorax* moderately transverse, sides rather strongly rounded, base moderately bisinuate; coarsely foveate-punctate, punctures more or less confluent, the interspaces subtuberculate; along middle of apical half a feeble waved carina. *Elytra* subcordate, about once and one-fourth the width, and not thrice the length of prothorax; seriate-punctate or foveate, punctures large, deep, distant, triangular or conical, and largest along suture and base, becoming smaller at sides and much smaller posteriorly. *Metasternum* and basal segment of abdomen each with a curved row of large punctures. *Legs* densely punctate; femora acutely dentate, posterior passing elytra. Length, 9 mm.; rostrum, $2\frac{3}{4}$ mm.; width, $4\frac{1}{4}$ mm.

Hab.—Queensland: Mossman River (type in Macleay Museum).

The scales on the unique specimen under examination are condensed into small clusters on the elytra, and some of these clusters are paler than the others. The elytral punctures are

very peculiar, they are shining, those of the first row are almost triangular (the basal and deepest end directed towards the base of the elytra), those of the second row are more conical, whilst towards the sides they become ovate, the spaces between the punctures and between the rows are on the same general level.

NOTOCALVICEPS RARUS, n. sp.

Black, subopaque; antennæ, tarsi, and tibial hooks dull-red. Not very densely clothed with moderately stout, sub-erect, brownish scales, on the prothorax confined to the punctures, on the elytra on the interstices as well; elytra in addition with a distinct oblique patch of whitish scales on each side, at about basal third and extending from the third to the seventh interstices; under-surface and tibiæ with long, thin scales; femora rather densely clothed. Head between eyes (elsewhere perfectly bald) and base of rostrum with a few elongate scales.

Head highly polished (except between eyes) and very finely punctate; forehead strongly quadrisinuate; coarsely punctate between eyes, the ocular fovea not traceable. *Rostrum* and antennæ as in the preceding species, except that the median carina of the rostrum is continued on the head almost to its middle. *Prothorax* moderately transverse, sides rather strongly rounded, base moderately trisinuate; with large, round, clearly-defined punctures, somewhat variable in size but nowhere confluent; with a feeble median carina, not traceable to base or apex. *Elytra* oblong-cordate, about once and one-third the width and almost thrice the length of prothorax, shoulders rounded, each feebly separately rounded at apex; seriate-punctate or foveate, punctures large, deep, distant, subconical, becoming smaller and more rounded towards sides, and very small posteriorly. *Metasternum* and basal segment of abdomen each with a curved impression containing large punctures. *Legs* densely punctate; femora rather feebly dentate, posterior scarcely extending to apex of abdomen. Length, 8 mm.; rostrum, $2\frac{1}{4}$ mm.; width, 4 mm.

Hab.—New South Wales (J. Faust).

The white oblique patches of scales on the elytra are very distinct, the general scales are rather longer and thinner than in the preceding. The median sinuations of the forehead are fully as wide and just about as deep as the lateral ones; they are slightly interrupted by punctures. The elytral punctures, though similar in character, are rather more elongate than in the preceding species, whilst those of the prothorax are not at all confluent; the femoral teeth are considerably smaller; the elytra are wider at the base and more decidedly arcuate posteriorly.

TERPOROPUS, n. g.

Head partially concealed, forehead lightly sinuous. Eyes rather large, ovate, rather coarsely faceted. Rostrum rather long and thin, moderately curved, with a shallow groove on each side above scrobe. Antennæ thin; scape inserted at about middle of rostrum, shorter than funicle; all the joints of the latter elongate; club ovate, twice the width of funicle. *Prothorax* subquadrate, constriction slight; ocular lobes obtuse. *Scutellum* absent. *Elytra* rather long and deep, almost parallel-sided. *Pectoral canal* deep and narrow, terminated immediately behind anterior coxæ. *Mesosternal receptacle* raised, longer than wide; sides incurved to base, emargination widely transverse; cavernous. *Metasternum* about half the length of the following segment; episterna narrow and depressed. *Abdomen* rather small, narrow, and nowhere suddenly lessened, sutures deep, straight, and distinct; first segment moderately large, as long as the three following combined, intercoxal process narrow; second very little longer than third; third and fourth combined slightly longer than fifth. *Legs* long and thin; posterior coxæ touching elytra; femora not grooved, acutely dentate, posterior passing elytra; tibiæ thin and lightly compressed, diminishing from base to apex; tarsi long, thin, shining, and very sparsely clothed above, third joint not much wider than second, deeply bilobed, but not to base, fourth long and thin. Elongate-elliptic, strongly convex, squamose, tuberculate, apterous.

The nearest ally of this genus appears to be *Stenoporopterus*, from which it can be readily distinguished by the legs, antennæ, and frontal excavations.

TERPOROPUS TENUICORNIS, n. sp.

Black, antennæ pale-red, the tarsi darker. Moderately-densely clothed with muddy-brown scales, interspersed with longer and suberect scales, that on the prothorax and elytra form feeble fascicles.

Head feebly convex; basal half rather coarsely punctate, subopaque, and scaleless; forehead lightly quadrisinuate; anterior half with moderately-dense concealed punctures; a very feeble elevation on each side of middle. Rostrum slightly longer than prothorax, sides feebly incurved to middle; basal third with strong punctures in feeble rows, separated by feeble ridges, elsewhere polished with moderately small and rather dense punctures. Scape the length of five following joints; first joint of funicle slightly shorter than second and slightly longer than third, third slightly longer than fourth, the others

feebly decreasing in length but none transverse. *Prothorax* as long as wide, sides moderately rounded, base truncate and not much wider than apex; with large but not very dense punctures, and which are more or less concealed except on flanks, feebly depressed along middle; towards each side with several very obtuse elevations. *Elytra* scarcely twice the length of prothorax and very little wider, as deep as wide, sides very feebly rounded except towards apex; seriate-punctate (or foveate), punctures very large and deep, becoming smaller posteriorly, much obscured by clothing (less so on sides); third and fifth interstices each with three obtuse tubercles, the largest on third at summit of posterior declivity. *Undersurface* with large, concealed punctures. *Femora* with distinct but rather thin, triangular, acute teeth, subequal on all; posterior passing elytra for about one-third their length; posterior tibiæ gently arched throughout, the others at base only. Length, 6 mm.; rostrum, 2 mm.; width, $2\frac{3}{4}$ mm.

Hab.—Queensland: Cairns (Macleay Museum).

A narrow species, with more or less concealed but very coarse punctures. The flanks of the elytra commence from the fifth interstice. The funicle is unusually thin.

AUSTRECTOPSIS, n. g.

Head moderately large and partially concealed, forehead sinuous. Eyes moderately large, ovate, widely separated, moderately faceted. Rostrum moderately long and curved, with a shallow groove on each side above scrobe. Antennæ moderately thin; scape inserted nearer apex than base of rostrum, the length of funicle; two basal joints of funicle elongate; club elongate-ovate, its outline continuous with that of funicle, the joints oblique. *Prothorax* transversely suboblong, base bisinuate, ocular lobes slightly obtuse. *Scutellum* distinct. *Elytra* suboblong, base trisinuate, shoulders rounded. *Pectoral canal* deep and rather wide, terminated between intermediate coxæ. *Mesosternal receptacle* not raised, base slightly wider than sides, emargination briefly U-shaped; cavernous. *Metasternum* rather long, but shorter than the following segment; episterna rather wide. *Abdomen* with distinct sutures; two basal segments rather large, first the length of second and third combined, its apex incurved, intercoxal process rather narrow and rounded; third and fourth rather large, their combined length rather more than that of second, second longer than fifth. *Legs* rather long; posterior coxæ not touching elytra; femora moderately stout, not grooved, dentate, posterior passing elytra; tibiæ compressed, rather strongly arched at base; tarsi rather long, thin, and feebly clothed, third joint

moderately wide and deeply bilobed, fourth the length of first. Subelliptic, convex, squamose, nontuberculate.

The affinities of this genus are not very obvious. It is placed in the *Poropterus* group on account of the sinuated forehead, narrow tarsi, sutural granules and rostrum approaching those of *Paleticus* and many allied genera, but some of its characters appear to denote affinity with the *Chæctetorus* group, whilst the long club is not in harmony with either.

Since this description was written I have examined a specimen of the New Zealand genus *Ectopsis* (for a specimen—*E. ferrugalis*—of which I am indebted to Major Broun). At a glance the two species—*ferrugalis* and *oblongus*—appear to be congeneric, but comparing them in detail *Ectopsis* is seen to differ in having smaller eyes, club not at all ovate, mesosternal receptacle raised, the canal terminated before the middle coxæ, the base narrower than the sides, but in particular by the femora being very distinctly grooved and the posterior terminated considerably before apex of abdomen.

AUSTRECTOPSIS OBLONGUS, n. sp.

Of a very dark-brown, rostrum (except at apex) black, antennæ and tarsi pale-red. Very densely clothed (apical two-thirds of rostrum nude) with fawn-coloured scales, paler before, and darker on, posterior declivity; apical segments of abdomen with darker scales except at sides; a distinct stripe of dark scales on flanks of meso- and meta-sternum and continued on flanks of prothorax almost to apex. Prothorax with stout, suberect scales, thickly but evenly scattered about and not forming fascicles; elytra with similar scales but condensed into feeble fascicles on the suture and alternate interstices, each elytral puncture with a scale that is white except posteriorly; elsewhere with stout scales, rather thickly distributed.

Head feebly compressed, forehead 5-sinuate. Rostrum longer than prothorax, sides almost parallel; basal third with coarse concealed punctures; elsewhere polished and lightly punctate. Scape inserted two-fifths from apex; first joint of funicle slightly shorter than second, fourth to sixth slightly the seventh strongly transverse; club the length of six preceding joints combined. *Prothorax* rather flat, strongly transverse, basal three-fourths almost perfectly parallel-sided, base lightly bisinuate, but the scutellar lobe distinct, posterior angles rectangular; surface feebly and irregularly elevated; punctures entirely concealed. *Elytra* fully thrice the length of prothorax and at base once and

one-third the width, parallel-sided to near apex; with series of rather large, round, distant punctures; interstices wider than punctures, the third with three, the fifth with four feeble elongate tubercles; suture thickened from before to about middle of posterior declivity; each side of suture towards base with small, shining granules. Punctures of *under-surface* entirely concealed. *Femora* with triangular teeth, those of the posterior large, of the four anterior considerably smaller, but still large. Length, $6\frac{1}{2}$ mm.; rostrum, 2 mm.; width, 3 mm.

Hab.—Queensland: Cairns (Macleay Museum), Kuranda (G. E. Bryant).

The forehead is very distinctly sinuate, but each emargination is slight. From some directions the third and fourth abdominal segments are seen to be drawn slightly backwards at the sides.

ROPTOPERUS TERRÆ-REGINÆ, n. sp.

♂. Dark-brown, antennæ and tarsi of a rather pale-red. Very densely clothed with loose fawn-coloured scales, forming ten fascicles on prothorax and about twenty on elytra. Head and base of rostrum and the legs very densely clothed, the latter in addition with elongate scales.

Head moderately convex, depressed towards base; punctures concealed. Rostrum shorter than prothorax, noticeably wider at base than at apex; punctures of basal two-thirds coarse and concealed, apical third shining but rather strongly punctate. First joint of funicle stouter and slightly longer than second, the others feebly transverse. *Prothorax* distinctly transverse, punctures nowhere traceable. *Elytra* more than twice the length of prothorax; apparently rather strongly tuberculate beneath fascicles; punctures everywhere concealed. Two basal segments of *abdomen* with rather large and not entirely concealed punctures. Posterior *femora* extending to apical segment of abdomen. Length, 4 mm.; rostrum, 1 mm.; width, 2 mm.

Hab.—Queensland: Cairns (Macleay Museum).

The clothing is much the same as in *tasmaniensis*, except that it is considerably denser (except on the two basal segments of abdomen, where it is sparser) and that the legs (at least in the unique specimen under examination) are not at all ringed. It may be at once distinguished, however, by the decidedly transverse prothorax. The base of the head is as in the following species, but the clothing, especially of the rostrum, is very different.

ROPTOPERUS OCCIDENTALIS, n. sp.

Almost black, antennæ and tarsi of a rather pale-red. Moderately-densely clothed with scales, varying on different individuals, from a muddy-brown to black, and forming ten fascicles on prothorax and about twenty on elytra. Head, base of rostrum, and legs densely squamose, the latter in addition with obscure whitish rings and long setæ.

Head moderately convex; base depressed and with a shining impunctate ring; punctures elsewhere concealed. *Rostrum* shorter than prothorax, shorter and wider in ♂ than in ♀; in ♂ coarsely punctate (the punctures concealed on basal half), shining and moderately coarsely punctate on apical half; in ♀ coarsely punctate on basal third, lightly punctate and shining elsewhere. *Scape* in ♂ inserted just before middle of rostrum, in ♀ at basal third; first joint of funicle the length of second and third combined, third to seventh transverse. *Prothorax* as long as wide, subobcordate, feebly impressed along the middle; with dense, round, concealed punctures; subtuberculate beneath fascicles. *Elytra* about twice the length and once and one-third the width of prothorax; striate-punctate, punctures oblong; striæ rather deep and narrow, interstices wider than striæ, and subtuberculate beneath fascicles; suture with a few small shining granules towards base. *Under-surface* and *legs* as in *tasmaniensis*. Length, $4\frac{1}{4}$ mm.; rostrum, $\frac{4}{5}$ mm.; width, 2 mm.; variation in length $3\frac{3}{4}$ - $4\frac{1}{4}$ mm.

Hab.—Western Australia: Swan River, Rottnest Island (A. M. Lea).

In both sexes the rostrum is almost parallel-sided in front of the antennæ, and increases in width behind them. The granules of the elytral suture are usually concealed. The clothing is more like that of *tasmaniensis* than of the preceding species, but is sparser and apparently very easily abraded; some of the elytral fascicles are crowned with dingy-whitish scales. All the specimens under examination (two of which were taken *in cop.*) were obtained under loose blocks of limestone.

CAIRNSICIS, n. g.

Head moderately large, not concealed. Eyes ovate, widely separated, coarsely faceted. *Rostrum* moderately long and curved, comparatively wide. *Antennæ* moderately thin; scape inserted nearer apex than base of rostrum and the length of funicle; two basal joints of the latter elongate; club ovate, wider than funicle. *Prothorax* transverse, base bisinuate, constriction feeble, ocular lobes obtuse. *Scutellum* absent. *Elytra* elongate-subovate, not much (and not suddenly) wider than prothorax. *Pectoral canal* deep and wide, terminated be-

tween four anterior coxæ. *Mesosternal receptacle* raised, sides incurved to base, emargination semicircular; cavernous. *Metasternum* much shorter than the following segment; episterna very narrow. *Abdomen* moderately large, sutures (except between first and second segments in middle) deep and distinct; first as long as second and third combined; third and fourth combined slightly longer than second or fifth. *Legs* moderately long; femora comparatively thin, feebly grooved, edentate, posterior terminating before apex of abdomen; tibiæ compressed and feebly bisinuate beneath, in addition to the terminal hook with a very feeble subapical tooth; tarsi moderately thin, not shining, third joint moderately wide and deeply bilobed, fourth elongate. Elliptic, convex, squamose, fasciculate, apterous.

Very close to *Roptoperus*, but the scape inserted nearer apex than base of rostrum and the length of funicle, the abdomen convex, the femora thinner and grooved, the tarsi (though rather thin) not shining, and with the third joint rather wide and deeply bilobed.

CAIRNSICIS OPALESCENS, n. sp.

Black, antennæ and claw joints of a rather pale-red. Very densely clothed (except on under-surface) with fawn-coloured scales, denser on prothorax than on elytra; on the former they are large, circular, and condensed into numerous small fascicles, on the latter they are smaller and less rounded and the scales of the (rather numerous) fascicles are shining. Head (except at base) and base of rostrum moderately-densely clothed.

Head feebly convex; base impunctate and shining; near base a circular line formed by dense, small, and confluent punctures, before this line shining, elsewhere with coarse, concealed punctures. Rostrum the length of prothorax, almost parallel-sided throughout; basal third with coarse, concealed punctures, elsewhere polished and lightly punctate. Scape inserted at apical third; two basal joints of funicle equal in length, the others transverse. *Prothorax* slightly transverse; punctures concealed; subtuberculate beneath fascicles, with a very feeble shining median carina. *Elytra* slightly wider than prothorax and about once and one-half as long; shoulders emarginate to receive posterior angles of prothorax; with series of large, round, partially-concealed punctures; subtuberculate beneath fascicles; a small, shining, conical granule on each side of scutellar region. *Under-surface*, except third and fourth abdominal segments, with moderately large and dense but partially-concealed punctures. Posterior *femora* extending almost to

apex of abdomen. Length, 5 mm.; rostrum, $1\frac{1}{2}$ mm.; width, $2\frac{1}{3}$ mm.

Hab.—Queensland: Cairns (Macleay Museum).

The prothoracic scales, and a few along suture of elytra, of the unique specimen under observation, have a greenish-opalescent gloss; but unless closely examined this gloss is not seen, although here and there a scale may show up green; on the sides and apex of the elytra some of the scales have a rosy gloss, but it is rather indistinct.

ZENOPOROPTERUS, n. g.

Head rather large, not concealed. Eyes small, ovate, widely separated, coarsely faceted. Rostrum not very long, wide and feebly curved. Antennæ moderately stout; scape inserted closer to base than apex and shorter than funicle; two basal joints of the latter elongate; club elliptic-ovate and rather large. *Prothorax* subquadrate, base bisinuate, constriction feeble, ocular lobes very obtuse. *Scutellum* absent. *Elytra* subovate, at base very little wider than prothorax, widest at about middle. *Pectoral canal* deep and wide, terminated between four anterior coxæ. *Mesosternal receptacle* flat between coxæ, but raised in front, emargination semicircular; cavernous. *Metasternum* much shorter than the following segment; episterna rather narrow. *Abdomen* large, sutures straight and distinct, first segment as long as second and third combined, intercoxal process wide; third and fourth combined slightly longer than second or fifth, fifth slightly longer than second. *Legs* moderately long; posterior coxæ almost touching elytra; femora stout, edentate, very feebly grooved, posterior terminated before apex of abdomen; tibiæ feebly compressed, bisinuate beneath, in addition to terminal hook with a small subapical tooth; tarsi thin and somewhat shining, third joint moderately wide, fourth long and thin. Elliptic ovate, moderately convex, squamose, tuberculate, apterous.

Very close to *Roptoperus*, but the third and fourth abdominal segments with very narrow (though distinct) sutures.

This does not appear to be a very satisfactory character to separate two genera, but in the species described below the flanks of the elytra are inwardly oblique and highly polished, a character rendering it exceedingly distinct. The head is depressed at the base, and at the extreme base is shining.

ZENOPOROPTERUS MIRUS, n. sp.

Black, rostrum and legs brownish-red, antennæ pale-red. Moderately-densely clothed with muddy-brown or ocherous-

red scales, on prothorax and elytra condensed into feeble fascicles; legs with elongate scales.

Head depressed and shining at base; in middle convex and with dense concealed punctures. Rostrum shorter than prothorax, sides very feebly incurved to middle, wider at base than at apex; wider and shorter in ♂ than in ♀; basal third with coarse concealed punctures, which, however, leave a short distinct median carina (very indistinct in ♀); elsewhere polished and lightly punctate. First joint of funicle longer than second. *Prothorax* feebly convex; basal three-fourths subparallel, base distinctly trisinate, not much wider than apex, walls almost vertical; with dense, not very small, and somewhat irregular punctures; surface nowhere level nor distinctly tuberculate; with a narrow, distinct median carina continuous from base to apex. *Elytra* about once and one-half the length of prothorax and at base very little wider, sides not rounded but considerably increasing in width to middle, thence strongly diminishing to apex; seriate-punctate punctures oblong, neither very large nor close together; third, fifth, and seventh interstices raised in places, but especially at base, the seventh with a somewhat sinuous outline; below the seventh the flanks from base to apical third are inwardly oblique highly polished and with three distinct rows of small, distant punctures. *Abdomen* with dense concealed punctures. Posterior *femora* extending to apical segment. Length, $3\frac{1}{2}$ mm.; rostrum, $\frac{4}{5}$ mm.; width, $1\frac{4}{5}$ mm.

Hab.—New South Wales: Richmond River (A. M. Lea).

In one of the (two) specimens under examination the upper-surface has been considerably abraded, and it is from this one that the sculpture has been described; the punctures of the other specimen are almost concealed except on the glabrous portion of the elytra. The sutures between the metasternum and its episterna are rather indistinct.

GYMNOPTERUS, n. g.

Head large, convex, not concealed. Eyes small, elongate-ovate, widely separated, moderately coarsely faceted. Rostrum short, wide and feebly curved, a shallow groove on each side above scrobe. Antennæ stout; scape inserted in middle of rostrum, shorter than funicle; basal joint of the latter elongate; club large, ovate, much wider than funicle. *Prothorax* convex, transverse, sides rounded, base truncate, constriction lightly impressed, ocular lobes obtuse. *Scutellum* absent. *Elytra* ovate, base truncate, shoulders rounded. *Pectoral canal* wide and deep, terminated between four anterior coxæ. *Mesosternal receptacle* rather suddenly elevated, emar-

gination widely transverse; cavernous. *Metasternum* short; episterna not traceable. *Abdomen* with distinct sutures; two basal segments large, first as long as second and third combined, apex rather strongly incurved, intercoxal process widely truncate; third and fourth narrow, with deep sutures, their combined length equal to that of fifth and slightly shorter than that of second. *Legs* rather long; posterior coxæ touching elytra; femora linear, feebly grooved, edentate, posterior passing elytra; tibiæ compressed and (except at base) straight, tarsi moderately long, third joint wide and deeply bilobed, fourth elongate. Ovate, strongly convex, feebly squamose, non-tuberculate, apterous.

Placed amongst the allies of *Poropterus*, although perhaps not very close to any of them. The small size and shining body of the only known species is suggestive of affinity with *Idotasia*, but the abdomen and femora are utterly different to those of that genus. It is perhaps a connecting-link between the two groups.

GYMNOPOROPTERUS PICTIPES, n. sp.

Black, shining, antennæ and tarsi red. Upper-surface glabrous except for a few indistinct scales contained in punctures; sides of rostrum, under-surface and legs, with white, stout, round scales, usually in feeble clusters.

Head with rather large punctures, base impunctate and slightly iridescent. Rostrum not much longer than head, about twice as long as wide, sides incurved to middle; with large, round punctures. *Prothorax* moderately transverse; with moderately large but irregularly, and not very thickly, distributed punctures. *Elytra* not twice the length of and at base no wider than prothorax, widest at basal third, nowhere parallel-sided; with series of rather small and distant, but round and deep punctures, with series of much smaller punctures intervening; interstices between the punctures not separately convex. Two basal segments of *abdomen* with large, round, sparse punctures; apical segment rather densely punctate. *Femora* densely punctate. Length, 3 mm.; rostrum, $\frac{2}{3}$ mm.; width, $1\frac{1}{2}$ mm.

Hab.—Queensland (Rev. T. Blackburn, No. 4685), Endeavour River (Macleay Museum).

The elytra are absolutely without striæ. The patches of white scales are very distinct on the legs and sides of rostrum.

MICROCRYPTORHYNCHUS ECHINATUS, n. sp.

Brownish-red, antennæ and tarsi paler. Very densely clothed with muddy-grey scales, which entirely conceal the

derm, except the apical half of rostrum (which is smooth and shining). Upper-surface and legs with numerous long, dark, more or less erect, stout scales or setæ: these project forward from the front of the prothorax, on the elytra are confined to the alternate interstices, and condensed into a loose fascicle on the third interstice at summit of posterior declivity; they are as numerous on the femora as on the tibiæ.

Rostrum moderately coarsely punctate in front of antennæ; sculpture concealed behind them. *Prothorax* not much longer than wide, sides rounded near base, slightly constricted near apex; with dense and rather large but entirely concealed punctures. *Elytra* raised above, not twice as long as prothorax and not much wider; from basal fifth to apical third subparallel; with series of large, round and deep, but entirely concealed punctures; alternate interstices feebly raised. Length, $1\frac{1}{2}$ mm.; rostrum, $\frac{1}{3}$ mm.; width, $\frac{2}{3}$ mm.

Hab.—New South Wales: Sydney, Gosford (A. M. Lea).

The size varies to a slight extent, but there is not half a millimetre difference between the largest and smallest specimens under examination. I have been unable to abrade the under-surface, but the punctures there (or at least on the metasternum and two following segments) are evidently of large size. The postmedian fascicles of the elytra are very distinct, although each is seldom composed of more than six or seven of the elongate scales; and will readily distinguish the species from *pygmæus*, than which it is also slightly larger.

MICROCRYPTORHYNCHUS CYLINDRICOLLIS, n. sp.

Reddish-brown, antennæ paler. Densely clothed with muddy-grey scales, which entirely conceal the derm, except the apical half of the rostrum (which is smooth and shining). Upper-surface and legs with stout, suberect, moderately long (but much shorter than in the preceding species) and rather pale scales.

Prothorax about once and one-fourth as long as wide, sides almost perfectly parallel, apex as wide as base. *Elytra* slightly wider than, not twice the length of and slightly raised above prothorax. Length, 2 mm.

Hab.—Western Australia: Mount Barker (A. M. Lea).

The figure⁽¹⁾ of the Japanese *Catabonops monachus* will give a very good idea of the appearance of this minute weevil. The punctures are evidently much the same as in the preceding species, the clothing is rather less dense, the stout

(1) A. S. E. Belg., xviii., 1875, pl. ii., fig. 7.

erect scales are paler, much shorter, and less (though still very) distinct; the most noticeable differences, however, are the shape of the prothorax and non-elevation of the elytra. Only having one specimen under examination it has not been abraded.

Subfamily COSSONIDES.

COSSONUS INCISUS, Pasc.⁽²⁾

Two specimens of this species were sent to me by Dr. Gestro, of the Genoa Museum. One from Celebes (the type locality) and one from Somerset (Queensland); the latter locality was not recorded by Pascoe in dealing with the insects collected by D'Albertis. The species may be readily distinguished by the shape of the prothoracic impression; this is in the form of an elongate triangle, with a carina across the middle, so that it resembles the letter A.

(2) Ann. Mus. Civ. Gen., 1885, p. 317.

SOUTH AUSTRALIAN POLYPLACOPHORA.

By WILLIAM G. TORR, M.A., B.C.L. (Oxon.), LL.D.
(Dublin and Adelaide).

[Read September 12, 1912.]

PLATES V. TO VII.

I have been invited by the President of the Royal Society of South Australia, Dr. J. C. Verco, to write a paper on the Polyplacophora, or multivalve-molluscs, of South Australia.

Since the publication of Mr. W. T. Bednall's paper on "South Australian Polyplacophora" in the Proceedings of the Malacological Society of London, vol. ii., part 4, April, 1897, a great impetus has been given to this interesting study in South Australia, and numbers of collectors have been at work, the following having written papers on the subject:—

W. G. Torr and Edwin Ashby, *Trans. Roy. Soc., S.A.*, 1898; Edwin Ashby, *Trans. Roy. Soc., S.A.*, 1900; M. M. Maughan, *Trans. Roy. Soc., S.A.*, 1900; W. T. Bednall and E. H. Matthews, *Proc. Mal. Soc., London*, vol. vii., part 2, June, 1906; Tom Iredale, *Proc. Mal. Soc., London*, June, 1910, and September, 1910.

To these writers I make my acknowledgments, as well as to the publishers of Tryon's *Man. Conch.*, vols. xiv. and xv.; E. R. Sykes, on Victorian Polyplacophora, *Proc. Mal. Soc., London*, vol. ii., part 2, July, 1896; A. F. Basset Hull, *Australian Naturalist*, April, 1908; W. G. Torr, *Western Australian Polyplacophora*, *Trans. Roy. Soc., S.A.*, vol. xxxv., 1911; Torr and May, *Proc. Royal Society of Tasmania*, 1912; Henry Suter, *New Zealand Polyplacophora*, *Journ. Mal.*, 1905, vol. xii., part 4; C. Hedley and A. F. Basset Hull, *Records Australian Museum*, vol. vii., No. 4, 1909; and Prof. J. Thiele (Berlin), *Die Fauna Südwest-Australiens*, Band iii., Lieferung ii., 1911.

There are other numerous references to Polyplacophora in various papers which I have examined:—

G. F. Angas' list, *Proc. Zool. Soc., London*, January, 1865, consisted of fourteen species; of these four have been omitted as uncertain.

D. J. Adcock's list, published in 1893, contained eighteen species, of which eight have not been identified.

Mr. Bednall, in the *Proc. Mal. Soc., London*, 1897, published thirty-seven species, of which one has been omitted.

Messrs. Maughan, Torr and Ashby, and Bednall and Matthews have brought up the list to fifty-two species, and this paper will raise the number to sixty-one identified species. Some of the names have had to be changed owing to Dr. Thiele and Mr. Tom Iredale's observations of the original specimens of Blainville and others.

My collection of chitons extends over practically the whole of the South Australian coastline from Port MacDonnell to Nuyt Archipelago in the Australian Bight.

The South Australian Polyplacophora include the following families:—*Lepidopleuridæ*, Pilsbry; *Ischnochitonidæ*, Pilsbry; *Mopaliidæ*, Pilsbry; *Acanthochitidæ*, Pilsbry; *Cryptoplacidæ*, Dall; and *Chitonidæ*, Pilsbry.

The order of exposure of South Australian Polyplacophora, *mutatis mutandis*, is *P. albida*, Blainville, on exposed rocks at or near high-water mark, sometimes accompanied by *P. costata*, Blainville, with *P. matthewsi*, Iredale, under rocks in deeper water. *I. crispus* is in abundance almost everywhere a foot or two below high-water mark, sometimes accompanied by *I. thomasi* or *I. vergatus*. The *Acanthochites* are found in sheltered pools on sandy weed-covered rocks. In deeper pools *I. contractus*, *I. cariosus*, *I. ustulatus*, *I. sulcatus*, and other *Ischnochitonidæ* are found, and deeper still *I. smaragdinus*, *I. ptychius*, *Lorica volvox*, *Loricella angasi*, *I. pilsbryi*, and most of the true chitons, *jugosus*, *tricastalis*, *exoptandus*, *calliozona*, and *torrianus*. On the west side of St. Vincent Gulf I have found true chitons on exposed rocks in shallow pools at low water. *I. tateanus*, *C. verconis*, *A. verconis*, and *C. bednalli* are, as a rule, obtained only by dredging.

Fam. LEPIDOPLEURIDÆ, Pilsbry.

1. *Lepidopleurus inquinatus*, Reeve, 1847.

Chiton inquinatus, Reeve, Conch. Icon., sp. 154.

Ischnochiton inquinatus, Reeve: Pilsbry, Man. Conch., ser. i., vol. xiv., p. 90.

Lepidopleurus liratus, H. Adams and Angas, Proc. Zool. Soc., 1864, p. 192; Angas, *loc. cit.*, 1865, p. 187; Pilsbry, Man. Conch., ser. i., vol. xv., p. 101.

L. inquinatus, Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 141; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 86.

Specimens of this diminutive chiton have been found all along the coast of South Australia extending from Port MacDonnell to St. Francis Island, Nuyt Archipelago. The writer has specimens from Corney Point, Wool Bay, Marino,

Noarlunga, Robe, Cape Jaffa, Minlacowie, and St. Francis Island. Large specimens, 20 mm. long and 8 mm. broad, have been dredged in St. Vincent Gulf by Dr. Verco.

2. **Lepidopleurus matthewsianus**, Bednall, 1906.

Lepidopleurus matthewsianus, Bednall, Proc. Mal. Soc., London, vol. vii., part 2, June, 1906.

Specimens have been obtained from Port MacDonnell, Encounter Bay, Normanville, Noarlunga, Marino, Wool Bay, Corney Point, Hardwicke Bay, and St. Francis Island. I have also taken it at Burnie and Devonport, on the north-west coast of Tasmania. The sanguineous appearance of the foot of this animal is peculiar.

Fam. ISCHNOCHITONIDÆ, Pilsbry.

3. **Callochiton platessa**, Gould, 1846.

Callochiton platessa (Gould): Haddon, "Challenger" Report, p. 15; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 141; Proc. Acad. Nat. Sci., Philad., 1894, p. 71; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 86.

Chiton platessa, Gould, Proc. Boston Soc. Nat. Hist., vol. ii., 1846, p. 143; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 49; Gould, U.S. Explor. Exped., p. 320, atlas, figs. 434, 434a.

Lepidopleurus platessa, Gould, Otia (Rectifications), 1862, p. 242.

Chiton crocinus, Reeve, Conch. Icon., pl. xxii., fig. 146, 1847.

Callochiton crocinus, Reeve: Pilsbry, Man. Conch., ser. i., vol. xiv., p. 50; vol. xv., p. 67.

Leptochiton versicolor, A. Adams, Proc. Zool. Soc., 1852, p. 92, May, 1854; Angas, Proc. Zool. Soc., 1867, p. 223.

Lepidopleurus empleurus, Hutton, Trans. N.Z. Inst., vol. iv., p. 178; Man. N.Z. Moll., p. 113, 1880; Pilsbry, Man. Conch., ser. i., vol. xv., p. 67.

Common in New South Wales, but rare in South Australia. Specimens have been obtained from Cape Jaffa, Second Valley, Aldinga, Marino, Corney Point, and valves have been dredged in Spencer Gulf. A very fine specimen, measuring 24 × 13 mm., was found by Mr. F. L. Saunders at Marino.

4. **Callochiton rufus**, Ashby, 1910.

Callochiton rufus, Ashby, Trans. Roy. Soc., S.A., 1900, p. 87; Die Fauna Südwest-Australien, Thiele, Band. iii., Lieferung ii., 1911.

One specimen only of this beautiful chiton was dredged by Dr. Verco in St. Vincent Gulf. It has been found by Dr. Thiele in Shark Bay, Western Australia.

5. **Ischnochiton** (*Stenochiton*) **juloides**, Adams and Angas, 1865.

Stenochiton juloides, Adams and Angas, Proc. Zool. Soc., 1864, p. 193; *op. cit.*, 1865; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 55.

Ischnochiton (*Stenochiton*) *juloides*, Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 142; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 87.

Hab.—Holdfast Bay (Angas), Largs Bay (Adcock), Yorke Peninsula (Matthews).

I have specimens (whole or valves) from St. Francis Island (dredging and shore), Port MacDonnell, Carrowa (West Coast), Hardwicke Bay, Spencer Gulf (dredging), Kangaroo Island, Troubridge Reef, Glenelg, Brighton, Largs Bay, and Fowler Bay. Valves are frequently found in shell sand. Mr. A. R. Riddle informs me that he has found them on *Pinna inermis*, old boots and bottles, and especially near the roots of *Zostera* at an extremely low tide, by dredging or with a grappling-iron. They are rarely found in shallow water.

6. **Ischnochiton** (*Stenochiton*) **pilsbryanus**, Bednall, 1896.

Ischnochiton (*Stenochiton*) *pilsbryanus*, Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 142.

Type specimens found on seaweed, Troubridge Shoal, St. Vincent Gulf.

I have specimens from Tapley Shoal living in *Zostera* (seaweed), dredged specimens from Spencer Gulf and off St. Francis Island, live specimens and numerous valves in from 6 to 20 fathoms of water. Two large specimens were found by Mr. F. L. Saunders on seaweed at Aldinga; they measured 9.5 × 3 mm. A number of very fine variegated specimens of this chiton have been found near the roots of *Zostera* at Wool Bay and other places by Mr. A. R. Riddle. The largest specimen measures 17 × 5 mm.

7. **Ischnochiton** (*Stenochiton*) **pallens**, Ashby, 1900.

Ischnochiton (*Stenochiton*) *pallens*, Ashby, Trans. Roy. Soc., S.A., 1900.

Dredged in St. Vincent Gulf by Dr. Verco. I found one specimen in shell sand at Aldinga, and Mr. Zietz collected a pretty buff specimen from Largs Bay. This species differs from *I. pilsbryanus* in the rapid tapering of the tail valves. As I have not had access to the type specimens of either *pilsbryanus* or *pallens*, it may be that my specimens may have to be reconsidered.

8. **Ischnochiton** (*Heterozona*) **cariosus**, Carpenter, MS. :
Pilsbry, 1873.

Heterozona cariosa, Carpenter, MS. : Pilsbry, Man. Conch., ser. i., vol. xiv., p. 65; vol. xv., p. 82.

Ischnochiton (*Heterozona*) *cariosus*, Pilsbry: Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 143; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 87.

This shell is widely distributed. It is abundant in Spencer and St. Vincent Gulfs, and the writer has collected it on St. Francis Island and all around the coast of Western Australia as far as Fremantle. It is often covered with *Serpularia* and has a *cariosus* appearance, hence its name.

9. **Ischnochiton** **pilsbryi**, Bednall, 1896.

Ischnochiton pilsbryi, Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 143.

Found at Sultana Bay (Bednall) and at Hickey Point, Y.P., and St. Francis Island by the writer. Most of the specimens were found on rocks embedded in the sand. At first sight it might be mistaken for *crispus* or *cariosus*, but markings and girdle scales are very distinct, and all the specimens are "uniform ochraceous-yellow."

10. **Ischnochiton** **ustulatus**, Reeve, 1847.

Chiton ustulatus, Reeve, Conch. Icon., sp. 102; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 96.

Ischnochiton ustulatus, Carpenter, MS. : Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 88.

Lepidopleurus ustulatus, Angas, P.Z.S., 1867, p. 222.

When alive this shell is very brilliant, almost crimson; but it loses its colour in formalin, methylated spirits, or when dry, and retains its singed appearance from which it derives its name. The writer has traced it all around the coast from Cape Jaffa to St. Francis Island. He also found it in Western Australia. An abnormal specimen was found by Mr. F. L. Saunders at Second Valley. It is much broader than the usual types; it measures 37×18 mm.

This chiton easily changes its *habitat*. Scores of specimens seen by Mr. Matthews on Yorke Peninsula one week were not able to be discovered the week following.

11. **Ischnochiton** **crispus**, Reeve, 1847.

Chiton crispus, Reeve, Conch. Icon., sp. 120; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 89.

Ischnochiton haddoni, Pilsbry, Man. Conch., ser. i., vol. xiv., p. 88.

Ischnochiton crispus, Reeve: Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 145; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 87.

Chiton longicymba, Blainville: Sowerby, Conch. Illus., fig. 67; Reeve, Conch. Icon., pl. xxiv., fig. 163 (*non* Blainville).

Ischnochiton longicymba, Blainville: Hutton, "Challenger" Report, p. 17 (*non* Blainville).

This very variable shell is found abundantly on the coasts of New South Wales, Victoria, Tasmania, and South Australia. The writer has specimens from almost every part of the South Australian coast from Port MacDonnell to St. Francis Island in the Australian Bight. It is not found in Western Australia. I collected a *five-valved* specimen at Ulverstone, Tasmania.

No chiton varies so much in colouration as *I. crispus*. I have pale emerald-green, black with a white stripe on the dorsal area, and white with a black stripe, brown and yellow. The commonest kind is a pale-yellow ochre colour. A very beautiful species has been called var. *decoratus*. It has a milky-white ground with regular green or brown longitudinal markings continued throughout the valves. The description given by Pilsbry, *loc. cit.*, of *I. haddoni* agrees with the shell better than any other I have seen.

12. *Ischnochiton fruticosus*, Gould, 1846.

Chiton fruticosus, Gould, Proc. Boston Soc. Nat. Hist., ii., p. 142; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 91; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 145.

Ischnochiton fruticosus, Gould: Pilsbry, Proc. Acad. Nat. Soc., Philad., 1894, p. 72.

This common New South Wales species is very rare in South Australian waters. The writer has examined hundreds of specimens similar to *fruticosus* and has only found one in South Australia with the striations on the girdle scales. One specimen only was found by Mr. E. H. Matthews on Southern Yorke Peninsula.

13. *Ischnochiton contractus*, Reeve, 1847.

Chiton contractus, Reeve, Conch. Icon., sp. 78; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 93.

Ischnochiton contractus, Reeve: Pilsbry, Man. Conch., ser. i., vol. xiv., p. 93; Nautilus, vol. viii., p. 129; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 87; Bednall, Proc., Mal. Soc., London, vol. ii., part 4, April, 1897, p. 145.

Chiton pallidus, Reeve, Conch. Icon., sp. 92, March, 1847; Pilsbry, Man. Conch., ser. ix., vol. xiv., p. 89.

Other synonyms are given by Pilsbry which are evidently intended, according to Bednall and Iredale, for *I. decussatus*.

Many scores of specimens are in my cabinet from both Gulf St. Vincent and Spencer Gulf, also from Hopetoun and Albany, in Western Australia. I have dried specimens 46 mm. long and 22 mm. broad.

14. **Ischnochiton variegatus**, Adams and Angas, 1864.

Lepidopleurus variegatus, H. Adams and Angas, Proc. Zool. Soc., 1864, p. 192; Pilsbry, Man. Conch., ser. i., vol. xv., p. 102.

Ischnochiton variegatus, Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 146.

This species is found in Spencer and St. Vincent gulfs. It will probably be classed under *I. crispus*, which it closely resembles. Pilsbry has no plates of this variety in his Manual, and the description given would equally apply to *I. crispus*. Bednall says it attains a length of two-thirds of an inch. I have a number of specimens from the coasts of Yorke Peninsula, Port MacDonnell, Cape Jaffa, and Marino. It is probably a cream-coloured variety of *crispus*.

15. **Ischnochiton sulcatus**, Quoy and Gaimard, 1834.

Chiton sulcatus, Quoy and Gaimard, Voy. "Astrolabe," Zool., 1834, vol. iii., p. 385.

C. decussatus, Reeve, Conch. Icon., 1847, pl. xviii., fig. 107.

C. castus, Reeve, *op. cit.*, pl. xxii., fig. 145.

Lepidopleurus speciosus, Adams and Angas, P.Z.S., 1864, p. 192; 1865, p. 187.

Gymnoplax urvillei, Rochebrune, Bull. Soc. Philom., Paris, 1880-1, p. 121.

Ischnochiton sulcatus, Quoy and Gaimard: Pilsbry, Man. Conch., 1893, ser. i., vol. xiv., p. 138; Iredale, Proc. Mal. Soc., London, vol. ix., part 2, June, 1910, p. 91.

I. decussatus, Reeve: Bednall, Proc. Mal. Soc., London, 1897, vol. ii., p. 146.

The most beautiful of the South Australian *Ischnochitons* may be easily distinguished by being broader in proportion to its length than the majority of *Ischnochitons*. It favours the edges of rocks, and is often found on top of stones and on the razor-like bivalve, *Pinna inermis*. The colours are very various—blue-green, rich brown, cream with brown dorsal areas, ochreous-yellow with splashes of purple, straw-colour with dark-brown splashes, brown and green with cream-white dorsal areas, and uniformly cream. I have dried specimens, 46 mm. long and 27 mm. broad. Juveniles may be easily distinguished by the regular pustules in the anterior and posterior valves and the lateral areas of the median valves. They are common in Spencer and St. Vincent gulfs, Streaky Bay, and West Coast.

16. *Ischnochiton ptychius*, Pilsbry.

Ischnochiton ptychius, Pilsbry: *Nautilus*, vol. viii., p. 53; Bednall, *Proc. Mal. Soc.*, London, vol. ii., part 4, April, 1897, p. 147.

It is often placed among *crispus*, but as a rule is found in much deeper water. I have specimens from Robe, Cape Jaffa, Second Valley, Normanville, Marino, and Southern Yorke Peninsula. Good specimens were taken by Mr. A. R. Riddle on broken *Haliotidæ* at Marion Reef, and also in a deep rock pool at Black Hill, near Port Moorowie. The strong serrations at the sutural margins of the valves, mentioned by Mr. Bednall, are plainly distinguishable in some specimens. In others they are missing, although taken at the same spot and similar in every other particular.

"It is a small oval pink-tinged shell, with wrinkled striations on the dorsal areas, and somewhat coarse concentric sulcations on the lateral areas, which are strongly serrated at the sutural margin."

It is somewhat difficult for a beginner to separate it from *I. crispus*.

I. ptychius has finely striated girdle scales.

17. *Ischnochiton tateanus*, Bednall, 1896.

Ischnochiton tateanus, Bednall, *Proc. Mal. Soc.*, London, vol. ii., part 4, April, 1897, p. 147; Sykes, *Proc. Mal. Soc.*, London, vol. ii., part 2, July, 1896, p. 87.

It may be distinguished by its form. In well-preserved specimens the width is nearly two-thirds of the length, and the fine serrations on the posterior edge of the lateral areas of the median valve are distinctly seen in most of the specimens.

I. tateanus is rarely found near the shore. It is a deep-water species. Dr. Verco has dredged several in St. Vincent and Spencer gulfs, and valves have been taken at St. Francis Island in 19 fathoms of water. A beautiful specimen was taken by Mr. F. L. Saunders at Marino. It is a pale-chocolate on the dorsal area, throughout the valves, and the lateral and pleural areas of the second, sixth, and seventh valves are creamy-white.

17A. *Ischnochiton wilsoni*, Sykes, 1896.

Ischnochiton wilsoni, Sykes, *Proc. Mal. Soc.*, vol. ii., part 2, July, 1896, p. 89.

One specimen dredged by Dr. Verco and one procured by Mr. Matthews are probably all that have been found in South Australian waters. The writer has one specimen 9 × 5 mm. from Marino (?). In this sample the granulations

in the pleural area are, under a $\frac{1}{4}$ -in. lens, arrow-shaped, with the point towards the dorsal area.

Mr. Matthews has kindly sent me a very fine specimen, 24×14 mm., which I take to be *I. wilsoni*. It has not the rosy-pink of the *type*, but the splashes of grey-brown and white correspond with Syke's drawing. The girdle scales are black, amber, and pearly-white, the rich brown splashes predominating. As far as I can decide with an undissected specimen, the anterior valve has nine and the posterior valve eight slits. The striations of the girdle scales are very distinct, four to seven striæ on each scale.

18. *Ischnochiton smaragdinus*, Angas, 1867.

Lophyrus smaragdinus, Angas, Proc. Zool. Soc., 1867, p. 115; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 137, vol. xv., pl. xv., fig. 27.

Lepidopleurus smaragdinus, Carpenter, MS.

Ischnochiton smaragdinus, Bednall, Proc. Mal. Soc., London, vol. ii., part 4., April, 1897, p. 148.

I. (Haploplax) smaragdinus, Angas: Pilsbry, Proc. Acad. Nat. Sci., Philad., 1894, p. 72.

The drawing of this shell in Pilsbry's Manual is very unsatisfactory. Both Angas' and Carpenter's descriptions seem incomplete. This shell may be distinguished by the blue-green spots on an olive-brown ground and the very pearly scales on the girdle. It is generally found in deeper water than the majority of *Ischnochitons*. It has the blue spots of *I. lentiginosus* of New South Wales, but it is not so carinated nor are the lateral areas so distinct as in *I. lentiginosus*. I have specimens from Yankalilla, Normanville, Second Valley, Aldinga, Marino, and elsewhere. It is exceedingly common on the north-west coast of Tasmania, where it is found in shallower water than in South Australia. I have considerable difficulty in separating this species from *Ischnochiton resplendens*, Bednall and Matthews, Proc. Mal. Soc., London, vol. ii., part 2, June, 1906.

19. *Ischnochiton virgatus*, Reeve, 1848.

Chiton virgatus, Reeve, Conch. Icon., sp. 192; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 78.

Trachydermon virgatus, Reeve: Carpenter, MS., p. 22.

Ischnochiton virgatus, Reeve: Carpenter, MS., p. 106; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 148.

This very pretty diminutive chiton, so ably described by Mr. Bednall, *loc. cit.*, has been found all along the South Australian coast from Port MacDonnell to St. Francis Island. I have specimens from nineteen different places, in-

cluding Kangaroo Island. I also collected it at Albany, Western Australia. Some very dark specimens were collected at Streaky Bay, which seemed a variety if not a new species. Under a $\frac{1}{4}$ -in. lens the girdle scales of *virgatus* are minutely striated. Carpenter says they are *not* striated. I have counted from ten to twelve striæ.

20. **Ischnochiton thomasi**, Bednall, 1896.

Ischnochiton thomasi, Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897.

The polished mottled appearance and pearly girdle scales are the distinctive features of this chiton. There are several varieties. I have specimens from Robe, Cape Jaffa, Second Valley, Normanville, Aldinga, Marino, Minlacowie, Southern Yorke Peninsula, and Venus Bay. It thus traverses the greater part of the South Australian coastline.

21. **Ischnochiton resplendens**, Bednall and Matthews, 1906.

Ischnochiton resplendens, Bednall and Matthews, Proc. Mal. Soc., London, vol. vii., part 2, June, 1906.

After careful examination of a number of specimens of this very beautiful *Ischnochiton* I can only place it as a colour variety of *I. smaragdinus*. While the appearance of some specimens varies considerably from *smaragdinus*, by putting a series, they run into one another, till it becomes practically impossible to separate them. I have *smaragdinus* 20 mm. long by 12 mm. broad, which is nearly as large as the type specimen of *resplendens*, and the colour-marking is hardly sufficient to make a new species. I have specimens from Port MacDonnell, Beachport, Cape Jaffa, Robe, Encounter Bay, Marino, Kangaroo Island, Minlacowie, Hardwicke Bay, and Corney Point. My specimens from Robe resemble Mr. Bednall's description. Specimens have also been taken in Wool Bay by Mr. A. R. Riddle.

22. **Ischnochiton gryei**, Filhol, 1880.

Tonicia gryei, Filhol, Comptes Rendus, 1880, vol. xci., p. 1095.

Lepidopleurus melanterus, Rochebrune, Bull. Soc. Philom., Paris, 1883-4, p. 37.

Ischnochiton parkeri, Suter, Proc. Mal. Soc., 1897, vol. ii., p. 186.

I. fulvus, Suter, Journ. Malac., 1905, vol. xii., part 4, p. 66; Iredale, Trans. N.Z. Inst., 1907 (1908), vol. xi., p. 373.

I. gryei, Filhol: Iredale, Proc. Mal. Soc., London, vol. ix., part 2, June, 1910, p. 91.

Going through Mr. Suter's specimens in Auckland, New Zealand, the author remarked that he had seen specimens

of a red *crispus* in South Australia similar to what Suter called *I. fulvus*. On his return to South Australia some specimens were sent to Mr. Suter, some of which were identified with *I. fulvus*, others with *I. crispus*. Some very beautiful specimens of *I. gryei* were taken off Port MacDonnell jetty and Cape Jaffa. The identification will require future consideration. Mr. Sanders found several diminutive specimens at Second Valley, which I take to be *gryei*.

23. **Ischnochiton** (*Ischnoradsia*) **novæ-hollandiæ**,
Gray and Reeve, 1847.

Chiton novæ-hollandiæ, Gray, M.S.: Reeve, Conch. Icon., sp. 142; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 145.

C. (Lophyrus) australis, Tenison-Woods, Proc. Roy. Soc., Tasmania, 1877, p. 46 (*non* Pilsbry).

Ischnochiton (Ischnoradsia) novæ-hollandiæ, Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 150.

Strongly resembles *I. australis*, Sowerby, but the lateral areas of *australis* are much more deeply sulcated than those of *novæ-hollandiæ*, and the pleural areas of the former are longitudinally ribbed, although I have found some *novæ-hollandiæ* slightly ribbed in the pleural areas.

Some specimens in my collection labelled Marino, South Australia, are certainly *I. australis*, but further investigation must be made before placing it on the list of South Australian chitons.

I. novæ-hollandiæ favours the open ocean beaches. I have specimens from Encounter Bay, Tungakalilla (large numbers), Kangaroo Island, and Second Valley; also from Penguin, Stanley, Wynyside, and Devonport in Tasmania, and Beaumaris, New South Wales. One dried specimen is 65 mm. long and 35 mm. broad. *I. australis* is common in New South Wales. The Tasmanian species show longitudinal riblets in the pleural areas.

Subfam. CALLISTOPLACINÆ, Pilsbry.

24. **Callistochiton antiquus**, Reeve, 1847 (?).

Chiton antiquus, Reeve, Conch. Icon., t. 25, f. 169 (poor).

Lepidopleurus antiquus, Angas, P.Z.S., 1867, p. 223.

Callistochiton antiquus, Carpenter, MS., and Haddon, "Challenger" Polyplac., p. 20.

Chiton (Callistochiton) antiquus, E. A. Smith, Zool. Coll. "Alert," p. 79.

Callistochiton sarcophagus, Carpenter, MS.

C. antiquus, Reeve: Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 150; Pilsbry, Proc. Acad. Nat. Sci., Philad., 1894, p. 73.

Very often found covered with calcareous matter. I have traced it from Port MacDonnell through both gulfs to St. Francis Island. Some beautiful dark-brown specimens came from Mr. Anderson, of Second Valley, and rich red (iron-stained?) ones from Cape Jaffa. Its sculpture and rounded appearance easily differentiates it from other chitons. It is our only South Australian *Callistochiton*. "This genus differs from *Ischnochiton* in the peculiar insertion-teeth, which are curved into ribs as if festooned, in the relation of the slits to the external ribs, and in the tail valve, which is often peculiarly humped" (Pilsbry, *Man. Conch.*, ser. i., vol. xiv., p. 260). This chiton has a very wide range, and has been collected by the author in places as far apart as Queensland and Western Australia.

Fam. CHITONIDIÆ, Pilsbry.

25. **Onithochiton ashbyi**, Bednall and Matthews, 1906.

Onithochiton ashbyi, Bednall and Matthews, *Proc. Mal. Soc.*, London, vol. vii., part 2, June, 1906, p. 92.

As far as I am aware, only one specimen of this chiton has been discovered. It was found by Mr. Ashby at Aldinga, and to him I am indebted for the specimen. It is our only *Onithochiton*, and the eyes are of a pearly appearance set in its cream-coloured valves. The smooth warty appearance will easily distinguish this shell.

26. **Chiton tricostalis**, Pilsbry, 1894.

Chiton (canaliculatus, var. ?) tricostalis, Pilsbry: *Nautilus*, vol. viii., 1894, p. 54.

C. tricostalis, Pilsbry: Bednall, *Proc. Mal. Soc.*, London, vol. ii., part 4, April, 1897.

This "handsomely sculptured shell" assumes an endless variety of colour. I have specimens, red and green, pink and black, green and white, creamy, cream with black spots, yellow with black spots, etc. The second valve is often of a distinctive colour. It is *bicostalis* in small specimens, the middle rib in the lateral areas begins when about half-grown. Some valves have four ribs. I have specimens from Capes Jaffa and Jervis, several places in Gulf St. Vincent, Southern Yorke Peninsula, and St. Francis Island. I have collected it in Western Australia, and have specimens from New South Wales.

27. **Chiton calliozona**, Pilsbry, 1894.

Chiton (Æreus, var.) calliozona, Pilsbry: *Nautilus*, vol. viii., 1894, p. 55.

C. calliozona, Pilsbry: Bednall, *Proc. Mal. Soc.*, London, vol. ii., part 4, April, 1897, p. 151.

This is the largest of our true chitons. I have one dried specimen measuring 55 × 25 mm. Colour markings very variable; pinks, greens, and bronze-browns are wondrously intermingled, while the minute pearls of the girdle are like rubies, emeralds, etc. It is found on smooth stones in clean sandy pools among seaweed. I have samples from Second Valley, Normanville, Marino, Wool Bay, Hardwicke Bay, and St. Francis Island. Fine specimens were taken at Marion Reef from the shell of living *Pinna inermis* and from broken bottles by Mr. A. R. Riddle. It is very like *Chiton arcus*, Reeve, from New Zealand, but there are marked differences.

28. *Chiton jugosus*, Gould, 1846.

Chiton jugosus, Gould, Proc. Boston Soc. Nat. Hist., ii., 1846, p. 142; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 178; Gould, Expl. Exped., xii., Moll. and Sh., p. 317, atlas, t. 28, f. 430, 1852; Smith, Zool. Coll. "Alert," p. 78, 1884; Haddon, "Challenger" Polyplac., p. 22, 1886; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 151.

C. concentricus, Reeve, Conch. Icon., 1847, sp. 95.

Lophyrus jugosus, Gould, Otia, p. 3, 212, 1862; Angas, P.Z.S., London, 1867, p. 222.

L. concentricus, P.Z.S., 1867, p. 221.

Hedley and Hull's comparison of *C. jugosus*, *C. torri* (*torrianus*), and *C. coxi*, in Records Australian Museum, vol. vii., No. 4, 1909, p. 262, is very valuable. The New South Wales specimens are not, as a rule, as brightly coloured as those from South Australia. Some from Watson Bay, New South Wales, are pink and brown, others a creamy-white in the six median valves, and the whole shell is broader than those from South Australia. The South Australian specimens are uniform in colour, the pale-blue green markings in the sulcations of the pleural areas are very distinct. It is found in fairly deep water, and loves the ocean rocks. I have specimens from Port MacDonnell, Beachport, Robe, Middleton, Cape Jaffa, Cape Jervis, Second Valley, Normanville, Aldinga, Marino, Venus Bay, and St. Francis Island. It has also been found at Kangaroo Island and Corney Point. Specimens from the last place measure 47 × 25 mm. Strange to say, I have no specimens from Spencer Gulf.

29. *Chiton torrianus*, Hedley and Hull, 1909.

Chiton coxi, Pilsbry; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 151.

C. torri, Hedley and Hull, Records of the Australian Museum, Sydney, vol. vii., No. 4, 1909, p. 262.

C. hullianus, Iredale, Proc. Mal. Soc., London, vol. ix., part 2, June, 1910, p. 103.

C. torrianus, Hedley and Hull, Mal. Soc. Journ., March, 1911, vol. ix., part 4.

Specimens of this very beautiful chiton were misnamed *C. coxi* for some years till the comparison of *C. jugosus*, *C. torrianus*, and *C. coxi*, by Hedley and Hull, *loc. cit.* The concentric lines on all valves differentiate it from *C. coxi*, and the sulcations of the pleural areas make it impossible to put it with *C. jugosus*. It is rarely found in the gulfs. I have collected it from Cape Jervis, Kangaroo Island, and Corney Point. Large numbers were found at the latter place by Mr. Walter Klem. Mr. Bednall reports it from Sultana Bay. I have South Australian specimens measuring 42×25 mm. and Western Australian 52×29 mm. I have collected it all around the coast of Western Australia from Esperance to Fremantle.

30. *Chiton limans*, Sykes, 1896.

Chiton muricatus, A. Adams, Proc. Zool. Soc., 1852 [May, 1854], p. 91, pl. xiii., fig. 6; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 175, pl. xxxvii., figs. 12, 13; *non* Telesius, Mem. Acad. Sci., St. Petersburg., ser. v., vol. ix., 1824, p. 483.

Lophyrus muricatus, Angas, Proc. Zool. Soc., 1865, p. 186, *loc. cit.*, 1867, p. 222.

Chiton limans and *C. carnosus*, Carpenter, MS.: Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 93.

The pointed girdle scales differentiate this rare South Australian chiton from all others of the family in South Australian waters. I have only one specimen from Dr. Verco, labelled Hardwicke Bay, Spencer Gulf. Its colour is a pale-ochreous yellow with light- and dark-brown on the first, second, fourth, fifth, and anterior valve. The markings and girdle scales correspond with specimens of *C. muricatus* from New South Wales.

31. *Chiton exoptandus*, Bednall, 1896.

Chiton exoptandus, Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 152.

This "much desired" chiton is easily distinguished from others by the uniformity of its pinkish colour-marking so well described by Mr. Bednall, *loc. cit.* It runs through all the gradations of a pinkish-yellow to a burnt sienna. One specimen in my possession has a uniform rich reddish brown strip the full length of the dorsal areas of each valve. I have specimens from Second Valley and valves from Normanville. It is frequently found at Marino, Troubridge, and Edithburgh, and is very plentiful at low tides in Wool Bay. I collected one small specimen in the crevice of a rock at Min-

lacowie and a valve at Corney Point. It has been dredged by Dr. Verco, and seems to confine itself to Spencer and St. Vincent gulfs. My specimens are not the largest found, although I have them 45×25 mm.

32. *Chiton bednalli*, Pilsbry, 1895.

Chiton bednalli, Pilsbry: *Nautilus*, ix., 1895, p. 90; Bednall, *Proc. Mal. Soc.*, London, vol. ii., part 4, April, 1897; Sykes, *Proc. Mal. Soc.*, London, vol. ii., part 2, July, 1896.

This, the most beautiful of all South Australian *Chitonidæ*, may be only a colour variety of *exoptandus*, but the uniformity of its green colouring differs so much from the pinkish tinges of *exoptandus* that it may well be classified and named after the *doyen* of *Polyplacophora* writers in South Australia. I have a specimen from Sultana Bay, a valve from St. Francis Island, a valve dredged from 25 fathoms in Thorny Passage, and several specimens dredged by Dr. Verco in Gulf St. Vincent. Size, 40×20 mm. One specimen was found by Mr. Kimber at Aldinga (South Australia), and Mr. Sykes reports it from Port Philip.

33. *Chiton verconis*, Torr and Ashby, 1898.

Chiton verconis, Torr and Ashby, *Trans. Roy. Soc.*, S.A., 1898, p. 215.

This chiton strongly resembles the drawings of *Chiton huttoni*, Suter, *Trans. N.Z. Inst.*, vol. xxxviii., 1905, p. 321, pl. xviii., figs. 1-6; but the slope of the tail valve is much steeper in *C. verconis*, and the pointed girdle scales are decidedly different. These scales are very similar to *C. limans*, but in the latter there are no striations. *C. verconis* has been dredged by Dr. Verco in Yankalilla Bay, 9 fathoms; Rapid Head, 9 to 11 fathoms; and in Spencer Gulf. All my specimens have been dredged. Mr. W. D. Reed has dredged it in Spencer Gulf, and it has been taken at Aldinga by Mr. Kimber. I have a very fine specimen labelled Port Fairy (Victoria), from the late Mr. Adcock's collection.

34. *Chiton oruktus*, Maughan, 1900.

Chiton oruktus, Maughan, *Trans. Roy. Soc.*, S.A., 1900, p. 89.

This shell has been found only on the south-east coast of South Australia. One specimen comes from Cape Jaffa and several have been taken at Port MacDonnell. It ought to be in Victorian waters. Mr. Maughan's description is very helpful, but the plates are very indistinct.

35. **Chiton aureo-maculata**, Bednall and Matthews, 1906.

Chiton aureo-maculata, Bednall and Matthews, Proc. Mal. Soc., London, vol. vii., part 2, June, 1906, p. 91.

The type specimen was reported from Marion Reef, Troubridge Island. Mr. Gatliffe sent me one from Victoria, which at the time I was unable to identify. The Rev. S. J. Martin took a fine specimen at Minlacowie. I have three specimens—one about the size of the type specimen, dredged by Dr Verco in Backstairs Passage (?), one from Corney Point, and the other from Port MacDonnell. It is probably a deep-water shell. I have been unable to detect the "golden spots" on any of my specimens, but one was identified by Mr. Matthews. It is similar to *C. verconis* and *C. limans*, but the girdle scales differentiate it from either. Mr. Martin's specimen is very handsome, a bright reddish-brown colour all over, mottled with dark splashes. It measures 19 × 11 mm.

36. **Lorica volvox**, Reeve, 1847.

Chiton volvox, Reeve, Conch. Icon., sp. 31; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 237.

C. cimolius, Reeve, Conch. Icon., sp. 14.

Lorica cimolia, H. and A. Adams, Ann. Mag. N.H. (2), ix., p. 355; Angas, P.Z.S., 1867, p. 224; 1871, p. 97.

Aulacochiton volvox, Shuttl., Bun. Mittheil, 1853, p. 68.

Chiton rudis, (?) Hutton, Trans. N.Z., Inst., iv., 1872, p. 179; Man. N.Z. Moll., 1880, p. 113.

Lorica volvox, Reeve: Haddon, "Challenger" Polyplac., p. 31; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 153; Suter, Proc. Mal. Soc., London, vol. vii., part 5, June, 1907, p. 297.

I have specimens from Cape Jaffa, Normanville, Second Valley, Marino, Wool Bay, Hardwicke Bay, Corney Point, and some very handsome specimens, with dark-brown dorsal areas, measuring 76 × 45 mm., from St. Francis Island. It has been dredged by Dr. Verco in Gulf St. Vincent, and Mr. A. R. Riddle reports it from Black Hill, near Port Moorowie. In one or two samples I have noticed spiny tufts similar to the *Acanthochitidæ*. I cannot detect any sign of tufts in full-grown specimens. *L. volvox* is often encrusted with limy matter.

37. **Loricella angasi**, Adams and Angas, 1864.

Lorica angasi, H. Adams and Angas, Proc. Zool. Soc., 1864, p. 193; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 238.

Loricella angasi, Adams and Angas: Pilsbry, Proc. Acad. Nat. Sci., Philad., 1894, p. 87; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 153.

Found in deep water, sometimes washed up on the beach after storms. It is reported from Sultana Bay (Matthews),

Rapid Bay (Angas), Holdfast Bay (Bednall), and New South Wales (Cox, Brazier). I have specimens dredged by Dr. Verco in Backstairs Passage, and either good specimens or valves from Cape Jervis, Normanville, Aldinga, and Brighton. The splashes of pink colouring are very vivid when preserved in spirits. The peculiarly large and broad anterior valve easily differentiates this species from *L. volvox*. It flattens itself so closely to the rocks and is so covered with foreign growth that I have had the greatest difficulty in detecting one on a rock which I had been examining for some minutes.

Fam. MOPALIIDÆ, Pilsbry.

38 *Plaxiphora albida*, Blainville, 1825.

Chiton albidus, Blainville, Dict. Sci. Nat., 1825, vol. xxxvi., p. 547; Pilsbry, Man. Conch., 1893, vol. xv., p. 105.

C. glaucus, Quoy and Gaimard, Voy. "Astrolabe," Zool., 1834, vol. iii., p. 376.

(?) *C. petholatus*, Sowerby, Mag. Nat. Hist., new series, iv., p. 289, May, 1840; Conch. Illustr., f. 64, 65, and var. *porphyrius*, f. 59.

Chatopleura conspersa, Adams and Angas, P.Z.S., 1864, p. 193; P.Z.S., 1865, p. 187.

Plaxiphora albida, Blainville: Thiele, Zool. Chun, 1909, Heft lvi., p. 24, pl. iii., figs. 22, 23.

P. tasmanica, Blainville: Thiele, *loc. cit.*, p. 25, pl. iii., figs. 24-26.

P. bednalli, Blainville: Thiele, *loc. cit.*, p. 25, pl. iii., figs. 27-30.

P. petholata, Sowerby: Pilsbry, Man. Conch., vol. xiv., p. 323; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 154.

P. albida, Blainville: Iredale, Proc. Nat. Soc., London, vol. ix., part 2, June, 1910, p. 98.

South Australian chiton-hunters will always be grateful to Mr. Iredale for his elaborate paper on the *Plaxiphoras*, and to Dr. Thiele for his "Revision des Systems der Chitononen." But we part with the old name of *petholata* with regret. Sowerby's description of *petholata*, *loc. cit.*, is a complete account of our *albida*, while Blainville's description of *albida* in Pilsbry, *loc. cit.*, is very poor, and might be that of any of our *Plaxiphora*. Is not there a danger in making the posterior valve the basis of decision? I have several hundred specimens of *Plaxiphora* before me from all parts of Australia, most of them collected by myself, and the tail valves differ so much in the same species according to size and growth that I agree with Iredale that Dr. Thiele, "through lack of specimens, has laid too much stress upon the value of the shape of the valves." The three South Australian *Plaxi-*

phora are easily separated. The zigzag markings of *albida* (? *petholata*), the smooth reticulated markings of *costata* (? *glauca*), and the strongly raised nodules of the lateral area in *matthewsi* (? *conspersa*) make the separation easy except in worn specimens.

Mr. Gatcliffe, of Victoria, has taken considerable pains in identifying the *Plaxiphora*, and agrees with Dr. Thiele in identifying our *P. glauca* with *P. albida*, Blainville.

P. albida is often found at and above high-water mark, and generally adheres to one spot without moving about like other chitons. At Robe I have seen hundreds alive, blistering in the sun. I have collected it all around the coast of South Australia, from Port MacDonnell to Streaky Bay, as well as Queensland, Victoria, and Tasmania. Going out from Streaky Bay 40 miles to St. Francis Island, *P. costata* takes the place of *albida*, and that would seem to continue right on to Western Australia, for I obtained *costata* at Albany, Bunbury, Rottneest Island, and saw nothing of *albida*.

I don't know if pearls are often found in chitons, but I extracted a blue egg-shaped pearly substance from the interior edge of a *Plaxiphora albida*.

39. *Plaxiphora matthewsi*, Iredale, 1910.

Plaxiphora conspersa, non Adams and Angas: Bednall, Proc. Mal. Soc., London, 1897, vol. ii., p. 154.

P. matthewsi, Iredale, Proc. Mal. Soc., London, vol. ix., part ii., June, 1910, p. 99.

This is the rarest of South Australian *Plaxiphora*. It is found in deeper water than either *albida* or *costata*. Its great breadth in proportion to its length easily distinguishes it from either of these. I have specimens from Marino, Troubridge, Second Valley, and St. Francis Island. I have also collected it on the north-west coast of Tasmania. Iredale's description, *loc. cit.*, is very good, but the absence of plates is a hindrance to identification.

The description of *Chatopleura conspersa*, Adams and Angas, P.Z.S., 1864, p. 193; Angas, P.Z.S., 1865, p. 187, agrees so well with *matthewsi* that I place it under a new nomenclature with considerable diffidence.

A very pretty half-grown specimen was taken by Mr. F. L. Saunders at Port Noarlunga. The nodules on the lateral areas are like tear-drops.

40. *Plaxiphora costata*, Blainville.

Chiton costatus, Blainville, Dict. Sc. Nat., xxxvi., p. 548; Pilsbry, Man. Conch., vol. xv., p. 105.

C. glaucus, Quoy and Gaimard, Voy. "Astrolabe," Zool., iii., p. 376.

P. glauca, Quoy and Gaimard: Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 154; Pilsbry, Man. Conch., ser. i., vol. xiv., p. 325; Suter, Journ. Mal., 1905, vol. xii., part 4, p. 66.

Plaxiphora costata, Blainville: Iredale, Proc. Mal. Soc., London, vol. ix., part 2, June, 1910, p. 97; Thiele, Zool. Chun., 1909, Heft lvi., p. 24.

Mr. Gatcliffe, of Victoria, identifies this shell with *P. bednalli*, Thiele.

I have specimens from Port MacDonnell, Robe, Middleton, Bluff, Encounter Bay, Second Valley, Noarlunga, Wool Bay, Troubridge, Hardwicke Bay, Spencer Gulf, and St. Francis Island. Only an occasional specimen is found on the South-East coast. Numbers were found at Port Noarlunga by Mr. F. L. Saunders. It is more common in Spencer Gulf, and is abundant on St. Francis Island. I have also collected it in Tasmania and in several places in Western Australia. Blainville's description of this shell, in Pilsbry's Manual, *loc. cit.*, is very unsatisfactory. Quoy and Gaimard's description of *P. glauca* does not correspond with my specimens in every particular. I can find no marginal striæ in the anterior portions of the valves. The whole of the shell in unworn specimens is covered with minute microscopic granulations or reticulations. Some specimens have beautiful parallel longitudinal lines of green and black on the median valves. It has seven or eight riblets on the anterior valves.

Fam. ACANTHOCHITIDÆ, Pilsbry.

41. *Acanthochites asbestoides*, Smith, 1884.

Chiton (Acanthochiton) asbestoides, Carpenter, MS.: Smith, Zool. Coll. "Alert," p. 83, pl. vi., fig. 6; Pilsbry, Man. Conch., ser. i., vol. xv., p. 17.

Acanthochites asbestoides, Carpenter: Pilsbry, Proc. Acad. Nat. Sci., Philad., 1894, p. 79; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 155.

Pilsbry's description of the Fam. *Acanthochitidæ* is very helpful. The South Australian species are constantly being increased, and a splendid opportunity awaits a student who will make this field a special study. The *Acanthos.* differ from nearly all other chitons by having tufts at the sutures, by the large fleshy girdle, and there being little or no distinction between the lateral and pleural areas.

The golden or silvery tufts of *asbestoides*, lying neatly along the suture between the valves, easily distinguishes it from other *Acanthos.*

I have found it in numbers in a sheltered cave at high-water mark on Kangaroo Island. I have specimens from

Beachport, Aldinga, Ardrossan, Stansbury, Point Soutar, Minlacowie, Streaky Bay, and all along the West Coast to St. Francis Island, Albany (Western Australia), and San Remo (Victoria). Dr. Verco has dredged it in Gulf St. Vincent.

Tom Iredale, in Proc. Mal. Soc., London. vol. ix., part 3, September, 1900, p. 155, quotes Dr. Thiele ("Revision des Systems der Chitonen," i., p. 48), "that *lueurii*, Blainville, must replace the familiar *asbestoides*, Smith."

42. *Acanthochites bednalli*, Pilsbry, 1894.

Acanthochites bednalli, Pilsbry, Proc. Acad. Nat. Sci., Philad., 1894, p. 81; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896.

After going through a great number of specimens of this species and *A. granostriatus*, I am unable to separate them. A series shows the striations in the dorsal area to vary from almost smooth to deep microscopic sulci. I have only one specimen of *A. coxi* from New South Wales. If it had been found in South Australia, I should certainly put it in with *A. bednalli*.

It occurs all around the coast of South Australia. Specimens in my collection are from the South-East (Port MacDonnell, Middleton), Gulf St. Vincent (Second Valley, Normanville, Aldinga, Marino, Sultana Bay (Troubridge), Spencer Gulf (Corney Point, Minlacowie), West Coast as far as St. Francis Island. A number of very large specimens, measuring 30 × 14 mm., were found at Kangaroo Island. I have similar ones from Port MacDonnell, Troubridge, and the West Coast.

43. *Acanthochites granostriatus*, Pilsbry, 1894.

Acanthochites granostriatus, Pilsbry: Nautilus, vol. vii., 1894, p. 119; Proc. Acad. Nat. Sci., Philad., 1894, p. 81, pl. ii., figs. 1-6, pl. iv., fig. 37; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897.

Similar to *A. bednalli*. Found all along the coast from Port MacDonnell to St. Francis Island.

44. *Acanthochites speciosus*, H. Adams, 1861.

Cryptoplax (Notoplax) speciosus, H. Adams, Proc. Zool. Soc., 1861, p. 385.

Acanthochites speciosus, H. Adams: Pilsbry, Man. Conch., ser. i., vol. xv., p. 32, pl. i., figs. 23-26; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 156; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 91.

A. (Notoplax) speciosus, H. Adams: Pilsbry, Proc. Acad. Nat. Sci., Philad., 1894, p. 83, pl. iv., figs. 31-33.

This very hairy chiton, with a girdle, when alive, four or five times wider than the tegmentum, is rare. I have specimens from Aldinga, Marino, Stansbury, and St. Francis Island. Dr. Verco dredged some very large specimens in Gulf St. Vincent. I have one specimen from Stansbury with three very distinct horny riblets on the anterior valve. This may be a monstrosity or a new variety of *speciosus*. I found one specimen at Albany, Western Australia, in which the riblets in the interior valve are distinct but nodulose. Mr. Maughan found a fine specimen washed ashore at Aldinga.

45. *Acanthochites (Notoplax) matthewsi*, Bednall and Pilsbry, 1894.

Acanthochites matthewsi, Bednall and Pilsbry: Nautilus, vol. vii., 1894, p. 120; (*Notoplax*?) Pilsbry, Proc. Acad. Nat. Sci., Philad., 1894, p. 83, pl. iv., figs. 27-30; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 156; Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 91.

This is the most beautiful and elaborately sculptured of all South Australian *Acanthochitidæ*. It somewhat resembles *A. glyptus*, Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 92. I have specimens from Robe, Cape Jaffa, Normanville, Marino, and valves (?) from St. Francis Island. I have seen them collected by Rev. S. J. Martin at Wool Bay. Mr. F. L. Saunders has taken it at Port Victor. A number of specimens were taken from the stomach of a whiting caught near Edithburgh. Robe specimens in spirits measure 30×15 mm. The girdle is very fleshy and wider than the valves themselves. They are of a very delicate milky colour, crossed with splashes of green. Pilsbry evidently had only a dried specimen. The specimens from Cape Jaffa and Normanville are of a ruddy tint—stained, I think, by their proximity to some ferruginous matter on lighthouse or jetty. One remarkable feature in nearly every specimen collected has been the presence of a light-green marking at the beak of the dorsal area on the fifth valve. This helps to distinguish this shell in nearly every instance.

46. *Acanthochites (Loboplax) variabilis*, Adams and Angas, 1864.

Hanleya variabilis, Adams and Angas, Proc. Zool. Soc., 1864, p. 194; Pilsbry, Man. Conch., ser. i., vol. xv., p. 101.

Acanthochites (Notoplax?) variabilis, Pilsbry, Proc. Acad. Nat. Sci., Philad., 1894, p. 84.

A. (Loboplax) variabilis, Adams and Angas: Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 156; Hedley and Hull, Records Australian Museum, vol. xii., No. 4, 1909, p. 266.

This is the most widely distributed of all South Australian *Acanthochitons*. I have found it all around the coast from Port MacDonnell to St. Francis Island. It is found on the South-East coast, St. Vincent and Spencer gulfs, and on the West Coast as well as on Kangaroo Island. I have specimens from twenty-three different places. The pinnatifid appearance of the dorsal area and the very tiny spicules at the sutures, sometimes only horny protuberances, easily differentiate this species from other *Acanthos*. It assumes every variety of shade and colour from a creamy-white to almost black, greens generally predominating. Lighter-coloured varieties are plentiful on Kangaroo Island and the west coast of Yorke Peninsula.

In young specimens the girdle of the *Acanthos* is very small, but when full-grown it has a large fleshy girdle, often twice as wide as the tegmentum. If not kept in spirits this girdle shrinks up considerably.

47. *Acanthochites crocodilus*, Torr and Ashby, 1898.

Acanthochites crocodilus, Torr and Ashby, Trans. Roy. Soc., S.A., 1898, p. 216, pl. vi., fig. 2.

Two specimens were found at a very low tide at Marino, one valve was taken by Mr. Klem at Corney Point, and Mr. Hedley, Records Aus. Mus., vol. vii., No. 2, 1908, Hedley and May, reports having taken it off the coast of Tasmania. May and Torr, Proc. Roy. Soc., Tasmania, 1912, pp. 35, 36, say this is not *crocodilus*.

The remarkably foliated appearance of the dorsal area and the shagreened pustules on the latero-pleural area make it easy to distinguish this rare species.

48. *Acanthochites cornutus*, Torr and Ashby, 1898.

Acanthochites cornutus, Torr and Ashby, Trans. Roy. Soc., S.A., 1898, p. 217, pl. vi., fig. 3.

This is evidently a deep-water species. It was dredged by Dr. Verco in 14 fathoms off Ardrossan. Mr. A. R. Riddle took one at Wool Bay. Specimens have been taken at Marino, Normanville, and St. Francis Island.

Its pinnatifid dorsal area, decided carination, and regular rows of pustules are its distinguishing features. Mr. Hedley found eyes on the dorsal area of *A. cornutus*. He used $\frac{1}{4}$ -in. lens.

49. *Acanthochites* (*Notoplax*) *wilsoni*, Sykes, 1896.

Acanthochites (*Notoplax*) *wilsoni*, Sykes, Proc. Mal. Soc., London, vol. ii., part 2, July, 1896, p. 92, pl. vi., figs. 2, 2a.

A. verconis, Torr and Ashby, Trans. Roy. Soc., S.A., 1898, p. 217, pl. vi., figs. 4a-f.

I have to thank Mr. Hedley for drawing my attention to the similarity between *A. wilsoni* and *A. verconis*. I have gone through a number of specimens. There is a great difference between the small and large specimens in colour-markings, the smaller being pearly-white mottled with rose-pink and seemingly more carinated, while the larger specimens are reddish to a deep maroon tint.

Taken in dredgings in St. Vincent and Spencer gulfs by Dr. Verco, by Mr. Ashby at Aldinga, Mr. Kerrison at Cape Jaffa, by Mr. Basset Hull on Long Reef (New South Wales), and by the writer at Robe, Marino, Kingscote, and Minlacowie.

Sykes' description is ably assisted by Mr. Hedley's drawings in Torr and Ashby's paper, *loc. cit.*

50. *Acanthochites maughani*, Torr and Ashby, 1898.

Acanthochites maughani, Torr and Ashby, Trans. Roy. Soc., S.A., 1898, p. 218, pl. vii., figs. 5a-f; Hedley and Hull, Records Australian Museum, vol. vii., No. 4, 1909, p. 265.

This species has been found only at Port Victor (Maughan), Bottle and Glass Reef, and Freshwater Bay, New South Wales (Hedley and Hull). I have a number of New South Wales specimens in spirits.

Acanthochites lachrymosus, May and Torr, just being published (1912) by the Royal Society of Tasmania, is somewhat similar to *A. maughani*. The shell is much larger, 26×10 mm., but on comparing a co-type with the type of *maughani*, though there is a striking resemblance in detail, there are decided differences.

51. *Acanthochites exilis*, Torr and Ashby, 1898.

Acanthochites exilis, Torr and Ashby, Trans. Roy. Soc., S.A., 1898, p. 218, pl. vii., figs. 6a-f.

Three specimens of this very diminutive chiton were dredged by Dr. Verco in 15 fathoms in Spencer Gulf. It is the smallest of all our South Australian *Polyplacophora*, and may be easily distinguished by the bright-red dorsal area of the third valve. One very handsome specimen, measuring 3×2 mm., was dredged by Dr. Verco in 15 fathoms off Wallarog.

52. **Acanthochites tatei**, Torr and Ashby, 1898.

Acanthochites tatei, Torr and Ashby, Trans. Roy. Soc., S.A., 1898, p. 219, pl. vii., figs. 7a-f.

One specimen only of this beautiful little *Acantho* was found at Middleton, Encounter Bay, by the writer. Mr. Gabriel reported finding one at Torquay, Victoria.

53. **Acanthochites costatus**, Adams and Angas, 1864.

Acanthochites costatus, Adams and Angas, P.Z.S., 1864, p. 194; Angas, *loc. cit.*, 1867, p. 224.

Macandrellus costatus, Dall, Proc. U.S. Nat. Mus., i., p. 81, f. 40 (dentition).

Chiton (Macandrellus) costatus, E. A. Smith, Zool. Coll. "Alert," p. 83, t. 6, fig. F.

Acanthochites costatus, Adams and Angas: Pilsbry, Man. Conch., ser. i., vol. xv., p. 40, pl. iii., fig. 74.

I have seen two specimens of this chiton. It was taken by Mr. Klem at Corney Point and named by Mr. Bednall. One other very similar I have from St. Francis Island. This shell agrees with the description in Pilsbry, *loc. cit.*, with the exception of the colour, which is of a pinkish hue, and the posterior valve has not the "six more or less distinct radiating ridges," as described by Smith from Coppinger's collection. Mr. Klem's specimen has a hairy girdle. The St. Francis Island specimen is fleshy.

Fam. CRYPTOPLACIDÆ, Dall.

54. **Cryptoplax striatus**, Lamarck, 1819.

Chitonellus striatus, Lamarck, An. S. Vert., vi., p. 317, 1819; Desh. in Lam., vii., pp. 481, 136; Sowerby, Genera of Shells, t. 139, f. 4; Conch. Illustr., f. 62; Blainville, Dict. Sc. Nat., xxxvi., p. 555, 1825; Reeve, Conch. Syst., ii., t. 135, f. 1; Conch. Icon., f. 4.

C. gunnii, Reeve, Conch. Icon., f. 5, 1847.

C. rostratus, Reeve, *loc. cit.*, f. 6.

C. oculatus, Reeve, *loc. cit.*, f. 7a,b (not of Quoy and Gaimard).

Cryptoplax striata—gunnii—rostrata, H. and A. Adams, Gen. Rec. Moll., i., p. 484; Angas, P.Z.S., 1867, pp. 224, 225.

Chiton (Chitonellus) striatus, Smith, Zool. Coll. "Alert," p. 84.

Cryptoplax striatus, Haddon, "Challenger" Report, xv., p. 39, t. 1, f. 9; t. 3, f. 9a-9m.

C. striatus, Lamarck, var. *gunnii*, Reeve; Bednall, Proc. Mal. Soc., London, vol. ii., part 4, April, 1897, p. 157; Torr, Trans. Roy. Soc., S.A., 1911, p. 100.

After examination of a large number of specimens from many parts of Australia, I have satisfied myself that the

Chitonellus striatus of Lamarck describes our South Australian species admirably. Most of the specimens are covered with soft velvet seal-like hair, which hardens into bristles when dried. I have a few hairless specimens, but this may be accounted for by local attrition or disease. The breadth of the valves varies so much in *striatus* that there seems no room for var. *gunnii*.

C. striatus is found all around the coast of Australia and Tasmania. I have collected it in about twenty places on the South Australian coast from Port MacDonnell to Nuyt Archipelago. The valves in some specimens are of a rich deep salmon-pink, while others are a dark-brown. The girdle is of a nut-brown when alive, going darker as it dries. It delights in the recesses of bunches of *Serpularia*, and I have taken macerated specimens from the stomach of a schnapper. I have seen living specimens nearly a foot long. I have dried ones 90 × 10 mm.

55. **Callochiton mayi**, Torr, 1912. Pl. v., figs. 1a-f.

C. mayi, Torr, Proc., Roy. Soc. Tasmania, 1912, p. 1.

General Appearance.—Shell oblong, very much elevated, strongly carinated, side slopes straight. *Colour*.—Creamy-white variegated with splashes of reddish-brown; the anterior and posterior valves are nearly always red, and this colour extends to the girdle.

Anterior Valve.—Red, smooth to the unaided eye, but microscopically regularly granulated and dotted all over with minute black dots which look like eyes, 14 to 16 pectinated teeth.

Median Valve.—*Lateral area* distinctly raised, smooth or with slight growth-lines. A broad shallow transverse sulcus in the centre of the area containing numbers of eye-dots somewhat regularly arranged. On one lateral area on one side of a valve 61 of these eye-dots were counted.

Pleural area deeply longitudinally sulcated with eight to twelve grooves, extending from the margin to the dorsal area, but growing shorter towards that area.

Dorsal area triangular, with microscopical irregular striations running into the pleural area.

The median valves have two distinct slits.

Posterior Valve.—Divided into two distinct areas by a raised riblet, the posterior part being similar in colour and granulations to the anterior valve, and the upper part creamy-white with splashes of red, microscopically granulated, numerous eye-dots, mucro median. The division between the two parts of this valve is very distinct. The pleural area has the same longitudinal sulci as that of the median valve.

Interior of Shell.—Porcelaneous, with raised riblets on posterior part of valve, sinus shallow and wavy, sutural laminæ very short.

Girdle.—Covered with irregular appressed spinelets, coarser towards the outer margin. In curled specimens these spines are erect, creamy-white with red spashes.

Measurement.—10 × 5 mm.

Hab.—Dredged by Dr. Verco in Spencer Gulf. One specimen was found by the writer on the north-west coast of Tasmania, and another from the same locality is in the possession of Mr. Basset Hull.

Remarks.—I have had considerable difficulty in determining the *genus* of this shell. It has pectinated teeth and eyes like *Tonicia*, but the girdle is not leathery, nor are the valves so polished. It may be a *Chatopleura*. The description is repeated, as the dredged South Australian specimens differ from the account given by Dr. Torr in the Proc. Roy. Soc., Tasmania. No eye-dots can be seen in the Tasmanian specimen.

56. *Lepidopleurus pelagicus*, *sp nov.* Pl. v., figs 2a-f.

General Appearance.—Ovate, decidedly arched and strongly carinated. Side slopes straight. The shell gradually tapers towards the tail valve. The valves overlap the girdle. *Colour.*—Uniform, pale sulphur-yellow; the girdle has a slightly deeper shade, almost brown when dried.

Anterior Valve.—Broader than the median valves. It has three or four concentric grooves or growth markings parallel to the girdle, crossed by a number of minute striations converging towards the apex. The interior is pearly-white. No dentition nor sutural laminæ. The posterior edge of the valve is serrated.

Median Valve.—The lateral area is gradually elevated above the central area. The whole of the valve is covered with minute tubercles in longitudinal rows in the dorsal and pleural areas. Under the microscope, these appear like strings of beads. The rows are transverse in the lateral areas. The sutural plates are diminutive and semi-transparent, the sinus very broad. The posterior edge of the valve is serrated. Interior pearly and semi-transparent, the striations of the tegmentum distinctly shows through.

Posterior Valve.—Mucro median elevated, with concave slope to girdle. Pustulose liræ converge to the mucro. Sutural plates delicately diminutive.

Girdle.—Leathery and spiny to the unaided eye. Under $1\frac{1}{2}$ -in. lens it is covered with minute specules.

Measurement.—Dried, 8 × 4 mm.

Hab.—Dredged by Dr. Verco from 130 fathoms off Cape Jaffa. Several valves were dredged from 300 fathoms off the south-east coast of South Australia.

Remarks.—In detail this shell strongly resembles *Lepidopleurus inquinatus*, but the whole shell is much more carinated and the lateral areas differ in the massing of the pustules.

57. *Ischnochiton bednalli*, *sp. nov.* Pl. v., figs. 3a-f.

General Appearance.—Elliptical, valves wide, rounded, slightly carinated, side slopes curved, cream colour uniform in valves and girdle. The posterior margins of the valves project considerably and give a verandah-like appearance. The valves are exceedingly delicate.

Anterior Valve.—Two or three ill-developed grooves or growth-lines parallel to the girdle crossed by about twenty microscopically pustulose liræ converging towards the apex. About twenty slits with regularly scalloped pectination between.

Median Valve.—Dorsal area uniform in width composed of five or six rows of pustules either worn or compressed. Pleural areas divided into five irregular diagonal rows of pustules by reticulated sulci, which gives the appearance of open network. Lateral areas distinctly raised and crossed transversely with four rows of pustulose liræ converging towards the dorsal area. Four of these pustules project from the posterior margin. Interior pearly-white. Valves project considerably. Sutural laminae small and delicate. Sinus very wide. Diminutive slit rays under $\frac{1}{4}$ -in. lens.

Posterior Valve.—Mucro ante-median almost covered by the seventh valve. Concave between the mucro and the girdles. The mucro is covered with pustules, and the rest of the valve has two or three concentric rings of pustulose liræ parallel to the girdle. The pustules grow smaller towards the mucro. About twenty-six slit rays.

Girdle.—Covered with microscopically striated scales.

Hab.—Two specimens only from St. Francis Island, Nuyt Archipelago, Australian Bight.

Measurement.—Dried specimen, 6 × 3 mm.

Remarks.—I have named this chiton after Mr. Bednall, the doyen of Polyplacophora work in Australia. It is an exquisite chiton, and somewhat resembles *Ischnochiton pilsbryi* and *Lepidopleurus inquinatus*.

58. *Acanthochites rufus*, *sp. nov.* Pl. vi., figs. 4*a-f*.

General Appearance.—Elliptical, roundedly arched, much more so than *A. variabilis*, valves beaked, colour uniformly terra-cotta.

Anterior Valve.—Five very indistinct riblets, which are really waves in the pustules. The pustules are in regular lines, appearing continuous with those on the second valve.

Median Valve.—Covered with pustules arranged in longitudinal liræ. There is little difference between the dorsal, lateral, and pleural areas. There are about twelve rows of these pustules on the latero-pleural area divided by sulci, and about fourteen rows on what may be termed the dorsal area. The microscopic pustules in these are much smaller than those in the latero-pleural areas. There is a gradual elevation towards the posterior end of each valve, and the pustules in this lateral region are more irregular.

Posterior Valve.—Mucro very indistinct, post median. A deep sulcus parallel to the girdle separates it from the outer edge of the shell. Rows of pustules converge towards the mucro and appear continuous with the rows on the median valves. Nine rows on the latero-pleural areas and twelve on the dorsal areas. The mucro is almost at right angles to the girdle, and the rows of pustules are concentric below the mucro.

Girdle.—Leathery, very narrow in dried specimen, covered with spinelets. Five corneous spots on the girdle surrounding the anterior valve and one at each suture, very indistinct in some.

Measurement.—10 × 5 mm.

Hab.—One specimen only from Kangaroo Island.

Remarks.—The detailed description of this shell approaches *A. variabilis*, but the absence of the distinction between the dorsal and the latero-pleural areas and the marked difference in the appearance and shape of the shells when placed side by side make it necessary to place it in a new species.

The name *rufus* is given on account of its rich terra-cotta colour.

59. *Acanthochites kimberi*, *sp. nov.* Pl. vi., figs. 5*a-f*.

General Appearance.—Long, narrow, tapering towards the ends. Valves rounded, beaked. *Colour*.—Either cream with splashes of dark- and light-green or, in some specimens, the green predominating over the cream with splashes of pink on some valves.

Anterior Valve.—Three sharply-defined riblets. Covered with rounded or oblong pustules larger at the margin and decreasing in size towards the apex. Interior pearly. Insertion plates deep, three slits.

Median Valve.—Dorsal area, wedge-shaped, foliated, covered with microscopic triangular pustules. Alternate black and white spots separate the dorsal from the pleural areas. Latero-pleural area, covered with irregular rounded and elliptical tubercles, small near the dorsal area, growing much larger as they approach the girdle and the posterior edge. Sinus broad, insertion plates deep, one slit on each side.

Posterior Valve.—Diminutive, mucro median, a distinct dorsal area similar to the median valves with irregular pustules below the mucro. Five microscopic riblets run from the mucro to the eaves. The dorsal area is concave. Articulation, bluish-green, rounded, excavated, deep insertion plates, two slits.

Girdle.—Leathery, covered with spinelets. Five erect silvery tufts stand out prominently around the anterior valve and one tuft at each suture. The hollows in which these tufts are placed is surrounded by a prominent ridge.

Hab.—Aldinga (by Mr. Kimber, after whom the shell is named), Kangaroo Island.

Measurement.—Dried specimen, 10×4 mm.

Remarks.—I have four specimens, varying somewhat in appearance, but similar in detail.

60. *Ischnochiton levis*, *sp. nov.* Pl. vi., figs. 6a-f.

General Appearance.—Smooth, rounded, decidedly carinate, pale-cream colour with spots of yellow, very broad in proportion to length, valves narrow.

Anterior Valve.—Smooth, except for a series of concentric growth-lines, microscopically granulated.

Median Valve.—Regular growth-lines appear over the dorsal, lateral, and pleural areas. The lateral areas are slightly raised, the growth-lines making four very large fine longitudinal riblets. The pleural area is minutely reticulated.

Posterior Valve.—Mucro ante-central. Two distinct areas, dorsal and pleural, consisting of microscopic regular granulations. The rest of the valve is smooth, almost flat, with two or three concentric lines. Eight or nine irregular slits.

Girdle.—Covered with rounded scales, microscopically striated.

Measurement.— 12×6 mm.

Hab.—Edithburgh (Mr. Matthews).

Remarks.—This belongs to the smooth variety of *Ischnochitonidae*. It resembles *I. wilsoni*, but its surface is not so granular. My one specimen is damaged. The name *levis* is given on account of its smoothness.

61. ***Acanthochites rubrostratus***, *sp. nov.*

Pl. vii, figs. 7*a-f*.

General Appearance.—Shell elliptical, broad, girdle wider than the valve. Tegmentum cream-coloured, dorsal areas bright-green tipped with rosy-pink, which gives it its name.

Anterior Valve.—Three to five distinct pustulose riblets with probably five slits. My dissected specimen was damaged. In one co-type the pustulated riblet becomes one elongated pustule. The tegmentum is covered with flattened pustules.

Median Valve.—The lateral area is separated from the pleural area by a rib covered with pustules. The lateral and pleural areas are covered with nine rows of rounded appressed pustules, somewhat regular, converging towards the apex. The dorsal area is narrow, corneous, showing growth-lines, no striæ, somewhat foliated, one slit.

Posterior Valve.—Mucro posterior with rows of pustules between it and the girdle, to which it is at right angles. A dorsal area is seen which is almost smooth with irregular pustules on the sides. The interior is pearly, deeply hollowed, five slits, insertion plates large.

Girdle.—Leathery covered with minute spinelets, having long silky tufts at the sutures and five tufts around the anterior valve. In a spirit specimen the girdle is as wide as the valves.

Measurement.—Dried specimen, 11 × 6 mm.

Hab.—Two specimens from St. Francis Island and one collected by Mr. Baker at Henley Beach.

Remarks.—Somewhat resembles *A. speciosus*, but the girdle is very much smaller and is not continued between the valves. The *Acantho* tufts are also much more decided than in *speciosus*.

62. ***Ischnochiton bakeri***, *sp. nov.* Pl. vii, figs. 8*a, b, c, f*.

General Appearance.—Shell almost round, valves narrow, flattened, colour greyish-white mottled with brown.

Anterior Valve.—Covered with microscopic imbricating pustules, closely packed, resembling girdle scales.

Median Valve.—Dorsal area, triangular, smooth, spotted. Lateral areas distinctly raised with four or five irregular pustules. Median valves covered with microscopic granules.

Posterior Valve is missing.

Girdle.—Covered with imbricating striated scales. The outer edge of the girdle is fringed with delicate specules.

Measurement.— 4×3 mm.

Hab.—Henley Beach (Mr. Baker).

Remarks.—Strongly resembles a juvenile *Loricella angasi*, but its striated girdle-scales distinguish it. I have much pleasure in naming it after its discoverer.

EXPLANATION OF PLATES.

- a—Dorsal view of entire shell.
- b—Anterior valve.
- c—Median valve.
- d—Posterior valve.
- e—Lateral view of posterior valve.
- f—Portion of girdle magnified.

The sizes of type specimens are marked in each case.

PLATE V.

- 1a,b,c,d,e,f—*Callochiton, mayi*, Torr.
- 2a,b,c,d,e,f—*Lepidopleurus pelagicus*, sp. nov.
- 3a,b,c,d,e,f—*Ischnochiton bednalli*, sp. nov.

PLATE VI.

- 4a,b,c,d,e,f—*Acanthochiton rufus*, sp. nov.
- 5a,b,c,d,e,f—*Acanthochiton kimberi*, sp. nov.
- 6a,b,c,d,e,f—*Ischnochiton levis*, sp. nov.

PLATE VII.

- 7a,b,c,d,e,f—*Acanthochites rubrostratus*, sp. nov.
 - 8a,b,c,d,e,f—*Acanthochites bakeri*, sp. nov.
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ADDITIONS TO THE FLORA OF SOUTH AUSTRALIA.

By J. M. BLACK.

[Read October 10, 1912.]

PLATE VIII.

This list includes a record of some alien plants which have been recently found growing wild in our State, and the description of two new species—an *Acacia* and a *Goodenia*—collected near Tarcoola in June of this year by Mr. J. W. Mellor during his ornithological visit to that district. The introduced plants are distinguished by an asterisk.

CRUCIFERÆ.—**Eruca sativa*, Lamk. (salad rocket). Received from several parts of the State as a weed in lucerne.—Mediterranean region.

LEGUMINOSÆ.—*Acacia tarculensis*, sp. nova. Frutex, ramulis resinoso-angulatis minute puberulis, phyllodiis oblongo-lanceolatis vel oblongis coriaceis 25-50 mm. longis arcte multinerviis (sæpe nervis 3 evidentioribus) lineâ resinosâ crenulatâ decurrente marginatis plerumque acumine recurvo terminatis, junioribus appresse albobescentibus, floribus pentameris, spicis axillaribus patulis laxis brevissime pedunculatis sæpius geminatis phyllodio circiter dimidio brevioribus, spicæ rhachi canotomentosâ, calyce 1½ mm. longo pubescente lobis obtusis tubo longioribus, petalis usque supra medium connatis calyce vix duplo longioribus, bracteis concavis cum acumine inflexo, ovario pubescente, legumine immaturo sericeo, seminibus transversis.

Tarcoola (J. W. Mellor, June, 1912). Belongs to Bentham's series viii., *Juliflora*, subseries D, *Falcata*. Differs from *A. kempeana*, F. v. M., in the angular branchlets and smaller leaves with resinous margins and relatively shorter corolla; from *A. resinomarginea*, W. V. Fitzg., in the broader and shorter leaves, downy branchlets, peduncles and young leaves; from both in the long calyx-lobes and twin flower-spikes. The unripe pods (15-23 mm. long) are on specimens gathered in the Gawler Ranges in September by Captain A. S. White. (Plate viii.)

COMPOSITÆ.—*Helipterum pterochætum*, Benth. Specimens in J. W. Mellor's collection from Tarcoola have 2-3 outer female flowers and about 14 bisexual flowers in each head. Bentham (Fl. Aust., iii., 648) says: "Florets 15-20, all apparently hermaphrodite." *Helichrysum cinereum*, F.

v. M. The specimens from Tarcoola are noteworthy, as this has hitherto been considered only a coastal shrub. The Tarcoola specimens agree exactly with those from Port Elliot. **Tanacetum boreale*, Fischer. Glen Osmond and Green Hill Roads (H. H. D. Griffith). Inadvertently named *T. huronense*, Fischer, in *Nat. Fl. of S.A.*, 83.—Russia and Siberia.

GOODENIACEÆ.—*Goodenia modesta*, sp. nova. Herba glabrescens humilis, caule tenui rigidulo 20-25 cm. alto, foliis radicalibus longe petiolatis ovatis vel lanceolatis integris vel basi paucidentatis, caulinis, integris brevioribus, pedunculis axillaribus solitariis unifloris bibracteolatis, axillis lanatis, bracteolis grandibus foliaceis pedicellum articulatum superantibus, calyce pubescente lobis linearilanceolatis, corollâ flavâ saccatâ 12-14 mm. longâ extus puberulâ lobis superioribus inæqualiter alatis, indusio ciliato, stylo piloso, ovarii septo fere ejus apicem attingente, ovulis numerosis dense sub-4-seriatis.

Tarcoola (J. W. Mellor). Belongs to Bentham's section iii., *Amphichila*, but differs from any of the described species in the inflorescence and the large bracteoles. (Plate viii.)

GENTIANACEÆ. — **Microcala quadrangularis*, Griseb. Roadsides near Knightsbridge (Adelaide).—A dwarf yellow-flowered annual from California and extra-tropical South America.

SCROPHULARIACEÆ.—**Bartsia viscosa*, L. Established at Myponga (H. H. D. Griffith).—Mediterranean region and northwards to England. *Veronica arvensis*, L. (wall speedwell). Near Adelaide.—Europe and Western Asia.

CHENOPODIACEÆ.—**Chenopodium opulifolium*, Schrad. Sandy land near Henley Beach.—Mediterranean region.

MYOPORACEÆ.—**Eremophila subfloccosa*, Benth. Coorabee (Australian Bight). Sent by secretary local branch of Agricultural Bureau. Hitherto recorded only for Western Australia. Corolla greenish.

GRAMINEÆ. **Eragrostis minor*, Host. Along Broken Hill railway and from as far north as Alice Springs.—Southern Europe and Western Asia. **Hordeum maritimum*, With. (sea barley), has been found growing as far inland as Nuriootpa.

DESCRIPTION OF PLATE No. VIII.

Acacia tarculensis, sp. nova. 1, flower and two bracts; 2, pistil; 3, calyx spread open.

Goodenia modesta, sp. nov. 1, corolla spread open; 2, one face of placenta, with ovules in about 4 rows; 3, style and indusium; 4, vertical section of unripe capsule: a, a, calyxlobes; b, pouch of corolla-tube; c, articulation of pedicel.

NOTES ON SOME OCCURRENCES OF SILICA NEAR
MOUNT PAINTER, FLINDERS RANGES.

By A. C. BROUGHTON.

[Read October 10, 1912.]

The locality from which the examples referred to were obtained is situated in the Far North-Eastern portion of South Australia, the north-easterly termination of the Flinders Ranges.

The specimens were collected from an area occupying about 24 square miles, extending from the divide of the ranges near Mount Pitt, 12 miles across the eastern slopes, to Parallana, on the edge of the great eastern plain.

The country rocks of the area examined have been determined as Pre-Cambrian by Dr. Mawson. They consist of granites, gneiss, schists, altered porphyries, and a felspathic and siliceous rock having the features of an eutectic mixture. The area has abundant evidence of having been subjected to great earth movements, as indicated by great crushed zones, faults, and slicken-sided faces exposed on excavating.

These fissures and crushed belts permitted the easy circulation of highly mineralized waters rich in silica and iron. The waters were evidently hot and from deep-seated sources. The final traces of such activity are probably to be found to-day at the hot springs at Parallana.

This water, travelling along the cracks and faults, deposited its mineral contents, cementing the crushed fragments into a solid whole. It is with some of the results of this cementation and deposition from solution that the paper deals.

These belts of iron-and-quartz-cemented zones have a greater resistance to the action of the weather than the more alkaline felspathic country rock, and their outcrops, with the crystal-lined cavities and caves, are a feature of the country.

The greater part of the cementing material consists of iron and quartz. The iron mineral being either specular and micaceous hæmatite, a porous ironstone, or a very massive tough iron rock. The quartz is either distributed irregularly throughout or else lining cavities.

Along Radium Ridge there are small aggregates of amethyst in the centre of a large mass of dense ironstone; cavities, lined with beautifully developed crystals of ordinary

colourless quartz, amethyst, and black quartz, often covered with a film of brilliantly green flashes of the radio-active mineral torbernite; in other places there are small quartz-lined cavities completely filled with a brilliant canary-yellow powder, which is another radio-active uranium mineral. Some of the quartz crystals have radiating fibres of the radio-active mineral, uranophane, passing through them.

Walking along the Ridge one can notice growths of quartz sticking out from the ground up to 3 ft. in height, and broken pieces lying around. Their shape at once suggests the stalactites in caves. On closer inspection they are found to have a hollow rectangular cavity passing up the centre, the length of the growth, and that the quartz has a radiating structure away from this hollow, suggesting it has grown outward from a nucleus which has since disappeared. This type of quartz was traced over an area of at least four square miles.

In places the loose rubble and soil can be scraped away, disclosing a cavity, the top of which has been worn off by erosion, with these growths pointing centrewards from all around. In other places are fissures in the country rock lined with this type of quartz formation.

In the solid rock, some feet from the surface and where atmospheric weathering has not penetrated, there are found masses of quartz with these long rectangular cavities filled with a powdery substance like clay. Probably at greater depth the original nucleus would be found in an unaltered state.

Beautifully coloured crystals tinted with various shades of red, brown, pink, and yellow may be collected at various places along the Ridge; also bunched aggregates and tabular masses.

Continuing in an easterly direction, pieces of quartz occur with a warty formation on the upper-surface and irregular sharp-edged rectangular protrusions on the lower, as if it had been formed in a mould produced by the cracking of rocks.

In some of the caves there occur small stalactites of silica hanging from the tops and projecting from the sides, and streaky formations on some of the rock faces, as if the silica-bearing waters deposited some of their load while slowly trickling along.

The Ridge takes a sudden turn to the south about three miles from its westerly end, and continues for about a mile, where it terminates in Mount Gee, or Crystal Mount, which is of considerable interest. Outcrops and cliffs, of jasper (up to 50 ft. high) and ironstone and quartz, with great

boulders of the same materials scattered around its flanks, are features of this part of the Ridge.

Numbers of crystal-lined cavities and caves are found in the quartz and ironstone outcrops. At the very top of Mount Gee is a small cave lined with what at first sight appears to be mud-covered quartz crystals. On breaking them, however, one is astonished at an unexpected snow-whiteness and purple in banded layers. An outcrop of similar quartz is found on the opposite side of Mount Gee; so, presumably, this formation passes through the top of the mountain. Banded quartz of various designs and structures are to be found here. Some are simply alternating layers of coloured quartz, generally pinks, whites, and yellows; others have iron layers alternating with the quartz; while again, some have the quartz and iron indiscriminately mixed. Much of the quartz has a delicate fibrous structure, at right angles to the layers in some cases, and radiating from centres in others, giving it a satin-like appearance. This fibrous structure is due to actual quartz material and not inclusions, as evidenced by breaking it, when the quartz splinters into long needle-like fragments.

Carnelian is often met with in bands passing around and through masses of quartz which have a well-defined crystal formation. On breaking, the common white quartz splits up into the individual crystals, and the carnelian may be obtained in small irregular fragments.

Quartz pseudomorphs after fluorspar occur here, as well as pseudomorphs after other minerals.

A common feature noticed was the alternate depositions of silica, both in individual crystals and large deposits, as indicated by a cap-in-cap formation. In places the complete upper part of a quartz crystal could be removed and yet have a regularly developed crystal underneath, with the six pyramid faces and their proper interfacial angles.

It was possible to do this on account of a drusy set of faces being covered with more silica not in optical continuity with the older quartz. Such an effect may occur several times in a single crystal. In some examples collected a layer of clay, oxide of iron as a thin film, or a layer of hæmatite up to $\frac{1}{4}$ in. thick, separated layers of silica which could be so removed. Quartz covered with hæmatite, which in turn was covered with more quartz with a different structure from the lower silica, was commonly met with.

This alternating feature gives rise to some beautiful examples of coloured quartz crystals. In some examples collected, four different colours, in layers conformable with the exterior of the crystal, occurred. The common colours met

with in such cases are blacks, pinks, reds, yellows, greens, browns, and the whites of milky quartz.

Inclusions, both solid and liquid, are frequent. Some layers, richer in inclusions than others, occur in the same crystal. It is also possible to find different layers with different types of inclusions. Thus in one layer you may find small dark specks of iron, the next may have liquid inclusions or perhaps not any, and the next layer may be rich in coloured particles giving a distinct colour to the layer.

Some fine examples of milky quartz, alternating with the transparent glassy variety, perhaps in six or eight alternating layers in the same crystal, are found lying about on the slopes of the mountain.

Another novel feature is the way most of the quartz breaks up on hitting. The individual crystals separate out with the pyramid termination at one end and a sharp point at the other which commences from the base of the pyramid faces, such pieces reminding one of single teeth of some animals. Many of the pyramid faces have warted developments on them. Some crystal faces are completely covered with these rough nodular elevations.

Continuing easterly, along Radium Ridge, instead of turning south to Mount Gee, we come to a creek on the remote side of which Mount Painter is situated.

This mountain, which is roughly four miles around the base and 1,000 ft. at its highest point above the creek, consists almost entirely of the crushed and ironstone rocks. Stiff climbing over boulder and rock-strewn flanks and up steep cliff faces and scrambling over scree, reveals on a grand scale the excessive crushing, with subsequent cementation, that the area has been subjected to. Great caves and hollows, weathered out of the less-resisting material of some of the cliffs, reveal great faces of country rock and crushed zones with the bands and cavities of quartz of different varieties. At the very summit of the mountain a band of amethystine quartz runs through the ironstone rock. The two highest points of the mountain are outcrops of ironstone-cemented crushed zones.

Many varieties of quartz are to be met with on the flanks and lower hills of this mountain; for example, sardonyx, amethystine-quartz, jasper, chalcedony, coloured quartz crystals, quartz formations of various shapes, and all more or less coloured.

Passing north-easterly from Mount Painter we traverse some four miles of granite country, all more or less intersected with the iron-and-quartz-cemented zones, and it is

worth noting that nearly all of them carry the radioactive minerals, autunite or torbernite, in isolated patches. Several miles of quartzites and schistose rocks are then encountered; the schists are copper-bearing in places.

Approaching the foot hills of the eastern flanks of the ranges highly siliceous rocks are again encountered, and seams of beautifully-coloured opaque quartz crystals are found intersecting the country rock. Fine examples of chalcedony and jasper occur. It is here that the present hot springs occur. The water is not boiling, but the hand cannot be held in it a moment. Sufficient water is ejected to flow along the boulder-and-gravel-strewn creek for about half a mile. Mounds of gypsum occur at the commencement of the great plain, which extends towards Queensland and New South Wales, about two miles from these springs, such mounds suggesting the recent activity of other springs. The whole locality is rich in seams of chalcedony, of which some fine examples were collected.

DESCRIPTIONS OF WILD HYBRIDS OF AUSTRALIAN DUCKS
CONTAINED IN THE S. A. MUSEUM COLLECTION.

By F. R. ZIETZ, Ornithologist of the South Australian
Museum.

[Read October 10, 1912.]

PLATE IX.

The following are descriptions of six interesting specimens of ducks which are, without doubt, hybrids bred in the wild state; they were shot, associated with other wild ducks, on Lakes Alexandrina and Albert, of the lower Murray. Specimens referred to as A, B, C, and D show characters of both *Anas superciliosa*, Gm., and *Nettion gibberifrons*, S. Müll.; specimen E, those of the former and *Spatula rhynchotis*, Lath., female; and specimen F, those of *Nettion gibberifrons* and *Spatula rhynchotis*, female.

A.—General plumage above dark-brown, the feathers broadly margined with greyish and rufous buff; upper part of the head and a band from the forehead through the eyes to the occiput brown-black, each feather narrowly edged with buff; superciliary stripe, cheeks and sides of neck buffy-white minutely streaked with brown; a band of buff feathers streaked with brown runs from the gape to the ear-coverts; chin and throat white immaculate; feathers of the breast with a blackish-brown crescentic band broadly edged with fulvous, those in the centre of the breast tipped with white, forming a silvery-white patch; feathers of the abdomen brown broadly edged with buff; sides of body and upper and under tail-coverts darker; wings brown, speculum on secondaries metallic-green, bordered anteriorly by a black band with a narrow buffy-white edging at the tips of the greater wing-coverts, and similarly posteriorly by another but broader black band with a broader white edging at the tips of the secondaries; wing-coverts dark greyish-brown with an olive lustre and light edges; the greater row brown with a sub-terminal black band and tipped with buffy-white; the greater under wing-coverts grey on the outer webs and nearly the whole of their inner webs white; the lesser ones white with a brown spot at the base; axillaries white; upper and lower mandibles bluish-black, nail black; legs and feet plumbeous with a yellowish tint, claws black. Wing, 9; tail, 4; culmen, 1.7; tarsus, 1.5; sex, (?). Locality: Lake Albert, South Australia, February 12, 1910. Plate ix., fig. 4.

B.—Differs from A in having the sides of head, neck, and throat pale-buff, deeper fulvous on the breast; the feathers of the lower breast and abdomen tipped with white, giving those parts a silvery wash; wing speculum coppery-green; basal half of lower mandible brown, the remainder yellow, with a few small brown spots. Wing, 9·5; tail, 4; culmen, 1·85; tarsus, 1·6; sex, (?). Locality: Lake Albert, South Australia.

C.—Differs from A in having the sides of head, throat, and the whole of the under-surface washed with ochreous-yellow; the feathers of the breast margined with bright ochreous-brown; lower mandible plumbeous with a small yellow spot near apex. Wing, 9·35; tail, 4; culmen, 1·7; tarsus, 1·5; sex, (?). Locality: Meningie, Lake Albert, South Australia, July 30, 1908.

D.—This specimen is much smaller than the three preceding ones, being about the size of *Nettion gibberifrons*, and also agreeing with that species in general colouration and markings with the following exceptions:—Facial markings similar to those of A; a white spot on each side of the head at the base of the upper mandible; greater wing-coverts not white, but olive with faint black subterminal band and broadly tipped with reddish-buff; greater under wing-coverts greyish-brown broadly edged with white on their inner webs, the lesser ones white with a brown spot at the base. Wing, 8; tail, 3·5; culmen, 1·65; tarsus, 1·45; sex, female. Locality: Lake Alexandrina, South Australia, May 16, 1895.

E.—Crown of head, facial markings, and throat similar to those of *Anas superciliosa*, the sides of the neck are more distinctly freckled, and the feathers of the under parts brown with broad reddish edges, as in the female of *Spatula rhynchotis*; upper parts brown with greenish reflections, each feather edged with buffy-grey; the scapularies brown, lighter along the shaft-line and richly glossed with green; upper wing-coverts dull-blue, those near the margin of the wing narrowly edged with white; the greater row brown with greenish reflections, having a subterminal black band glossed with metallic-green and broadly tipped with white; wing speculum on the secondaries metallic-green, each feather having a subterminal black band narrowly edged with white at the tip; the two outer tertials of each wing are brown with a broad velvety-black margin on their outer webs glossed with green; under wing-coverts white, some of the greater ones tipped with grey; axillaries white; primaries and tail-feathers brown, glossed with olive, the latter and also the rump and upper tail-coverts narrowly margined with reddish-

buff; bill black, slightly spatulate, lower mandible brown, the nail clouded with yellow; lamellæ of upper mandible more developed than in *Anas superciliosa* and slightly projecting beyond the lower margin of the bill; irides yellowish-brown; legs and feet orange. Wing, 10·25; tail, 3·65; culmen, 2·3; tarsus, 1·75; width of bill at base ·75, at apex 1; sex, male. Locality: Lake Albert, South Australia, January 16, 1899. Plate ix., fig 5.

F.—In general colouration and markings this bird agrees with *Nettion gibberifrons*, but in other respects, as noted, it shows characters which approach those of the female of *Spatula rhynchotis*. The feathers of the forehead, cheeks, and sides of neck are tinged with buff, and their brown shaft-streak is more pronounced, the scapularies and tertials are more acuminate and show greenish reflections, the upper wing-coverts are brown with bluish-grey margins; the under wing-coverts white, the marginal ones brown edged with white; the greater row silvery-grey; four secondaries metallic-green on their outer webs, the remainder olive with a greenish lustre; bill spatulate, width at base ·57, greatest width at apical end ·8; upper mandible yellowish-brown; lower mandible yellow; lamellæ of upper mandible well developed and projecting below to its lower margin; legs and feet orange. Wing, 7·75; tail, 4; culmen, 1·75; tarsus, 1·35; sex, female. Locality: Lake Alexandrina, April 11, 1895. Plate ix., fig. 6.

EXPLANATION OF PLATE IX.

- Fig. 1.—*Anas superciliosa*.
 „ 2.—*Nettion gibberifrons*.
 „ 3.—*Spatula rhynchotis*, female.
 „ 4.—*Anas superciliosa* × *Nettion gibberifrons*. Hybrid.
 „ 5.—*Anas superciliosa* × *Spatula rhynchotis*. Hybrid.
 „ 6.—*Nettion gibberifrons* × *Spatula rhynchotis*. Hybrid.
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NOTES ON SOUTH AUSTRALIAN MARINE MOLLUSCA,
WITH DESCRIPTIONS OF NEW SPECIES.—PART XV.

By JOS. C. VERCO, M.D. (Lond.), F.R.C.S. (Eng.).

[Read October 10, 1912.]

PLATES XV. AND XVI.

This paper is a continuation of the series from page 215 of vol. xxxv. of 1911, and embraces all the known South Australian species of *Helcioniscus*, *Patella*, *Nacella*, *Acmaea*, *Phenacolepas*, *Haliotis*, *Scissurella*, and *Schismope*. It discusses also several species which have been attributed to South Australia, but are not recognized as occurring here.

***Helcioniscus tramosericus*, Martyn.**

Patella tramoserica, Martyn, Univ. Conch., t. 16, P. (*Helcioniscus*) *tramoserica*, Martyn, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 205.

Helcioniscus diemenensis, Philippi, Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1908, vol. xxi. (New Series), part 1, p. 282.

Gatliff and Gabriel discarded the name *P. tramoserica*, Martyn, because the type locality was North America, and no Victorian specimen was exactly like his figure; but in answer to enquiries by Mr. Gabriel, Dall has since written that Martyn's species does not occur on the coasts of America, and that it is probably Australian or New Zealand. Very likely Martyn obtained it from Australia, but by mistake gave it an American habitat.

It occurs all along the South Australian coast from the east as far towards the west as Venus Bay. At St. Francis Island it is very rare and small, up to 18 mm.; so it seems to fade out along our west coast. It was not taken at any place along the south or west coast of Western Australia, its place being taken by *Patella neglecta*.

***Helcioniscus illibratus*, Verco.**

Helcioniscus illibratus, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 205, pl. x., figs. 6-14: *Type locality*—Spencer Gulf; Hedley, Commonwealth of Australia, Fisheries, part 1, 1911, p. 93, "100 fathoms, 40 miles south of Cape Wiles, South Australia."

Dredged in 15 to 20 fathoms off St. Francis Island, 5 dead. Taken in Western Australia, as far round as Rottnest Island.

Helcioniscus limbatus, Philippi.

Patella limbata, Philippi, *Abbild und Besch, Conch.*, vol. iii., p. 71; (*Helcioniscus*) Verco, *Trans. Roy. Soc., S.A.*, 1907, vol. xxxi., p. 100.

It is very common, large, and beautiful in St. Francis Island, where *H. tramosericus*, Martyn, is very rare and small. I did not take it anywhere in Western Australia. Mr. Hedley in "The Marine Fauna of Queensland," in the Australasian Association for the Advancement of Science, 1909, p. 355, does not include either of these species, nor in his Addendum, p. 809. It would seem, therefore, to be restricted to Tasmania and the southern shore of Australia.

Patella ustulata, Reeve.

Patella ustulata, Reeve, *Conch. Icon.*, 1855, vol. viii., pl. xxxi., figs. 88a, 88b; Verco, *Trans. Roy. Soc., S.A.*, vol. xxx., 1906, p. 206, and vol. xxxi., p. 99.

Taken at Venus Bay, and many at St. Francis Island, up to 32 mm. long by 26 mm. broad.

Patella aculeata, Reeve.

Patella aculeata, Reeve, Verco, *Trans. Roy. Soc., S.A.*, 1906, vol. xxx., p. 207.

Taken alive on the rocks on St. Francis Island up to 36 mm. by 26 mm., so that as far west as this the size is maintained.

Patella stellæformis, Reeve

Patella stellæformis, Reeve, *Conch. Systematica*, 1842, vol. ii., p. 15, pl. cxxxvi., fig. 3; Pilsbry, *Man. Conch.*, vol. xiii., 1891, p. 98, pl. xvii., figs. 25-27, pl. lvi., figs. 62-65; Tate and May, *Proc. Linn. Soc., N.S.W.*, 1901, vol. xxvi., part 3, p. 410.

Patella pentagona, Reeve, *Conch. Icon.*, 1854, pl. xx., figs. 48a, 48b, 48c (non Born Mus. Test. Vindobonensis).

Var. Patella chapmani, Tenison-Woods, *Proc. Roy. Soc., Tasmania*, 1876 (1875), p. 157; Verco, *Trans. Roy. Soc., S.A.*, 1906, vol. xxx., p. 208.

Var. Acmaea alba, Tenison-Woods, *Proc. Roy. Soc., Tasmania*, 1877 (1876), pp. 155, 156; Verco, *Trans. Roy. Soc., S.A.*, 1906, vol. xxx., p. 208.

I think Tate and May were right in regarding *P. chapmani*, Tenison-Woods, as conspecific with *P. stellæformis*, Reeve; but the two types are so unlike that the former may well be regarded as a good variety of the latter.

Taken at Rosetta Head, Encounter Bay (Tate), Tyringa Beach, Venus Bay, numerous and foliaceous but small, and Fowler Bay on the west coast; and on St. Francis Island up to 27 mm. by 20 mm. by 7.5 mm.

The species is rare and rather small on the South Australian coast, both the typical and the variant form, and it is only when we get west as far as St. Francis Island that we find it of fair size and in good variety. Here we take both the craggy typical shell and the extreme variant (*Acmaea alba*).

Nacella parva, Angas.

Nacella parva, Angas, Proc. Zool. Soc., 1878, p. 862, pl. liv., fig. 12; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 208, and 1907, vol. xxxi., p. 101.

Taken on the beach at Sceales Bay, and at St. Francis Island in 6 fathoms, and in 15 to 20 fathoms, many and in good condition, with the axial line of dorsal spots of a delicate blue colour; in 35 fathoms, 2 much more depressed than those from shallower waters.

Nacella crebrestriata, Verco.

Nacella crebrestriata, Verco, Trans. Roy. Soc., S.A., 1904, vol. xxviii., p. 144, pl. xxvi., figs. 20, 21; 1906, vol. xxx., p. 208; and 1907, vol. xxxi., p. 101.

Dredged in 55 fathoms off Cape Borda, 1; taken on the beach at Venus and Sceales Bays, Port Sinclair, and St. Francis Island.

Var. **roseoradiata**, Verco.

Was taken at Guichen Bay and St. Francis Island.

Nacella stowæ, Verco.

Nacella stowæ, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 209, pl. x., figs. 4, 5, and 1907, vol. xxxi., p. 101; Gatliff, Proc. Roy. Soc., Victoria, 1907, vol. xx. (New Series), part 1, p. 34, recorded for Victoria.

Kingston Beach, many; St. Francis Island beach, 4 good.

Acmaea alticostata, Angas.

Patella alticostata, Angas, Proc. Zool. Soc., London, 1865, p. 56, pl. ii., fig. 11; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 209.

Taken at Venus Bay and Port Sinclair, also on St. Francis Island, abundant, typical, good condition, and in considerable variety. *Radula*, pl. xvi., figs. 3, 4.

Acmaea flammea, Quoy and Gaimard.

Patelloidea flammea, Quoy and Gaimard, Voy. "Astrolabe," Zool., 1834, vol. iii., p. 354, pl. lxxi., figs. 15, 16; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 212.

A form like the type, which I have from the Derwent estuary, the type locality, has not been found by me in South

Australia. It is questionable whether this is really conspecific with *A. jacksoniensis*, Reeve, and *A. crucis*, Tenison-Woods.

Var. *A. jacksoniensis*, Reeve (*Patella*), Conch. Icon., vol. viii., 1855, pl. xxxix., figs. 127a and 127b.

Var. *A. gealei*, Angas (*Patella*), Proc. Zool. Soc., London, 1865, p. 57.

Var. *A. crucis*, Tenison-Woods, Proc. Roy. Soc., Tasmania, 1877 (1876), p. 52.

Taken at Venus and Streaky Bays and St. Francis Island, many and various, with or without the cross.

***Acmaea calamus*, Crosse and Fischer.**

Patella calamus, Crosse and Fischer, Journ. de Conch., 1864, p. 348, and 1865, p. 42, pl. iii., figs. 7, 8; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 211.

Sceales Bay, West Coast.

Var. ***polyactina*, nov. var.** Pl. xv., figs. 1, 2.

This is a colour variety. It has the shape of *A. calamus*, C. and F., though sometimes narrower in front, and has the fine radial sculpture. It may reach 21 mm. long by 17 mm. broad and 7 mm. high, but it has brown rays gradually widening, generally seven, the odd one in the posterior centre; but there may be six, or as many as fourteen, by secondary intercalation. They may be broken up into blotches or specks, and may tend to be united by reticulating spots and lines. The shell is sometimes polyangulate as well as rayed. They grade into typical *A. calamus*, Crosse and Fischer.

Gulf St. Vincent, Sceales Bay, Wallaroo Bay 15 fathoms.

***Acmaea septiformis*, Quoy and Gaimard.**

Patelloida septiformis, Quoy and Gaimard, Voy. "Astrolabe," Zool., 1834, vol. iii., p. 362, pl. lxxi., figs. 43, 44; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 215.

"Quoy gave it the name of '*septiformis*,' because in colour it resembles the *Navicella*, called by some authors '*Septaires*.'" —Lamarck, Anim. S. Vert. (2nd Edition, Deshayes, etc.), 1836, vol. vii., p. 550.

Port Elliston, many, large, flat, and eroded; Streaky Bay, many and large; St. Francis Island, few and small.

***Acmaea marmorata*, Tenison-Woods.**

Acmaea marmorata, Tenison-Woods, Proc. Roy. Soc., Tasmania, 1876 (1875), pp. 156, 157; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 210.

It was taken at Venus and Streaky Bays, St. Francis Island, and Point Sinclair, along the west coast of South Australia. At Streaky Bay it may be 26 mm. long and at St.

Francis Island 19 mm. I did not find any examples anywhere in Western Australia, so that it would seem to disappear somewhere between St. Francis Island and Esperance. The examples from New South Wales and Queensland sent to me are much smaller than those taken at Guichen and Streaky Bays, which may be regarded as the metropolis of the species.

***Acmæa subundulata*, Angas.**

Acmæa subundulata, Angas, Proc. Zool. Soc., London, 1865, p. 155; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 214.

I took it alive in Streaky Bay in considerable numbers in very shallow water at low tide on wood and bottles and other shells, also at Murat Bay and on St. Francis Island, and at Esperance Bay, Western Australia.

***Phenacolepas calva*, Verco.**

Scutellina calva, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 217, pl. viii., figs. 9, 10; Hedley and May, Records Austr. Mus., 1908, vol. vii., No. 2, p. 110, "100 fathoms, off Cape Pillar, Tasmania"; Hedley, Commonwealth of Australia, Fisheries, part 1, 1911, p. 93, "100 fathoms, 40 miles south of Cape Wiles, South Australia."

Dredged in 200 fathoms off Beachport, 3.

***Phenacolepas alboradiata*, Verco.**

Scutellina alboradiata, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 217, pl. viii., figs. 1, 2.

Gulf St. Vincent, depth unrecorded, 4; Salt Bay Creek, Edithburgh; 110 fathoms off Beachport.

***Haliotis albicans*, Quoy and Gaimard.**

Haliotis albicante, Quoy and Gaimard, Voy. "Astrolabe," 1834, Zool., vol. iii., p. 311, pl. lxxviii., figs. 1, 2. *Type locality*—"King George Sound, upon rocks at the entrance."

Haliotis albicans, Quoy and Gaimard, Lamarck, Anim. S. Vert. (2nd Edition, Deshayes, etc.), 1843, vol. ix., p. 31, sp. 16; Reeve, Conch. Icon., 1846, vol. iii., pl. x., fig. 30; Philippi, Abbild. Besch. Conch., 1846, vol. ii., p. 69, pl. iv., figs. 1a and 1b; Angas, Proc. Zool. Soc., London, 1865, p. 183, recorded for South Australia; Sowerby, Thes. Conch., 1882, vol. v., p. 30, sp. 57, pl. iii. (430), fig. 20; Weinkauff, Conch. Cab. (Ed. Küster), Band. vi., Abt. 1.B., 1883, p. 71, pl. xxi., fig. 6, pl. xxviii., fig. 2; Pilsbry, Tryon, Man. Conch., 1890, vol. xii., p. 78, pl. v., fig. 27; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 407, Tasmania; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1903, vol. xv. (New Series), part 2, p. 178, Victoria.

Taken all along coast of South Australia from Glenelg River to St. Francis Island.

Quoy used the specific name "*albicante*," which is grammatically correct, as *hous*, *hotis* is a neuter noun.

Lamarck and Sowerby give New Zealand as the habitat, but Hutton does not record it in his Manual of the New Zealand Mollusca, 1880, so it is probably a mistake.

In Adcock's Handlist of the Aquatic Mollusca of South Australia, 1893, p. 9, No. 366, it was given as *H. glabra*, Chemnitz, with *albicans*, Quoy and Gaimard, as its synonym.

***Haliotis elegans*, Koch.**

Haliotis elegans, Koch, in Philippi, *Abbild. und Besch. Conch.*, 1844, vol. i., p. 119, pl. i., figs. 1, 2; Reeve, *Conch. Icon.*, 1846, pl. vii., fig. 21; Sowerby, *Thes. Conch.*, 1882, vol. v., p. 27, Sp. 44, pl. xi. (438), fig. 82, and pl. xiv. (440 bis.), fig. 119; Weinkauff, *Conch. Cab. (Ed. Küster)*, 1883, Band. vi., Abt. 1.B., p. 51, Sp. 39, pl. xx., figs. 2, 4; Pilsbry, Tryon, *Man. Conch.*, 1890, vol. xii., p. 103, pl. xiii., fig. 70; Adcock, *Handlist, etc.*, 1893, p. 9, No. 370.

Koch gives as the type locality "the western shore of New Holland," but Reeve and all who follow give "Port Adelaide," including Pilsbry, who says he has not seen the species. Koch correctly says it is "very rare" and gives its proper *habitat*. But it has not been found at Port Adelaide nor anywhere along the southern coast of Australia to my knowledge. It occurs on the western shore of Australia. Swainson, in *Proc. Roy. Soc., Tasmania*, 1855, p. 51, writes:—"I have seen but two specimens, in the collection of my friend G. W. Walker, who thinks he procured it on some island in Bass Straits." Probably, however, Mr. Walker made a mistake.

***Haliotis nævosa*, Martyn.**

Haliotis nævosa, Martyn, *Univ. Conch.*, 1784, vol. ii., f. 63, reproduced in *Chenu's Bibliothéque Conch.*, Ser. 1, Tome ii., 1845, p. 23, No. 63, pl. xxii., fig. 1; *Cab. Jno. Hunter, Hab. Nouv. Galles du Sud*; Lamarck, *Anim. S. Vert. (2nd Edition, Deshayes, etc.)*, vol. ix., 1843, p. 34, No. 20, *hab.* New Zealand; Reeve, *Conch. Icon.*, vol. iii., pl. viii., fig. 27a, pl. ix., figs. b, c; 1865, *Angas, Proc. Zool. Soc., London*, p. 183, No. 178, *hab.* South Australia, and 1867, p. 218, No. 203, *hab.* New South Wales; Sowerby, *Thes. Conch.*, vol. v., 1882, p. 31, No. 59, pl. x. (437), fig. 73, *hab.* New Zealand, Van Diemen Land, and Philippines; Weinkauff, *Conch. Cab. (Ed. Küster)*, Band. vi., Abt. 1.B., 1883, p. 34, No. 25, pl. xiv., figs. 1-3; Watson, "Chall.," *Zool.*, 1886, vol. xv., p. 49, No. 1; 1890, Pilsbry, Tryon, *Man. Conch.*, vol. xii., p. 116, pl. xi., figs. 56, 60; Tate and May, *Proc. Linn. Soc., N.S.W.*, 1901, vol. xxvi., p. 407; Pritchard and Gatliff, *Proc. Roy. Soc., Victoria*, 1903, vol. xv. (New Series), part 2, p. 178, *hab.* Victoria.

Haliotis clathrata, Reeve, *Conch. Icon.*, fig. 72; Sowerby, *Thes. Conch.*, 1882, vol. v., pl. vi. (433), fig. 39, who says it is a synonym of *H. nævosa*, Martyn, in which Pilsbry, *loc. cit.*, con-

curs, as a juvenile, from the Philippines; Sowerby also gives *H. ruber*, Leach, and *H. sulcata*, Philippi, as synonyms.

This occurs all along the South Australian coast from the Glenelg River to St. Francis Island.

***Haliotis conicopora*, Peron.**

Haliotis conicopora, Peron, Voy. "Terr. Austr.," vol. ii., 1816, p. 80; Hedley, Proc. Linn. Soc., N.S.W., 1905, part 4, p. 520; Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1908, vol. xxi. (New Series), part 1, p. 380.

Haliotis tubifera, Lamarck, Anim. S. Vert. (2nd Edition, Deshayes, etc.), vol. ix., 1843, p. 24, No. 3, *hab.*, the seas of New Holland.

Haliotis cunninghamii, Gray, King's Survey of Australia, vol. ii., Appendix, p. 494, *teste* Gatliff and Gabriel, *loc. cit.*

Haliotis granti, Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1902, vol. xiv. (New Series), part 2, p. 183, pl. x., and 1903, vol. xv., p. 180. *Type locality*—Victoria.

Hedley, *loc. cit.*, drew attention to Peron's name and locality, Kangaroo Island, and suggested its conspecificity with *H. tubifera*, Lamarck, and *H. granti*, Pritchard and Gatliff. I think, too that this is the shell figured by Philippi in *Abbild und Beschr. Conch.*, p. 147, pl. iv. and v. (Gen. 2 and 3), under the name *H. navosa*, Martyns, and which, according to Preiss, came from Mistaken Island, in New Holland. It has both from the figure and description the pipe-like holes, which in profile are well shown.

From an examination of a considerable number of specimens it seems open to question whether this is not really a variety of *H. navosa*, Martyns, and though some individuals can be easily distributed in their typical species, others cannot be placed in one rather than the other. The validity of the spiral cords and of the axial corrugations, and the extent of projection of the spire above the dorsal surface, so as sometimes to show the basal angle and in other cases not, the consequent downward slope of the surface from the suture to the perforations, or even an upward slope or its rounded curve all vary considerably.

Taken all along the South Australian coastline, at Beachport measuring 17.5 cm. by 13.5 cm.

***Haliotis iris*, Martyn.**

Haliotis iris, Martyn, Univ. Conch., vol. ii., fig. 61; Martini and Chemnitz, Conch. Cab., 1788, vol. x., p. 317, pl. 167, figs. 1612, 1613; Wood's Index Test., 1825, p. 175, No. 13, New Zealand; Gmelin, Syst. Nat., 1789, vol. vi., p. 3691, No. 19.

H. iris, Gmelin, Lamarck, Anim. S. Vert. (2nd Edition, Deshayes, etc.), 1843, vol. ix., p. 23.

H. iris, Martyn, Deshayes, Encycl. Meth., 1830, vol. ii., p. 178; Reeve, Conch. Icon., 1846, fig. 37; Hutton, Man. New Zea-

land Moll., 1880, p. 104; *H. iris*, Gmelin, Sowerby, Thes. Conch., 1882, vol. v., p. 20, Sp. 9, pl. iii. (430), figs. 24, 25; *H. iris*, Martyn, Weinkauff, Conch. Cab., Band. vi., Abt. 1.B., p. 11, Sp. 8, pl. iv., figs. 3, 4; Pilsbry, Tryon, Man. Conch., 1890, vol. xii., p. 110, pl. xiii., figs. 65, 66.

Lamarck correctly gives "the seas of New Zealand" as the *habitat*, Reeve gives Kangaroo Island, but Swainson, in Proc. Roy. Soc., Tasmania, 1855, p. 51, wrote: "By some unaccountable mistake it is stated to inhabit Kangaroo Island. It is well known, however, in these colonies (the Australian) to be altogether peculiar to the islands of New Zealand." It has not been taken on Kangaroo Island or on the shore of South Australia.

Haliotis roei, Gray.

Haliotis roei, Gray, King's Voy., vol. ii., Appendix, 1827, p. 493, no locality given; Reeve, Conch. Icon., 1846, pl. iv., fig. 10; Sowerby, Thes. Conch., vol. v., 1882, p. 31, Sp. 60, pl. x. (437), figs. 77, 78; Weinkauff, Conch. Cab. (Ed. Küster), Band vi., Abt. 1.B., p. 37, No. 28, pl. xv., figs. 4-6; Pilsbry, Tryon, Man. Conch., 1890, vol. xii., p. 117, pl. xviii., fig. 1, pl. xlviii., figs. 11-13.

Haliotis scabricosta, Menke, Moll. Nov. Holl. Spec., 1843, p. 31, No. 172: *Type locality*—Mistaken Island; Philippi, Abbild und Beschreib. Conch., vol. i., 1844, p. 120, No. 4, pl. i., fig. 6.

Sowerby, Pilsbry, and Weinkauff give *H. hargreavesii*, Cox, as a synonym; but Hedley denies the identity, Proc. Linn. Soc., N.S.W., 1905, vol. xxx., part 4, p. 520. The two small examples of this species which the author, Dr. Cox, gave me support Hedley's contention.

It was recorded in Adcock's Handlist of Aquatic Mollusca of South Australia, 1893, p. 9, No. 367, as *H. rugosa-plicata*, Chemn. I have Tate's specimens thus named by him, but they are typical *H. roei*.

The species is rare in South Australia, but has been taken at Encounter Bay, at Aldinga (Mr. Kimber), up to 8.2 cm. long, by 6.5 cm. broad, and at St. Francis Island.

It has not been recorded from Victoria or Tasmania, but is common in Western Australia.

Sowerby gives "New Holland" as the *habitat*; Menke "Mistaken Island," in King George Sound.

Haliotis cyclobates, Peron.

Haliotis cyclobates, Peron, Voy. "Terr. Austr.," vol. ii., 1816, p. 80: *Type locality*—Kangaroo Island; Hedley, Proc. Linn. Soc., N.S.W., 1905, vol. xxx., part 4, p. 520; Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1908, vol. xxi. (New Series), part 1, p. 380.

Haliotis excavata, Lamarck, Anim. S. Vert., 1822, vol. vi., p. 215; 1843 (2nd Edition, Deshayes, etc.), vol. ix., p. 25, No. 4, "the seas of New Holland"; Deshayes, Encyc. Meth., 1830, vol. ciii., vers. vol. ii., p. 179; 1841, Delessert, Recueil, p. 33, figs.

4a, 4b, "Java seas," also figs. 6a, 6b (error in text 2a, 2b), "Java seas"; Reeve, Conch. Sys., 1842, vol. ii., p. 42, pl. cl., fig. 1; Reeve, Conch. Icon., 1846, vol. iii., pl. viii., fig. 25; H. and A. Adams, Gen. Recent Moll., vol. i., p. 443 (*Padollus*); Sowerby, Thes. Conch., 1882, vol. v., p. 30, Sp. 56, pl. iii. (430), figs. 21, 26; Weinkauff, Conch. Cab., 1883 (Ed. Küster), Band. vi., Abt. 1.B., p. 39, Sp. 29, pl. xvi., figs. 1, 2; Pilsbry, Tryon, Man. Conch., 1890, vol. xii., p. 119, pl. ix., fig. 51, pl. xlix., fig. 23; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1903, vol. xv. (New Series), part 2, p. 180, "Portsea, Port Phillip."

Dredged alive up to 15 fathoms and taken alive on the rocks at low water along the South Australian coastline in both gulfs from Yankalilla Bay to Streaky Bay, and Murat Bay in the west. I did not get it at St. Francis Island nor anywhere in Western Australia. It is recorded from Port Phillip, Victoria, but not from Tasmania. It would seem to be very localized and confined to the southern coast of Australia.

Haliotis emmæ, Gray.

Haliotis emmæ, Gray, MSS., Brit. Mus. Cat.; Reeve, Conch. Icon., 1846, vol. iii., pl. x., fig. 29; also Elements of Conch., 1860, vol. ii., pp. 12, 13, pl. xxiii., fig. 131; Sowerby, Thes. Conch., 1882, vol. v., p. 32, Sp. 68, pl. ii. (429), fig. 16, "New Zealand"; Weinkauff, Conch. Cab. (Ed. Küster), Band. vi., Abt. 1.B., p. 56, Sp. 43, pl. xxii., figs. 1, 2; Pilsbry, Tryon, Man. Conch., 1890, vol. xii., p. 122, pl. xiv., fig. 75; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., pp. 407, 447, "Tasmania"; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1903, vol. xv. (New Series), part 2, p. 178, "Victoria."

Padollus emmæ, Gray, H. and A. Adams, Gen. Recent Moll., 1858, vol. i., p. 443.

W. Swainson, in Proc. Roy. Soc., Tasmania, 1855, p. 48, says, "*H. tricostatus*, Lam.; *H. pulcherrima*, Auct.; and our *H. costata*, are (in Reeve's Conch. Icon.) erroneously called *H. emmæ*," and cited as Australian species. But *H. costata*, Swainson, is given by Pilsbry as a synonym of *H. rugosoplicata*, Chem. Again, on page 51, "I see no difference between the species figured at plate x., fig. 29 (Conch. Icon., Reeve), under the singular name of *H. emmæ*, and that described by me in the Bligh Catalogue as *Haliotis carinata*. . . . Dr. Milligan has fine specimens from the Tasmanian coasts, but we do not think it also inhabits New Holland, as here stated."

It was recorded for South Australia in Adcock's Handlist of Aquatic Mollusca, 1893, p. 9, No. 372, as *H. (Padollus) carinata*, Martyn, with *emmæ*, Gray, as a synonym; but this was compiled from Tate's manuscript list, and he, in the Tasmanian Census in Proc. Linn. Soc., N.S.W., 1901, pp. 407 and 447, withdrew *H. carinata* in favour of *H. emmæ*.

Taken at the Glenelg River, Lacepede Bay, Edithburgh, St. Francis Island, and Le Hunte Bay, *i.e.*, the whole length of the South Australian coast where examined. It was not found in Western Australia.

Variations consist in the stoutness of the spiral cords, and especially in the prominence of the spiral ridge above the row of holes; this may be barely perceptible, or it may be so marked as to resemble *H. tricostalis*—in fact, it is open to question whether *H. emmæ* is not the eastern variant of the western *H. tricostalis*.

***Haliotis tricostalis*, Lamarck.**

Haliotis tricostalis, Lamarck, Anim. S. Vert., 1882, p. 218.

This species was recorded for South Australia in Adcock's Handlist of Aquatic Mollusca, South Australia, 1893, p. 9, No. 373, as *Haliotis (Padollus) rubicundus*, Montfort, with *tricostalis*, Lamarck; *canaliculata*, Schbt. and Wag.; *scalaris*, Leach, as synonyms. I have not taken it in South Australia, and do not know that it has been collected here. Some of our examples of *H. emmæ*, Gray, approach it. Swainson, in Proc. Roy. Soc., Tasmania, 1855, p. 48, speaking of Reeve's Mon. of the genus in Conch. Icon., says, "*H. tricostatus* (meaning *tricostalis*), *H. pulcherrima*, Auct., and our *Haliotis costata*, here erroneously called *H. emmæ*," evidently regarding all four as conspecific; whereas Pilsbry makes *tricostalis*, *pulcherrima*, *costata* (a synonym of *rugosoplicata*) and *emmæ* four distinct species.

***Haliotis parva*, Linne.**

Haliotis parva, Linne., Sys. Nat., vol. x., p. 780; Gmelin, Sys. Nat., 1789, Tome i., vol. vi., p. 3689, No. 7; Pilsbry, Tryon, Man. Conch., 1890, vol. xii., p. 120, pl. xiv., fig. 74; Adcock, Handlist Aquatic Moll., South Australia, 1893, p. 9, No. 374.

Adcock records it for South Australia, but no authentic specimen from our shores is known.

***Haliotis pulcherrima*, Martyn.**

Haliotis pulcherrima, Martyn, Univ. Conch., pl. lxii., Pilsbry, Tryon, Man. Conch., 1893, vol. xii., p. 124, pl. xiii., fig. 69; Adcock, Handlist Aquatic Moll., South Australia, 1893, p. 9, No. 371.

Pilsbry gives South Australia as one of its localities, and Adcock records it, but no authentic specimen from our shores is known.

***Haliotis rugoso-plicata*, Chemnitz.**

Haliotis rugoso-plicata, Chemnitz, Conch. Cab., vol. x., p. 311, figs. 1603, 1604, 1604a; Pilsbry, 1890, vol. xii., p. 110, pl. xx., figs. 12, 13.

Pilsbry gives South Australia as one of its localities, but it is unknown here. The shell listed by Adcock under this name is *H. roei*, Gray.

Scissurella australis, Hedley.

Scissurella australis, Hedley, Memoirs Austr. Mus., 1903, part 6, vol. iv., p. 329, fig. 63; Verco, Trans. Roy. Soc., S.A., vol. xxxiv., p. 115; 1911, Hedley, Commonwealth of Australia, Fisheries, part 1, p. 92, "100 fathoms, off Cape Wiles, South Australia."

Schismope atkinsoni, Tenison-Woods.

Schismope atkinsoni, Tenison-Woods, Proc. Roy. Soc., Tasmania, 1877 (1876), p. 149; Hedley, Austr. Assoc. Adv., Sci., 1909, p. 352; Verco, Trans. Roy. Soc., S.A., 1910, vol. xxxiv., p. 116; Hedley, Commonwealth of Australia, Fisheries, part 1, p. 92.

Dredged by me in 15 to 20 fathoms off St. Francis Island, 100 fathoms off Beachport, and by Hedley in 100 fathoms off Cape Wiles. Taken also at Bunbury, Western Australia. Hedley records it from Queensland.

Schismope pulchra, Petterd.

Schismope pulchra, Petterd, Jour. of Conch., 1884, vol. iv., p. 139, No. 17; Verco, Trans. Roy. Soc., S.A., 1910, vol. xxxiv., p. 117; Hedley, Commonwealth of Australia, Fisheries, part 1, p. 92.

Dredged off St. Francis Island in 15 to 20 fathoms, 5; and by Hedley in 100 fathoms off Cape Wiles. Taken also in Western Australia.

NOTES ON THE MARINE SHELLS OF WESTERN AUSTRALIA,
WITH DESCRIPTIONS OF NEW SPECIES.
PART II.

By JOS. C. VERCO, M.D. (Lond.), F.R.C.S. (Eng.).

[Read October 10, 1912.]

PLATES XV. AND XVI.

This paper is the second in the series, continued from p. 219 of vol. xxxv., 1911, and deals with the genera *Helcioniscus*, *Patella*, *Nacella*, *Acmaea*, *Phenacolepas*, *Haliotis*, and *Schismope*.

It embraces also a list of shells received from Geraldton.

***Helcioniscus illibratus*, Verco.**

Helcioniscus illibratus, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 205, pl. x., figs. 6-14; Hedley, Commonwealth of Australia, Fisheries, 1911, part 1, p. 93.

King George Sound beach, 3; Ellensbrook, 9; Yallingup, 4 (from these two localities the specimens have a more decided bluish-purple tint); Bunbury beach, 2; in 15 fathoms, 2; in 22 fathoms, 1 (about half as large again as the type); Rottneest Island, 1.

***Patella neglecta*, Gray.**

Patella neglecta, Gray, Capt. King's Survey of the Inter-tropical and Western Coasts of Australia, ii., Appendix, p. 492, 1827.

P. (Scutellastra) neglecta, Gray, Pilsbry, Man. Conch., 1891, vol. xiii., pp. 95, 96, pl. xx., figs. 41, 42, pl. lviii., figs. 40, 41.

P. rustica, Linn, Menke, Moll. Nov. Holl., p. 33, 1843, and Zeitschr. F. Malac., 1844, p. 62.

Patella melanogramma, (?) Gmelin, Sowerby, Genera of Shells, vol. i., p. 140.

Patella zebra, Reeve, Conch. Icon., 1854, pl. iv., figs. 7a, 7b, "Swan River."

Locality. — Esperance beach, few; Hopetoun, few; King George Sound, Rabbit Island, many, and up to full size between water-marks; Ellensbrook and Yallingup, many; Rottneest Island, 1.

This species does not appear to come much further east than Esperance. It was not found on St. Francis Island, nor has it been taken along the coast of South Australia.

On Rabbit Island it attains the length of 100 mm. Nearly every individual exceeding 25 mm. in length carries

one or more patelliform parasites. I thought, naturally, they were young individuals of the same species, but they proved to be always examples of what I have named and described as *Acmaea patellavecta*.

***Patella axiaerata*, n. sp.** Pl. xv., figs. 3 and 4.

Shell small, depressed, conical, elliptical, apex somewhat antemedian, lateral margins somewhat concave, so as to be lifted off a flat surface. Apex blunt, surface smooth; colour opaque-white, numerous rays (18 in the type), golden-yellow, with darker golden axial hairlines in them. Margin simple, smooth. Spatula well marked, large, with a distinct neck and large head. Interior white, through which the yellow rays are visible.

Dimensions. — Length, 4·4 mm.; breadth, 3·2 mm.; height, 1·9 mm.

Habitat.—Type, Rottneest Island, with many others; King George Sound beach, 8 small.

Variations.—Some are shorter and higher, more convex in the hinder slope, more acute at the apex. The number of golden rays may be only 12 or 10, due to the fusion of two narrower into a larger one; sometimes the ray, which is at first single, becomes later double. In some examples the golden hairlines in the rays are conspicuous and numerous. The apical region inside, for a varying extent, may be of a yellowish-brown colour.

The shape of its base suggests that its usual *habitat* is the conical surface of another shell, and as this is a very common habit with *Acmaea*, it may belong to this genus. It recalls *Patella illibrata*, Verco, by its form and apex and rays. It was not taken alive.

Type is in my cabinet.

***Patella ustulata*, Reeve.**

Patella ustulata, Reeve, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 206; 1907, vol. xxxi., p. 99; and 1912, vol. xxxvi., p. 182.

This was taken at Esperance Bay and King George Sound; at Ellensbrook up to 25 mm. long, by 20 mm. wide, by 7 mm. high, the largest specimen taken in the West; at Yallingup and at Bunbury, up to 18 mm. long.

They vary greatly. A common form has from 12 to 14 broad white or yellow ribs; the rest of the shell may be white or yellow or black or pinkish-brown. Some, after a moderate growth in this fashion, become wholly black.

They do not reach the size of those at Beachport, which may be 47 mm. by 40 mm.

Patella aculeata, Reeve

Patella aculeata, Reeve, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 207, and 1912, vol. xxxvi., p. 182.

Taken on the beach, King George Sound, 10, the largest is only 23 mm. by 19 mm.; Ellensbrook, 3, up to 21 mm. long; Yallingup, up to 14 mm. It was not taken above Cape Naturaliste. The specimens seem to diminish in size and scaliness as they go west and north, and are not so large as the South Australian shells, which may attain 40 mm. in length.

Patella hepatica, Pritchard and Gatliff.

Patella hepatica, Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1903, vol. xv. (New Series), part 3, p. 194; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 207.

Esperance Bay, 3, up to 17 mm. by 13 mm.; "Albany" (Dr. Torr), 20 mm. by 15 mm. by 6.5 mm.; Yallingup, 6; Bunbury, 1. This—which is probably a variant of *P. ustulata*, Reeve—is smaller than the Victorian shell, and was not taken above Geographe Bay.

Patella stellæformis, Reeve.

Patella stellæformis, Reeve, Conch. Sys., 1842, vol. ii., p. 15, pl. cxxxvi., fig. 3; Verco, Trans. Roy. Soc., S.A., 1912, p. 182.

Taken on the beach at Esperance Bay, 1, very large, 39 mm. long, 37 mm. wide, and 12 mm. high, and 3 small specimens, scaly, with 8 ribs, the anterior splitting early into two; at Albany, many, 1 7-ribbed, the others 8-ribbed, outside speckled brown, inside white or brownish-yellow or speckled red-brown; at Ellensbrook, very many, up to 22 mm. long and 21 mm. wide and 6.5 mm. high, mostly 8-ribbed, some 7-ribbed, others 9-ribbed, rough and speckled; on Rott-nest Island, several, up to 18 mm. long and 15 mm. wide and 6.5 mm. high.

The reddish-brown specks outside may be arranged in radial series on the ribs, or scattered irregularly on the surface. Internally the spatula may be brown, but generally white. There may be a red-brown line along the groove of the ribs. No specimens of the polygonal variety, *P. chapmani*, Tenison-Woods, or of the variety *Acmea albida*, Tenison-Woods, were found. The typical forms were much more numerous and foliaceous than on the eastern shores of South Australia.

Nacella parva, Angas.

Nacella parva, Angas, Proc. Zool. Soc., London, 1878, p. 862, pl. liv., fig. 12; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 208, 1907, vol. xxxi., p. 101, 1912, vol. xxxvi., p. 183.

Taken in King George Sound on the beach, and in 10 to 15 fathoms very many, and in 28 fathoms a few; on Bunbury beach, 3; in Geographe Bay, 15 fathoms, 2; off Fremantle, in 6 fathoms, 1. They vary greatly in width; some may be 6.75 mm. long by 2.25 mm. wide, and others 5.25 mm. long by 1.75 mm. wide, and so confirm the suggestion made in 1906 that *N. compressa*, Verco, is only a variant. They are none of them quite so wide as the South Australian examples, 5.6 mm. by 2.8 mm.; and none of them quite so narrow, 5 mm. by 1.6 mm., but are intermediate. At King George Sound they are much more common in the shallow dredging than anywhere in South Australia.

***Nacella crebrestriata*, Verco.**

Nacella crebrestriata, Verco, Trans. Roy. Soc. S.A., 1904, vol. xxviii., p. 144, pl. xxvi., figs. 20, 21; 1906, vol. xxx., p. 208; 1907, vol. xxxi., p. 101; and 1912, vol. xxxvi., p. 183.

King George Sound beach, 3; Yallingup, 5; Rott-nest Island, 2.

Var. *roseoradiata*, var. nov.

This is typically a broader and more elliptical shell, has about two-thirds as many radial striæ, and 15 or 16 deep-pink axial rays, gradually increasing in width.

This was taken at Guichen Bay, South Australia; but in much better condition and more abundantly at Ellensbrook and Yallingup. Some examples are oval rather than elliptical, being narrower anteriorly; they vary somewhat in width, and one has its lateral margins incurved, as though the narrow surface—*e.g.*, *Zostera*—on which it lived had shrunk, and consequently had led to the contraction of the sides of the aperture of the shell.

Type is in my cabinet.

***Nacella stowæ*, Verco.**

Nacella stowæ, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., pl. x., figs. 4, 5; 1912, vol. xxxvi., p. 183.

King George Sound beach, 8; Bunbury beach, 4; Rott-nest Island, 2. Identical with the South Australian specimens, but in poor condition.

***Acmaea patellavecta*, n. sp. Pl. xv., figs. 5-7;
pl. xvi., fig. 5.**

Shell solid, elliptical, conical. Apex at the junction of the anterior and middle third, eroded. Margin in profile concave at the sides (due to its habit of living on a patella). Anterior slope nearly straight, posterior somewhat convex.

Outer surface with 40 radial, low, broad, round ribs, with linear interspaces, slightly crenulating the margin. Obsolete accremental growth-lines cross the ribs. The general colour is a sordid white, and the surface is mostly eroded. The interior is bordered with a narrow continuous band of a grey colour, articulated with 40 equidistant blackish-brown radially arranged spots, corresponding with the intercostal spaces. The spatula is well marked, bluish-white, with distinct muscle-scars rather wide in front, so as to give it a decided neck, beyond which it projects with a convex end.

The radula consists of 105 rows of teeth with the formula 2 (3.0.3.) 2, or more correctly 2 ($\overline{1.1.1.0.1.1.1}$) 2. The marginals are simple, bent nearly at a right angle in the middle, with straight stems and curved cusps. The outer laterals are in line with each other, the inner of the two is only about half as wide as the other, with distinct cusps but with united bases which (though the radula may be picked to pieces) are inseparable. The inner laterals are at a higher level, and are close to each other, but their bases are quite separable. There is no central tooth. It has a triangular branchia extending from the left over the neck to the right, without any branchial cordon.

Dimensions.—Length, 31.5 mm.; breadth, 23 mm.; height, 14 mm.; height of the curve at the border, 2.5 mm.

Locality.—Type from Cape Naturaliste.

It is found also in abundance on Rabbit Island, King George Sound, and at Ellensbrook and Yallingup, south of Cape Naturaliste.

It lives on the shell of *Patella neglecta*, Gray. Nearly every example of which above 25 mm. in length carries one or more (hence its name).

Variations.—It may grow to the size of 41 mm. long by 32 mm. wide and 21.5 high. The ribs may increase to more than 50.

The outer surface is generally much eroded, so that the apex is absent. In one example, 18 mm. by 13 mm. by 5 mm., the top is a brown point without any sign of a spiral, .5 mm. by .25 mm. in size surrounded by a white area 2 mm. by 1 mm., from which project 9 primary rays. These increase rapidly by splitting and by intercalation to 23 at the margin.

The blackish markings inside the border vary with the number of ribs. They may be very distinct, but in the larger shells they fade out and may disappear altogether: sometimes in the smaller shells they may be very faint. The narrow marginal band may be so dark as to quite obscure

the spots. The colour inside varies. The inner border may be a pale heliotrope, within this an opaque white band, and then heliotrope as far as the muscle-scar. The interior may be wholly dark blotchy-brown, except the muscle-scar, which is white, and the front two-thirds of the spatula, which may be bluish-white. The brown may be more or less blotched about a whitish interior, or almost absent. In some a faint greenish-blue tint is present, deepest in the spatula.

Diagnosis.—Its *habitat*, on the back of living *Patella neglecta*, Gray, suggested that it might be the young of this mollusc: but it is not narrowed anteriorly, the ribs are low, round, and approximate; the apex is less eccentric, the spots inside—if present—are single, and not in couples. The dentition and branchiæ are not those of *Patella*, but of *Acmæa*.

Its other ally is *A. alticostata*, Angas, but its ribs are more numerous, lower, and more approximate than in Angas' species: it has not the intercostal curved concentric dark markings, and the internal marginal spots are disposed radially instead of laterally. The dentition of the radula separates them widely. *Vide* pl. xvi., figs. 3-5.

It closely resembles the figure of *Patella nigrosulcata*, Reeve, *Conch. Icon.*, 1885, Sp. 84a, *hab. (?)*, and may prove to be this species; *Patella (scutellastra) stellæformis*, Reeve, *var. nigrosulcata*, Reeve, Pilsbry, *Man. Conch.*, 1891, vol. xiii., p. 100, pl. lxi., figs. 66, 67. Pilsbry gives no *habitat* for this variety, but for the species he gives "Japan to Port Jackson, South Australia," etc.

Though *P. stellæformis*, Reeve, is abundant, large, and typical in the localities where my shell is found, no intermediate forms were taken. The figures do not indicate a laterally concave base. If *P. stellæformis* has been proved by dissection to be a *Patella*, this cannot be a variety, because this is an *Acmæa*.

Type in my collection.

Acmæa alticostata, Angas.

Patella alticostata, Angas, *Proc. Zool. Soc.*, London, 1865, p. 56, pl. ii., fig. 11; Verco, *Trans. Roy. Soc.*, S.A., 1912, vol. xxxvi., p. 183.

Taken at Esperance Bay, 1 measuring 26 mm. long by 22 mm. broad and 6 mm. high, in perfect condition, has only 9 very broad, round ribs with narrow intercostal spaces, but is plainly of this species; at King George Sound, abundant, and typical up to 44 mm. by 42 mm. by 12 mm.; at Ellensbrook, 3, up to 20 mm.; at Yallingup, 3, up to 23 mm.; at Bunbury, up to 14 mm.; at Rottnest, up to 25 mm.

***Acmaea flammea*, Quoy and Gaimard.**

Patelloidea flammea, Quoy and Gaimard, Voy. "Astrolabe," Zool., 1834, vol. iii., p. 354, pl. lxxi., figs. 15, 16; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 183.

Var. *Jacksoniensis*, Reeve (*Patella*), Conch. Icon., vol. viii., 1855, pl. xxxix., figs. 127a, 127b.

King George Sound beach, many, similar to our South Australian form, without a definite dark maltese cross, but with four white radial bands more or less irregular and indistinct. Shape mostly narrowed in front, some very much; Ellensbrook; Yallingup, many, up to 17 mm. by 13 mm. by 5.5; Bunbury; Rottnest Island, many and large, up to 25 mm. by 20 mm. by 12.5 mm.

Var. *Crucis*, Tenison-Woods, Proc. Roy. Soc., Tasmania, 1877 (1876), p. 52.

King George Sound beach, up to 20 mm. by 16 mm.; Yallingup; Bunbury; Rottnest Island, up to 25 mm. by 20 mm. by 11.5 mm.

"Geraldton and Abrolhos Island" (Dr. Torr). They are identical with the South Australian examples in shape, size, and colouring.

***Acmaea conoidea*, Quoy and Gaimard.**

Patelloidea conoidea, Quoy and Gaimard, Voy. "Astrolabe," Zool., vol. iii., 1834, p. 355, pl. lxxi., figs. 5, 7; Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 214.

Ellensbrook, 1, half-grown. A form was found on the rocks at the south end of Rottnest Island, the largest example being 22 mm. long, 18 mm. wide, and 12.5 mm. high; it may be 18 mm. by 13.5 mm. by 8 mm., or 15 mm. by 11 mm. by 4 mm. There may be about 16 radial, thread-like ribs, with from 2 to 5 intervening threadlets. These may be absent except for obsolete primary threads. The apex is nearly central, slightly anterior and blunt. The colour is wholly black, with a black marginal band within. The rest of the interior is white, except the apical third, which is lighter or darker brown. In some the marginal black band may be broken by a linear radial extension of the white interior to the edge at one point towards the back, or at two symmetrical points or at several, and in some specimens radial black colour-bands are visible in the interior through the white. When the shell is eroded outside some four or five white radial bands may be displayed or quite a number, or the erosion may destroy all the black outer coating and leave only white; and if the rubbing and rolling affect the margin, it reveals an irregularly articulated border of white and black. This, I think, is probably the *P. conoidea* of Quoy. Though

I sought carefully on every beach examined for his species, I could not find any shell to match his unique type specimen, and I think it is probably somewhat of a monstrosity as regards its comparative height. The lateral concavity of its borders is explained by its resting on some convex surface, while erosion has removed both sculpture and colour from its upper three-fourths. Although the shells gathered by me are so distinctive in some examples by their wholly deep-black exterior, their internal black border, and elate conical shape, I feel sure they are only a further variant of the shells taken from the same rocks which I have recorded under the name of *A. flammea*, Quoy and Gaimard, *var. jacksoniensis*, Reeve.

Acmæa calamus, Crosse and Fischer.

Patella calamus, Crosse and Fischer, Journ. de Conch., 1864, p. 348, and 1865, p. 42, pl. iii., figs. 7, 8; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 184.

Var. ***polyactina***, Verco.

Taken on King George Sound beach, 6; at Yallingup, 4; on Bunbury beach, 3; in Geographe Bay, 15 fathoms 2, in 22 fathoms 3; off Fremantle, in 6 fathoms, 2; on Rott-nest Island, 3; "Cottesloe," 1; "Geraldton," 1. This variety seems to replace the typical shell in Western Australia.

Acmæa septiformis, Quoy and Gaimard.

Patelloida septiformis, Quoy and Gaimard, Voy. "Astrolabe," Zool., 1834, vol. iii., p. 362, pl. lxxi., figs. 43, 44; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 184.

King George Sound beach, up to 15 mm. long and 12 mm. wide; Ellensbrook, 3, worn; Yallingup, 1, worn; none further north.

Acmæa subundulata, Angas.

Acmæa subundulata, Angas, Proc. Zool. Soc., London, 1865, p. 155; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 185.

A number were taken on the beach at Esperance Bay, but none further west.

Phenacolepas calva, Verco.

Scutellina calva, Verco, Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 217, pl. viii., figs. 9, 10; also *op. cit.*, 1912, vol. xxxvi., p. 185.

King George Sound beach, 1; in 14 fathoms, 1.

Phenacolepas alboradiata, Verco.

(*Scutellina*) Trans. Roy. Soc., S.A., 1906, vol. xxx., p. 217; also *op. cit.*, 1912, vol. xxxvi., p. 185.

King George Sound beach, 1.

Haliotis albicans, Quoy and Gaimard.

Haliotis albicante, Quoy and Gaimard, Voy. "Astrolabe," Zool., vol. iii., pl. lxxviii., figs. 1, 2.

H. albicans, Quoy and Gaimard, Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 185.

Taken at King George Sound, the *type locality*.

Haliotis elegans, Koch.

Haliotis elegans, Koch, in Philippi, Abbild und Besch. Conch., 1844, vol. i., p. 119, pl. i., figs. 1, 2; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 186.

The *type locality* is "the western shore of New Holland, very rare." It was taken on Rottneest Island.

Haliotis conicopora, Peron.

Haliotis conicopora, Peron, Voy. Terr. Austr., vol. ii., 1816, p. 80; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 187. Synonyms are *H. tubifera*, Lamarck, and *H. granti*, Pritchard and Gatliff.

Taken at Esperance; in King George Sound; at Ellensbrook, measuring 17.5 cm. by 13.5 cm.; and on Rottneest Island.

Haliotis roei, Gray.

Haliotis roei, Gray, King's Voy., vol. ii., Appendix, 1827, p. 493; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 188.

Taken at Esperance Bay, King George Sound, Ellensbrook, Bunbury, and Rottneest Island. This is by much the most common *Haliotis* in Western Australia. It may be 10 cm. long by 8.2 cm. broad. It appears to have come round from the west along the southern coast of Australia, and reached Encounter Bay.

Haliotis tricostalis, Lamarck.

Haliotis tricostalis, Lamarck, Anim. S. Vert., 1822, p. 218; also (2nd Edition, Deshayes, etc.), 1843, vol. ix., p. 30, No. 14 "Java seas"; Deshayes, Encyc. Meth., 1830, vol. ciii., Vers, vol. ii., p. 181, No. 12; Delessert, Recueil., 1841, pl. xxxiii., figs. 8a, 8b; Menke, Moll. Nov. Holl., 1843, p. 32, No. 177, "West coast of New Holland"; H. and A. Adams, Gen. Recent Moll., 1858, vol. i., p. 443, pl. l., fig. 7 (*Padollus*); Chenu, Man. Conch., 1859, vol. i., p. 368, figs. 2746, 2747; Weinkauff, Conch. Cab. (Ed. Küster), 1883, Band. vi., Abt. 1.B., p. 13, Sp. 10, pl. v., figs. 3, 4;

Pilsbry, Tryon, Man. Conch., 1890, vol. xii., p. 123, pl. xii., pp. 84, 85; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 190.

Hedley, in Proc. Linn. Soc., N.S.W., 1906 (1905), part 4, p. 521, writes:—"Pilsbry marks Montfort's name (*i.e.*, *Haliotis rubicundus*) as doubtful, but it was recognized and accepted by Dr. J. E. Gray in King's Survey Trop. Austr., Appendix ii., 1827, p. 495, and he had unusual facilities for ascertaining the facts of the case." In May, 1907, he wrote to me privately:—"I find Bolten has a *Haliotis rubicunda*, Mus. Bolt., p. 14, No. 160, which upsets the later *H. rubicundus* of Montfort. I suppose *H. tricostalis*, Lamarck, 1822, should be called *H. scalaris*, Leach, 1814. The copy of Anim. S. Vert. in the library of the Australian Museum, Sydney, formerly belonged to Wm. Swainson. In the margin of p. 218 is a pencil note in Swainson's hand, 'This is the *Padollus scalaris* of Leach.'" Hedley's suggestion is commended to those who have the literature and material necessary to settle the question. Meanwhile I use the well-known name of Lamarck.

The species is less common than *H. roei*, Gray, but yet not rare. It was taken at Esperance, Albany, Ellensbrook, Bunbury, and Rottneest Island. The last locality provided a specimen measuring 11.5 cm. by 9.25 cm.

Schismope atkinsoni, Tenison-Woods.

Scissurella atkinsoni, Tenison-Woods, Proc. Roy. Soc., Tasmania, 1877 (1876), p. 149; (*Schismope*) Verco, Trans. Roy. Soc., S.A., 1912, p. 191.

Taken on Bunbury beach, 1.

Schismope pulchra, Petterd.

Schismope pulchra, Petterd. Journ. of Conch., 1884, vol. iv., p. 139, No. 17; Verco, Trans. Roy. Soc., S.A., 1912, vol. xxxvi., p. 191.

Hopetoun beach, 2; King George Sound beach, 2.

A LIST OF SHELLS RECEIVED FROM GERALDTON, WESTERN AUSTRALIA.

Two or three years ago Dr. Torr brought me from Geraldton, and the Abrolhos or Houtman Islands close by, a number of shells he had collected there, and during this year Mr. Bardwell, a resident in the town, has sent me a small consignment. From this material I have prepared a list of all the species received up to the present. The two

localities are so adjacent that I have placed the species from both of them together. An asterisk has been attached to those which are found in South Australian waters, so that at a glance the proportion of species common to the two regions can be noted.

Of the 150 shells identified in this list, 108 are found in South Australia. Of the 12 shells not named, 4 are almost certainly found there, and possibly three others, or 112 probably, and 115 possibly among 162; that is, 71 per cent. These are, of course, the most common shells, and if the same ratio holds with the rare species, nearly three-fourths of the marine mollusca will be common to the two far distant localities. The proportion of 71 per cent. applies to the Pelecypods and to the Gasteropods alike.

- **Spirula spirula*, *Linne*, 1758, *Nautilus*.
- Cadulus occiduus*, *Verco*, 1912.
- Cryptoplax*, sp.
- Patella neglecta*, *Gray*, 1827.
- **Nacella parva*, *Angas*, 1878.
- **Acmæa alticostata*, *Angas*, 1865, *Patella*.
- **Acmæa septiformis*, 1834, *Patelloidea*.
- **Acmæa crucis*, *Tenison-Woods*, 1877.
- **Acmæa polyactina*, *Verco*, 1912.
- Acmæa patella-vecta*, *Verco*, 1912.
- **Haliotis roei*, *Gray*, 1827.
- **Megatebennus omicron*, *Crosse and Fischer*, 1864,
 Fissurella.
- **Macroschisma tasmaniæ*, *Sowerby*, 1866.
- **Gena nigra*, *Quoy and Gaimard*, 1834, *Stomatella*.
- **Turbo jourdani*, *Kiener*, 1839.
- **Turbo stamineus*, *Martyn*, 1784, *Limax*.
- Turbo pulcher*, *Reeve*, 1842.
- Turbo ticaonicus*, *Reeve*, 1842.
- **Astralium fimbriatum*, *Lamarck*, 1822, *Trochus*.
- Astralium stellare*, *Gmelin*.
- **Phasianella australis*, *Gmelin*.
- **Phasianella ventricosa*, *Quoy and Gaimard*, 1834.
- **Phasianella variegata*, *Lamarck*, 1822.
- **Phasianella rosea*, *Angas*, 1867, *Eutropia*.
- Phasianella*, sp.
- **Cyclostrema tatei*, *Angas*, 1878.
- Trochus obeliscus*, *Gmelin*.
- **Clanculus plebeius*, *Philippi*, 1846, *Trochus*.
- **Monodonta melanloma*, *Menke*, 1843.
- Monodonta (Chlorodiloma) zeus*, *Fischer*, 1874, *Trochus*.
- **Cantharidus lehmanni*, *Menke*, 1843, *Trochus*.

- **Cantharidus pulcherrimus*, Wood, 1828, Trochus.
 **Thalotia conica*, Gray, 1827, Monodonta.
 **Thalotia chlorostoma*, Menke, 1843, Trochus.
 **Thalotia neglecta*, Tate, 1893.
Thalotia indistincta, Wood, 1828, Trochus.
 **Phasianotrochus irisodontes*, Quoy and Gaimard, 1834, Trochus.
 **Leiopyrga octona*, Tate, 1891.
 **Euchelus baccatus*, Menke, 1843, Monodonta.
 **Euchelus ampullus*, Tate, 1893.
Nerita undata, Linne.
Nerita polita, Linne, var. *antiquata*, Recluz, 1841.
 **Syrnola tincta*, Angas, 1871.
 **Odostomia simplex*, Angas, 1871.
 **Odostomia pupæformis*, Sowerby, 1865.
 **Odostomia vincentina*, Tryon, 1886.
 **Oscilla tasmanica*, Tenison-Woods, 1877 (1876), Parthenia.
 **Turbonilla hofmani*, Angas, 1867.
 **Turbonilla fusca*, A. Adams, 1855, Chemnitzia.
 **Cingulina spina*, Crosse and Fischer, 1864, Turritella.
 **Scala aculeata*, Sowerby, 1844, Scalaria.
 **Scala jukesiana*, Forbes, 1852, Scalaria.
 **Crossea labiata*, Tenison-Woods, 1876 (1875).
 **Litorina mauritiana*, Lamarck, 1822, Phasianella.
Tectarius rugosus, Menke, 1843, Littorina.
Planaxis sulcatus, Born, 1778, Buccinum.
Modulus disculus, Philippi, 1846.
 **Risella melanostoma*, Gmelin, 1789, Trochus.
 **Diala monile*, A. Adams, 1862, Alaba.
 **Diala lauta*, A. Adams, 1864, Alaba.
 **Capulus conicus*, Schuhmacher, 1817, Amalthæa.
 **Capulus antiquatus*, Linne.
Crepidula aculeata, Gmelin, Patella.
 **Ianthina violacea*, Bolten.
 **Natica collei*, Recluz, 1843.
 **Polinices conica*, Lamarck, 1822, Natica.
 **Eunaticina papilla*, Gmelin, Sigaretus.
 **Truncatella scalarina*, Cox, 1868.
 **Truncatella marginata*, Küster.
 **Rissoa* (*Setia*) *nitens*, Frauenfeld, 1867, *Setia*.
Rissoa, sp.
Rissoa, sp.
Rissoa, sp.
Rissoa, sp.
Rissoa, sp.
Rissoa, sp.

- *Rissoa (Epigrus) petterdi, *Brazier*, 1894, *Rissoa*.
 *Rissoina flexuosa, *Gould*, 1861.
 *Vermicularia siphon, *Lamarck*, 1818, *Serpula*.
 *Siliquaria weldii, *Tenison-Woods*, 1876, *Tenagodus*.
 *Bittium granarium, *Kiener*, 1842, *Cerithium*.
 *Cerithium icarus, *Bayle*, 1880.
 Cerithium cordigerum, *Bayle*, 1880.
 *Triphora granifera, *Brazier*, 1894.
 *Plesiotrochus monachus, *Crosse and Fischer*, 1864,
 Cerithium.
 Campanile læve, *Quoy*, 1834, *Cerithium*.
 Strombus floridus, *Lamarck*, 1822.
 Bursa anceps, *Lamarck*, *Ranella*.
 Cypræa caput-serpentis, *Linne*.
 Cypræa carneola, *Linne*.
 Tonna variegata, *Lamarck*, 1822, *Dolium*.
 *Cymatium exaratum, *Reeve*, 1844, *Triton*.
 *Pyrene versicolor, *Sowerby*, 1832, *Columbella*.
 *Pyrene semiconvexa, *Lamarck*, 1822, *Buccinum*.
 *Pyrene austrina, *Gaskoin*, 1851, *Columbella*.
 *Pyrene atkinsoni, *Tenison-Woods*, 1876, *Drillia*.
 Cantharus undosus, *Linne*, 1758, *Buccinum*.
 *Arcularia pauperata, *Lamarck*, 1822, *Buccinum*.
 Arcularia glans, *Linne*, 1758, *Buccinum*.
 Arcularia dorsata, *Bolton*, *Buccinum*.
 Thais hippocastanea, *Linne*, 1758, *Murex*.
 Thais succincta, *Martyn*, 1784, *Buccinum*.
 * var. *textiliosa*, *Lamarck*, 1822.
 * var. *ægrotata*, *Reeve*.
 Thais lineata (?), *Lamarck*.
 Drupa chaidea (?), *Duclos*, 1832, *Purpura*.
 Drupa margariticola, *Broderip*, 1832, *Murex*.
 Megalatractus aruanus, *Linne*, 1758, *Murex*.
 *Marginella angasi, *Brazier*, 1870.
 Mitra.
 *Cymbium flammeum, *Bolton*, 1798, var. *miltonis*, *Gray*,
 *Oliva australis, *Duclos*, 1835.
 *Clathurella rufozonata, *Angas*, 1877.
 *Cythara kingensis (?), *Petterd*, 1879, *Daphnella*.
 *Conus anemone, *Lamarck*, 1810.
 Conus miliaris, *Hwass*.
 *Bulla australis, *Gray*, 1825.
 Hydatina physis, *Linne*, 1758, *Bulla*.
 *Tornatina fusiformis, *A. Adams*, 1854, *Bulla*.
 *Retusa, sp.
 *Atys exigua (?), *A. Adams*, 1854.
 *Siphonaria baconi, *Reeve*, 1856.

- **Siphonaria stowæ*, *Verco*, 1906.
Siphonaria, sp.
- **Nucula micans*, *Angas*, 1878.
- **Arca navicularis*, *Bruguiere*, 1797.
- **Barbatia domingensis*, *Lamarck*, 1822, *Arca*.
- **Glycimeris radians*, *Lamarck*, 1819, *Pectunculus*.
- **Meleagrina fimbriata*, *Dunker*, 1852, *Avicula*.
Vulsella vulsella, *Linne*.
Septifer bilocularis, *Linne*, 1756, *Mytilus*.
- **Brachyodontes erosus*, *Lamarck*, 1819, *Mytilus*.
- **Modiolaria paulucciæ*, *Crosse*, 1863, *Crenella*.
- **Cardita crassicosta*, *Lamarck*, 1819.
Cardita incrassata, *Sowerby*, 1825.
- **Chama spinosa*, *Broderip*.
Chama fimbriata, *Reeve*, or *ruderalis*, *Lamarck*.
- **Lucina tatei*, *Angas*, 1878.
- **Loripes icterica*, *Reeve*, 1850.
- **Thyasira globosa*, *Forskal*.
- **Lasea scalaris*, *Philippi*, 1847, *Poronia*.
Lepton, sp.
- **Rochefortia donaciformis*, *Angas*, 1877, *Mysella*.
- **Cardium elongatum*, *Bruguiere*.
- **Cardium erugatum*, *Tate*, 1888.
Cardium, sp.
Codakia interrupta, *Lamarck*, 1818, *Cytherea*.
- **Sunetta excavata*, *Hanley*, 1842, *Cytherea*.
Chione marica, *Linne*, *Venus*.
- **Chione undulosa*, *Lamarck*, 1818, *Venus*.
Gafrarium australe, *Sowerby*, 1851, *Circe*.
- **Gafrarium angasi*, *E. A. Smith*, 1885, *Circe*.
- **Venerupis crenata* (?), *Lamarck*, 1818.
- **Petricola lapicida*, *Chemnitz*, *Venus*.
- **Tellina albinella*, *Lamarck*, 1818.
Tellina perna, *Spengler*.
- **Tellina decussata*, *Lamarck*, 1815.
- **Donax brazieri*, *E. A. Smith*, 1891.
Donax columbella, *Lamarck*.
Donax sulcarius, *Menke*.
- **Saxicava arctica*, *Linne*, 1767, *Mya*.
- **Pholas australasiæ*, *Sowerby*, 1849.

SHELLS FROM THE GREAT AUSTRALIAN BIGHT.

By JOS. C. VERCO, M.D. (Lond.), F.R.C.S. (Eng.).

[Read October 10, 1912.]

PLATES X. TO XIV. AND XVI.

In March, 1912, the Federal Minister of Trade and Customs granted me permission to go on the trawler "Endeavour" during a trip of investigation in the Bight.

The area covered extended from 30 to 120 miles west of the longitude of Eucla, along the 100-fathom line, the trawl being taken across this line from 75 fathoms to 120 fathoms. The 100-fathom line followed the curve of the coast fairly uniformly at a distance of about 60 miles. The shells obtained were those brought up incidentally in the large trawl when this was gathering fish. As its mesh was comparatively large, very few small shells were taken. The fauna was consequently quite different from that I have dredged off the South Australian coast in deep water before, when either a very fine-meshed net-dredge or a conical iron bucket-dredge has been used, and only smaller forms have been obtained. Mr. Dannevig, the Director of the Fisheries investigation, very kindly gave me two hauls with my bucket-dredge in deep water, and so supplied me with material for comparison with what I have taken in a similar manner and at equal depths elsewhere.

I am pleased to take this opportunity of expressing my thanks to the Ministerial heads of the Department in the Commonwealth and in the State for the opportunity of securing much interesting material, and also to the officers and men on the trawler for their very ready and interested help.

In this paper, owing to lack of time, I am only able to deal with the larger Gasteropods. I hope to deal with the smaller forms and with the Pelecypods in the future.

***Phasianella australis*, Gmelin.**

Buccinum australe, Gmelin, Sys. Nat., 1788, p. 3490, No. 173.

One large specimen, dead, in poor condition, dredged in 100 fathoms 90 miles west of Eucla.

Clanculus leucomphalus, Verco.

Clanculus leucomphalus, Verco, Trans. Roy. Soc., S.A., 1905, vol. xxix., p. 168, pl. xxxi., figs. 9-11.

One example was taken alive in 72 fathoms 40 miles west of Eucla, rather larger than the type, being 8.5 mm. high and 12 mm. in diameter.

Calliostoma hedleyi, Pritchard and Gatliff.

Calliostoma hedleyi, Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1902 (1901), vol. xiv. (New Series), part 2, p. 182, pl. ix., fig. 4: *Type locality*—Western Port (Gatliff); also *op. cit.*, 1906 (1905), vol. xviii. (New Series), part 2, p. 65; Hedley and May, Records Austr. Mus., 1908, vol. vii., p. 109, "100 fathoms, off Cape Pillar, Tasmania."

One example, taken in 80 fathoms 80 miles west of Eucla.

Crepidula immersa. Angas.

Crepidula immersa, Angas, Proc. Zool. Soc., London, 1865, p. 57, pl. ii., fig. 12: *Type locality*—"Port Lincoln, South Australia"; also p. 174, No. 118; Watson, 1886, "Chall.," Zool., vol. xv., p. 460, No. 4, "Bass Strait"; Tryon, Man. Conch., 1886, vol. viii., as a synonym of *C. onyx*, Sowerby, p. 128, pl. xxxviii., figs. 46, 47; J. B. Wilson, 1887, Vict. Nat., p. 116, "Port Phillip, Victoria"; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii., p. 201; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 377, as a synonym of *C. unguiformis*, Lamarck, Tasmania; also p. 445.

Taken in 75 fathoms 80 miles west of Eucla, up to 44.5 mm. in length, 3 quite fresh.

Caledoniella contusifomis, Basedow.

Caledoniella contusifomis, Basedow, Trans. Roy. Soc., S.A., vol. xxix., 1905, p. 183, pl. xxviii., fig. 1; *var. pulchra*, pl. xxviii., fig. 3.

Taken in 72 to 88 fathoms, 1, *C. pulchra*; in 88 to 100 fathoms, very many; in 100 fathoms, very many; in 96 to 84 fathoms, 12 specimens; and in 95 to 120 fathoms, very many. The trawling extended from 40 miles to 120 miles west of the longitude of Eucla. The examples were so numerous that we kept as many as we thought we might want and threw the rest overboard with the rubbish. They seemed to be most plentiful when large masses of green, sponge-like material were brought up. They were of varying sizes, but attained larger dimensions than the type, the shell reaching a maximum of 37 mm. long by 29 mm. wide. We did not secure a single specimen of the other varieties of this species, such as *testudinis* or *labyrinthina*, nor of the typical *contusifomis*, though variations in colour-marking were found in *C. pulchra*. Some had just the same colouration as

the example figured, the shield "of a rich yellow ground-colour, with large circular or oval lighter blotches surrounded by wreaths of black." A very large number were altogether destitute of the black wreaths, and had pale-yellow areas on the darker-yellow ground. Others had opalescent-white spots instead of the pale-yellow, and others again had yellow spots on an opalescent-white ground.

Balch, of Boston, Massachusetts, in a paper on a new Labradorean species of *Onchidiopsis*, in the Proc. U.S. Nat. Mus., vol. xxxviii., No. 1761, p. 469, places *Caledoniella* in the subfamily *Velutininae*, of the family *Lamellariidae*; but in order to locate the genus definitely in its subfamily it is necessary to determine whether the animal has the sexes separate or united, and whether it has an expiratory cleft.

Turritella runcinata, Watson.

Turritella runcinata, Watson, Jour. Linn. Soc., vol. xv., 1881, p. 217; Verco, Trans. Roy. Soc., S.A., 1910, vol. xxxiv., p. 122.

Taken in 50 fathoms west of Eucla, 2; 75 fathoms 80 miles west of Eucla, 3; 80 fathoms 80 miles west of Eucla, 4; 101 fathoms 80 miles west of Eucla, 1. It may reach 64 mm. in length by 17 mm. in width. They were all dead.

Vermicularia flava, Verco.

Vermicularia flava, Verco, Trans. Roy. Soc., S.A., 1907, vol. xxxi., p. 214, fig. 1; Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1908, vol. xxi. (New Series), part 1, p. 376, "Western Port"; Hedley and May, Records Austr. Mus., 1908, vol. vii., p. 111, "100 fathoms, off Cape Pillar, Tasmania"; Hedley, Commonwealth of Australia, Fisheries, 1911, part 1, p. 93, "100 fathoms, off Cape Wiles."

Taken in 80 fathoms 80 miles west of Eucla, alive; in 100 fathoms 90 miles west of Eucla.

Siliquaria australis, Quoy and Gaimard.

Siliquaria australis, Quoy and Gaimard, Voy. "Astrolabe," Zool., 1834, vol. iii., p. 302; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 378, recorded for Tasmania; Menke, Moll. Nov. Holl., p. 10, No. 28, recorded for Western Australia; Angas, Proc. Zool. Soc., 1865, p. 174 (*Tenagodes*), recorded for South Australia; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 204, recorded for Victoria.

Dredged alive in large masses of yellow sponge in 80 fathoms 80 miles west of Eucla, and in 75 fathoms; in 100 fathoms 90 miles west of Eucla, and in 72 fathoms 40 miles west of Eucla.

Siliquaria weldii, Tenison-Woods.

Tenagodus weldii, Tenison-Woods, Proc. Roy. Soc., Tasmania, 1876 (1875), p. 144, "East coast, Tasmania"; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 205 (*Tenagodes*), "Port Phillip, Western Port"; May, Proc. Roy. Soc., Tasmania, 1902, p. 110, "Type in Tas. Mus., Hobart."

Siliquaria (Pyxipoma), Tryon, Man. Conch., 1886, vol. viii., p. 191, pl. lviii., fig. 28; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 378; Hedley, Records Austr. Mus., 1905, vol. vi., part 2, p. 42, "111 fathoms, off Cape Byron, New South Wales"; Hedley and May, *op. cit.*, 1908, vol. vii., No. 2, p. 111, "100 fathoms, off Cape Pillar."

Taken in 100 fathoms 90 miles west of Eucla, in sponge.

Siliquaria anguina, Linnæus.

Tenagodus anguinus, Linnæus, Mus. Lud. Ulr., 701, No. 431, 1758.

Serpula anguina, Born, Mus. Caes. Vindobon., Test., Tome 18, fig. 15; Gmelin, Sys. Nat. Linn., 1789, vol. vi., p. 3743, "Indian Ocean."

Siliquaria anguina, Chenu, Illus. Conch., p. 1, pl. i., figs. 1, 2; Reeve, Conch. Icon., pl. iii., Sp. 7, figs. 7a, 7b, 7c, 7d, 7e; Tryon, Man. Conch., 1886, vol. viii., p. 190, pl. lviii., figs. 23-25; Sowerby, Thes. Conch., vol. v., 1887, p. 165, No. 13, pl. 481 (*Siliquaria* ii.), figs. 11-13.

Serpula muricata, Born, Mus. Caes. Vindobon., Test., Tome 18, fig. 16.

Siliquaria muricata, Lamarek, Anim. S. Vert. (2nd Edition, Deshayes, etc.), 1838, vol. vi., p. 584, "Indian seas"; Chenu, Illus. Conch., p. 2, pl. ii., figs. 13, 14, "Indian seas and New Holland."

Gmelin, Reeve, Tryon, and Sowerby give *S. muricata* as a synonym of *S. anguina*.

Taken in 100 fathoms 90 miles west of Eucla, several, in a piece of blackish-purple sponge, which stains them somewhat violet. It has the *S. muricata* form, and is easily distinguished from our other two southern Australian species *S. australis* and *S. weldii* by its squamate longitudinal ribs.

Cypræa thersites, Gaskoin.

Cypræa (Aricia) thersites, Gaskoin, Proc. Zool. Soc., 1848, p. 90: *Type locality*—"Salt Creek, Yorke Peninsula, South Australia, on clusters of *Zoophytes* at 2 to 3 fathoms."

Dredged alive in 72 fathoms 60 miles west of Eucla, 1; in 100 fathoms 90 miles west of Eucla, 1; in 75 to 120 fathoms 40 miles west of Eucla, 2. This species has hitherto appeared to be of an exceedingly limited *habitat*, being taken only in Gulf St. Vincent and Spencer Gulf. Once I dredged a large living specimen at the mouth of the American Inlet, off Hog Bay, Kangaroo Island. But it has not been recorded

from Victoria, Tasmania, or Western Australia. To meet it in about 100 fathoms in the Great Australian Bight was a surprise. The specimens obtained were all comparatively young. Their outer lip was formed and toothed, and the base was flattened. The youngest is nearly white, with a faint bluish-grey tint, and has two broad darker bands running across the shell from one lateral margin to the other. There are about 25 brown spots on the right margin and 10 on the left. The next more mature specimen has a flatter base, which projects more at both ends, which are faintly tinted with orange; the ground-colour is more bluey-grey, and numerous transverse interrupted streaks of brown cross the shell, more marked on the left side; numerous smaller spots are superadded to those on the right border. The third example is nearly mature, is of a still darker bluish-grey, with much more numerous and darker and larger blackish-purple spots on both margins, especially the left, and with darker brown dashes on the dorsum arranged antero-posteriorly. They differ from specimens found in our gulfs in their much lighter colour. The latter, even when much less mature, long before they show any sign of a formed lip, are of a yellow-orange colour, and are abundantly covered with dark-rusty-brown spots and blotches. The pallor of the deep-sea examples is very striking.

Cypræa reevei, Gray.

Cypræa reevei, Gray, Sowerby, Conch. Illus., 1832, *Cypræidæ*, p. 2, No. 15*, fig. 52: *Type locality*—Garden Island, mouth of the Swan River"; Menke, 1843, Moll. Nov. Holl., p. 29; Tryon, Man. Conch., 1885, vol. vii., p. 166, pl. iii., figs. 24, 25.

Taken in 100 fathoms 90 miles west of Eucla, 5 alive; in 105 fathoms 30 miles west of Eucla, 1 alive. This species is taken in King George Sound on rocks at low tides alive, and it is found alive in 100 fathoms. Most of the examples taken are more pallid than those in-shore, but there are the same pink tips and spire and obsolete transverse darker bands. It seems to have come round from the west, and to have reached South Australia, where it is known to extend as far as Backstairs Passage. From Victoria and Tasmania it is unrecorded.

Cypræa pulicaria, Reeve.

Cypræa pulicaria, Reeve, Proc. Zool. Soc., 1845, *hab. (?)*; Conch. Icon., 1846, Sp. 84, pl. xvii., fig. 84; Tryon, Man. Conch., 1885, vol. vii., p. 189, pl. xvi., figs. 59, 60.

Taken in 80 fathoms 80 miles west of Eucla, 1 alive; in 100 fathoms 80 miles west, 3 alive; in 100 fathoms 90 miles west, 6 alive. They vary from 17 mm. to 24 mm. in

length, are of a greyish-yellowish or yellowish-brown colour. There may be no dots whatever, or only a few brown dots about the right border, or many scattered all over the surface irregularly, or some of these may be arranged in three transverse rows, or besides other scattered sparse dots, there may be two or three obscure transverse bands of brown blotches. They are narrower and more cylindrical than the *C. piperata*, Solander, though probably only a variant.

Cypræa umbilicata, Sowerby ; var. **armeniaca**, *n. v.*

Pl. x, figs. 1-3.

1825. *Cypræa umbilicata*, Sowerby, G. B., Catalogue of Shells in collection of Earl of Tankerville, Appendix, p. xxx., No. 2260, pl. iv. and v.: *Type locality* unknown.

1826. *Cypræa umbilicata*, Sowerby, G. B., Zool. Jour., 1826. vol. ii., p. 494.

1828, Wood, Supp. Index, Test., 1828, p. 9, pl. iii., fig. 13. *hab.* unknown.

1828, *Cypræa umbilicata*, Sowerby, Gray, Zool. Jour., vol. iv., p. 77, and Sowerby, G. B., p. 221.

1837. *Cypræa pantherina*, Solander MSS., var. *umbilicata*, Sowerby, Conch. Illus. *Cypræa*, p. 2, No. 5, fig. 169.

1844, *Cypræa tigrina*, Lamarck, Deshayes, Anim. S. Vert. (2nd Edition, Deshayes, etc.), vol. x., p. 504.

1845, *Cypræa pantherina*, Lamarck, Reeve, Conch. Icon., pl. iii., Sp. 7.

1848, *Cypræovula umbilicata*, Sowerby, Gray, Proc. Zool. Soc., London, pp. 124, 125.

1867, *Cypræovula umbilicata*, Sowerby, Angas, Proc. Zool. Soc., London, p. 205.

1872, *Cypræovula umbilicata*, Sowerby, Brazier, Proc. Zool. Soc., London, 1872, p. 86.

1880, *Cypræa umbilicata*, Sowerby, Cox, Proc. Linn. Soc., N.S.W., 1879, p. 386.

1880, *Cypræa umbilicata*, Sowerby, Thes. Conch., vol. iv., p. 21, Sp. 61, pl. vii., figs. 42-44.

1883, *Luponia umbilicata*, Sowerby, Brazier, Proc. Linn. Soc., N.S.W., vol. vii., p. 117.

1885, *Cypræa umbilicata*, Sowerby, Tryon, Man. Conch., vol. vii., p. 181.

1898, *Cypræa umbilicata*, Sowerby, Beddome, Proc. Linn. Soc., N.S.W., vol. xxii., 1897, pp. 564-568, pl. xx., figs. 1, 2.

1900, *Cypræa umbilicata*, Sowerby, Pritchard and Gatliff, Proc. Roy. Soc., Victoria, vol. xii. (New Series), part 2, p. 187.

1901, *Cypræovula umbilicata*, Sowerby, Tate and May, Proc. Linn. Soc., N.S.W., vol. xxvi., 1901, p. 374.

Cypræa umbilicata, Sowerby

This species was erected upon a shell in the collection of the Earl of Tankerville, and was described and figured in

the Appendix to the Sale Catalogue of the Earl's collection by G. B. Sowerby, F.L.S., in 1825. Only two specimens were known—the type and one in the cabinet of Mr. Sowerby. The type came into the possession of the British Museum. Its *habitat* was unknown. He remarked its resemblance to *C. tigris*, but in the Zoological Journal of 1826 indicated its diagnostics.

The name *C. umbilicata* had been previously attached to a shell by Solander, which Gray thinks was *C. pyrum*; but as Solander's name was only in manuscript, and was never published, Sowerby's specific name stands.

In 1828 Dr. Gray discussed it, and suggested that as only one specimen was known it might be merely a monstrosity, a deformed *C. tigris*; but if a good species, it should be placed in his newly created genus *Cyprovula*.

G. B. Sowerby replied that two specimens were known which were quite alike; this supported the probability of its being a good species, allied rather to *C. pantherina* than to *C. tigris*.

In 1837, however, Mr. Sowerby, in his Conchological Illustrations, registered his species as a variety of *C. pantherina*, Solander MSS., having evidently accepted the suggestion that it was only a variant or a monstrosity of this variable and well-known shell.

Deshayes, in his 2nd Edition of Lamarck's Anim. S. Vert., 1844, enters it among the synonyms of *C. tigrina*, Lamarck; and Reeve, in his Conch. Icon. of 1845, under *C. pantherina*, Lamarck, says "*C. umbilicata* has been acknowledged a monstrosity."

This degradation of the species to the position of a monstrosity was doubtless due to the peculiar deformed appearance of the shell and to the fact that for more than twenty years no other specimens had been found and its *habitat* was still unknown. But in 1848 Mr. Roland Gunn wrote to Dr. Gray about a collection of cowries he had found on "the east shore of Barren Island, one of Hunter's islands, north-west of Van Diemen Land," and he sent one fine specimen to the British Museum. This Dr. Gray recognized as *C. umbilicata*, Sowerby, and placed definitely among his *Cyprovula* as "the giant of the genus," removed the reproach of monstrosity from it, and established it as a true and very remarkable species, the home of which had at last been discovered. It immediately leaped into notoriety and became valuable, for the second specimen sent to England by Mr. Gunn realized the handsome sum of £30; whereas in my Tankerville Catalogue, in which have been written the prices

paid at the sale of his shells, the sum of £3 3s. is entered against *C. umbilicata*, Sowerby.

Angas in 1867 recorded the dredging, in deep water 2 miles off the coast of New South Wales, a little south of Wollongong, of several living specimens, somewhat smaller and paler in colour than the ordinary Tasmanian examples.

Sowerby in his Thesaurus gives figures of Miss Saul's specimen, which is possibly the before-mentioned individual, offered to her by Mr. Gunn for £30, and which subsequently realized that sum: and also of one of those mentioned by Mr. Angas as being dredged by Admiral Loring off Wollongong.

Dr. Cox in 1880 created a variety, *alba*, for a shell obtained at Circular Head, Tasmania, pure white, and quite devoid of all the usual characteristic spots and colouration.

John Brazier in 1883 recorded typical examples found by Mr. Bailey at Cape Schanck and Portland, on the Victorian coast.

C. E. Beddome, in an exhaustive note, refers to an individual found by Dr. A. E. Cox at Port Stephens, New South Wales, only $2\frac{1}{2}$ in. long, lighter in colour than the Tasmanian shells, covered with light chestnut spots, base white, but not so highly enamelled as the southern forms found here (in Tasmania). He reproduces it (fig. 2, pl. xx.).

When out in the Federal trawler "Endeavour" in March, 1912, three large cowries, with a deep umbilicus, were obtained. Two of them were immature and very slightly coloured, but the third was mature, and resembled somewhat *Cypræa umbilicata*, Sowerby. I have regarded it as a variety of this species, and named it *Cypræa armeniaca* (from *armeniaca*, an apricot), because of the beautiful apricot-yellow colour of its base. Should other examples be found and establish its right to a specific distinction its name will stand, as I know of no other species so called.

***Cypræa umbilicata*, Sowerby; var. *armeniaca*, n. v.**

Shell solid, globular, very smooth and glazed. It has a well-marked umbilicus in which the volutions are plain; obsolete, narrow, flat, spiral bands occur on the right side of the dorsum. The base is convex. The aperture moderately wide, slightly dilated anteriorly, and then narrowing into a canal 8 mm. long; posteriorly very curved round the posterior part of the whorl and turning up behind and ending in a well-marked notch. The outer lip is bent in at a right angle, slightly convexly flattened, thick, with 38 rather small teeth,

almost confined to the inner edge. The teeth along the inner-margin are 29, narrow and very short, ending rather abruptly at their inner ends and rapidly becoming obsolete at their outer. The base is prolonged, thickened, and expanded on each side in front, especially on the left, and also at the back, where there is a considerable thickening round the notch, which is projected by it 8 mm. from the umbilicus, and some distance to the left of the centre of the spire.

The colour is whitish, but except along the line of union of the mantle-folds and just above the margins the white is obscured by clouds and blotches of light yellowish-brown and scattered chestnut spots, an irregular line of which bounds the upper edge of the right mantle lobe. The top of the anterior beak is painted blackish-brown, as is also the right side of the callus of the outer lip behind at its junction with the body-whorl. The whole of the base and outer lip is of a rich apricot colour, deepest outside the columellar teeth, which it tinges, and on the callus forming the anterior and posterior projections of the inner lip; it extends to both lateral margins and covers the dorsal surface of the anterior beak and the callus round the posterior notch. The left side of the body-whorl is of a delicate faint lilac tint, which fades insensibly into the yellow, white, and chestnut around. The interior is a creamy-white.

The animal is white, but the margin of its mouth is of a deep apricot colour, as is also the somewhat expanded semi-circular anterior end of the foot. The tentacles, about half an inch long, are of a paler tint, and so are their bases, which are about one-third as long and twice as stout, and bear the black eyes on their summits, outside the tentacles.

Dimensions.—Length, 3·9 in. ; breadth, 2·5 in. ; height, 2·2 in.

Locality.—100 fathoms, Great Australian Bight, 60 miles from shore, 80 miles west of Eucla, with 2 immature shells. The trawl worked over the sea bottom from 75 to 120 fathoms, so that they might have come from any intermediate depth.

The youngest example, taken at 80 fathoms in the Great Australian Bight 80 miles west of Eucla, is light and papery. It is 3 in. long by 2·2 in. wide and 1·9 in. high. Its outer lip is formed and bent in, and has 33 teeth, and there are 28 on the inner side of the aperture. The posterior notch touches the last whorl in the sunken spire, the anterior canal is smooth for 6 mm. beyond the teeth. There are faint axial growth-lines and numerous spiral flat bands. The ground-colour is white with a spiral disposition of brown smudges and streaks, which on the left side of the shell are united by a lighter

general brownish colouring. The base is of a faint apricot tint, which also tinges the columellar teeth. Near the base is a band of deep brown spots of varying size, which are found also on the base of the body-whorl; the anterior end and the lower third of the depressed spire and the adjacent part of the outer lip are of a dark walnut-brown.

A slightly older specimen, from 100 fathoms, is 3·5 in. long, 2·5 in. wide, and 2·2 in. high, has fewer brown spirals, with 36 outer and 26 inner and 4 intermediate teeth, the outer lip is rather more thickened, and the flat dorsal spirals are slightly more conspicuous.

I have had five examples of the Tasmanian form to compare it with, as well as the figures given by all the above-mentioned authors. Mine differs in shape, being more globular, higher, and wider, not only relatively, but absolutely. Mr. May kindly lent me two very diverse examples, which respectively measured 4·4, 2·3, 1·9 in. and 3·4, 2·1, 1·8 in. in length, breadth, and height, whereas mine is 3·9, 2·5, 2·2 in. Allowing, therefore, for the greater length of the anterior and posterior prolongations in Mr. May's large specimen, which is probably a senile change, mine is still more globular. It is interesting to notice the greater similarity between my specimen and the type, whose dimensions are: Length, 3·8 in.; and breadth, 2·3 in., which is different from that of most specimens. Sowerby does not give the height of his shell, nor a figure in profile, and it is difficult to estimate this from his figure, but it seems less elevated than mine. The concave depression on the under-surface of the forward projection is much less in mine, and the posterior curve of the aperture, its upward bending and the twist to the left are more marked. The colour is very different. The fairly uniform peppering with dark spots, the white base, the brown wide blotch over the middle third of the base of the body-whorl are wanting in mine, while the apricot base and the lilac side are absent from the typical shells.

It may be that the shape is due to its *habitat* in the quiet waters of 100 fathoms, and that though mature it is not senile, and its colouring to its having been taken alive instead of being washed up and partially bleached on the shore. But we will hope other specimens may be secured which will determine its right to be called a good species.

Type in my collection.

Trivia australis, Lamareck.

Cypræa australis, Lamareck, Anim. S. Vert., 1822, vol. vii., p. 404, and 1844 (Edition Deshayes), vol. x., p. 545, "The seas of New Holland" (M. Macleay); Sowerby, Conch. Illus., 1832,

fig. 29, p. 12 (1841), No. 112, "New South Wales"; Quoy and Gaimard, 1834, Voy. "Astrolabe," Zool., vol. iii., pl. xlvi., figs. 19-26; Menke, 1843, Moll. Nov. Holl., p. 30, *Cypræa* (*Trivia*), "Western shore of Australia"; Kiener, Coq. Viv., 1845, p. 138, Sp. 125, pl. xlvi., 2 bis; Reeve, Conch. Icon., 1846, vol. iii., pl. xxiv., fig. 138; Angas, Proc. Zool. Soc., London, 1867, p. 206; also 1878, p. 867, "Fowler Bay and Cape Northumberland," South Australia; Sowerby, *Cypræa* (*Trivia*), 1870, Thes. Conch., vol. iv., p. 45, pl. 325, figs. 439, 440 (*Cypræa*, pl. xxxiv.); Brazier, Proc. Zool. Soc., London, 1872, p. 86; Weinkauff, 1881, Conch. Cab. (Ed. Küster), Band. v., Abt. iii., p. 142, pl. xlix., figs. 14, 15; Tryon (*Trivia*), 1885, Man. Conch., vol. vii., p. 206, pl. xxiii., figs. 53, 54; Brazier, Proc. Linn. Soc., N.S.W., vol. ix., p. 29; Beddome, 1898 (*Trivia*), Proc. Linn. Soc., N.S.W., vol. xxiii., pl. xxi., fig. 19; Pritchard and Gatliff (1899), 1900, vol. xii. (New Series), p. 187, Victorian coast; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 374, Tasmania; Hedley and May, Records Austr. Mus., 1908, vol. vii., p. 111, No. 2, "100 fathoms, off Cape Pillar."

Taken in 80 fathoms 80 miles west of Eucla, 2 alive, without dorsal colour-blotches.

***Ovula philippinarum*, Sowerby.**

Ovula philippinarum, Sowerby, Proc. Zool. Soc., London, 1848, p. 136; also Thes. Conch., 1855, vol. ii., p. 481, Sp. 44, pl. c., figs. 57, 58, "Philippines"; Reeve, Conch. Icon., 1865, Sp. 46, pl. x., figs. 46a, 46b; Tryon, Man. Conch., 1885, vol. vii., p. 252, pl. iv., figs. 100-9. He gives among its synonyms *O. angasi*, A. Adams (from Port Curtis, Australia), etc.

One example, dredged in 72 fathoms 40 miles west of Eucla, 18.5 mm. in length, not quite so solid as the figures in the above plates seem to show.

***Tonna variegata*, Lamarck.**

Dolium variegatum, Lamarck, 1822, Anim. S. Vert., vol. vii., p. 261; also 1844 (Edition Deshayes), vol. x., p. 143, No. 6, "The seas of New Holland, in the Bay of Dogs"; Angas, Proc. Zool. Soc., 1867, p. 197, recorded for New South Wales; also by Hedley, Mem. Austr. Mus., 1903, vol. iv., p. 341; Tryon, Man. Conch., 1885, vol. vii., p. 262, pl. iii., fig. 13.

Tonna variegata, Lamarck, Hedley, Austr. Assoc. Adv. Science, 1909, p. 361, recorded for Queensland.

A fresh shell, 85 mm. by 65 mm., was taken in 100 fathoms 80 miles west of Eucla. This is the easterly limit on the southern Australian coast for the species to my knowledge. Its absence from South Australian, Victorian, and Tasmanian waters makes it probable it has come from the north round Cape Leuwin.

***Cassis fimbriata*, Quoy and Gaimard.**

Cassis fimbriata, Quoy and Gaimard, Voy. "Astrolabe," 1833, Zool., vol. ii., p. 596, pl. xliii., figs. 7, 8; Angas, Proc. Zool.

Soc., 1865, recorded for South Australia; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 188, recorded for Victoria.

One individual, 83 mm. long by 52 mm. broad and 46 mm. high, with three spiral rows of tubercles on the body-whorl, was taken alive in 100 fathoms, quite typical in form and colour, and a second one dead.

Cassidea adcocki, Sowerby.

Cassis adcocki, Sowerby, Proc. Mal. Soc., 1896, vol. ii., p. 14, text figure: *Type locality*—Yankalilla Bay, South Australia; Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1912 (New Series), part 1, p. 170, recorded for Bass Straits.

One example was taken dead in 100 fathoms 90 miles west of Eucla.

Cassidea pyrum, Lamarck.

Cassis pyrum, Lamarck, Anim. S. Vert., 1844 (Edition Deshayes), vol. x., p. 33, "New Holland"; Angas, Proc. Roy. Soc., 1867, p. 197, recorded for New South Wales; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 189; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 373 (*Semicassis*), recorded for Tasmania.

Cassis nivea, Brazier, Proc. Zool. Soc., 1872, p. 616, pl. xliv., fig. 1.

Cassis tumida, Petterd, Proc. Roy. Soc., Tasmania, 1886 (1885), p. 321.

Cassis thomsoni, Brazier, Proc. Linn. Soc., N.S.W., 1875, vol. i., p. 8; Hedley (*Cassidea pyrum*, Lamarck, var. *thomsoni*, Brazier), Mem. Austr. Mus., 1903, vol. iv., part 6, p. 341, pl. xxxv., figs. 2, 3.

Dredged in 100 fathoms 90 miles west of Eucla, 4; in 75 to 120 fathoms 120 miles west of Eucla, 1; in 95 fathoms 90 miles west of Eucla, 3. All were well coronated, with moderately exserted spires and with more or less marked axial plicæ on the inflation of the body-whorl, a little below the coronation. The colour when fresh was a pink-flesh tint, with a blackish-purple on the varix of the canal, and about seven blotches of black-purple on the outside of the recurved labrum, fading away towards the dorsum as vanishing spiral flames. Some have two spiral bands of orange blotches on the body-whorl.

One quite fresh shell was taken in 140 fathoms, 34 mm. 22.5 mm., without angle or tubercles or plicæ, with a thickened reflected lip, with seven purplish-black spots on it, a micromorph of the variety found to the east of Bass Straits.

Cassidea semigranosa, Lamarck.

Cassis semigranosa, Lamarck, 1822, Anim. S. Vert., vol. vii., p. 228, No. 23: *Type locality*—"The seas of New Holland";

Angas, Proc. Zool. Soc., 1865, p. 168 (*Semicassis*), recorded for South Australia; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 190, recorded for Victoria; Tate and May, 1901, Proc. Linn. Soc., N.S.W., vol. xxvi., p. 373 (*Semicassis*), "South and east coasts of Tasmania."

One dead shell, taken in 80 fathoms 80 miles west of Eucla.

Ficus tessellatus, Kobelt.

Ficula tessellata, Kobelt, Conch. Cab. (Ed. Küster), 1881, Band. iii., Abt. 3.B., p. 12, Sp. 6, Taf. ii., fig. 3: *Type locality*—Australia.

Pyrula tessellata, Kobelt, Tryon, Man. Conch., 1885, vol. vii., p. 267, pl. v., fig. 31, Rosemary Island, Australia.

One fragment, taken in 100 fathoms 90 miles west of Eucla. This is a new genus for the southern coast of Australia.

Cymatium rubicundum, Perry.

Septa rubicunda, Perry, 1811, pl. xiv., fig. 4; Gatliff, Vict. Naturalist, 1902, vol. xix., No. 5, p. 76; (*Lotorium*) Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1905, vol. xviii. (New Series), part 2, p. 41; (*Septa*) Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1908; (*Cymatium*) Hedley, 1909, Austr. Assoc. Adv. Sci., p. 360, "Queensland."

Triton australe, Lamarck, Anim. S. Vert. (Edition Deshayes), 1843, vol. ix., p. 625.

Triton nodiferus, Lamarck, Anim. S. Vert. (Edition Deshayes), 1843, vol. ix., p. 624.

Triton saulæ, Reeve, Conch. Icon., 1844, pl. v., fig. 17, "Philippines."

Examples were taken along the 100-fathom line. Three were only 40 mm. and 30 mm. in length. Each of these retained the protoconch, which was conical, and consisted of four quite smooth, sloping, slightly conical whorls. The extreme tip, however, in each example was absent. Three large ones were obtained alive up to 21 cm. long by 11 cm. broad, including the everted lip. These were somewhat more elongate and narrow than those found on the shore at Albany and Wedge Island and less solid, and were less deeply coloured than those taken on the beach on the west coast of Australia.

Cymatium verrucosum, Reeve.

Triton verrucosus, Reeve, Proc. Zool. Soc., London, 1844, p. 118, *hab.* (?); Conch. Icon., 1844, vol. ii., pl. xvii., fig. 71; Kobelt, Conch. Cab. (Ed. Küster), 1878, Band. iii., Abt. 2, p. 188, pl. liii., figs. 6, 7; Tryon, Man. Conch., 1881, vol. iii., p. 24, pl. xiii., fig. 117; Pritchard and Gatliff, *Lotorium verrucosum*, Reeve, Proc. Roy. Soc., Victoria, 1898 (1897), vol. x. (New Series), p. 266, recorded for Victoria; Tate and May, *Lampusia*, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 355, for Tasmania.

Triton quoyi, Reeve, Proc. Zool. Soc., London, 1844, p. 118; Conch. Icon., 1844, vol. ii., pl. xix., fig. 93.

Taken in 75 fathoms 80 miles, and in 100 fathoms 90 miles, west of Eucla. It has the ordinary characters of the *T. quoyi* form.

Cymatium vespaceum, Lamarck.

Triton vespaceum, Lamarck, 1822, also Lamarck, Anim. S. Vert. (Edition Deshayes, etc.), 1843, vol. ix., p. 636, *hab.* (?), 14 lines long; Kiener, Spec. Coq. Viv., vol. vii., 1842, p. 18, No. 13, pl. iii., fig. 2, "Indian Ocean"; Menke, Moll. Nov. Holl., 1843, p. 25, "West coast of Australia"; Tryon, Man. Conch., 1881, vol. iii., p. 22, pl. xii., figs. 94-100; Hedley (*Cymatium*), Austr. Assoc. Adv. Sci., 1909, p. 360, "Queensland."

Two examples, taken in 100 fathoms 90 miles west of Eucla, 23.5 mm. long and 20 mm. broad.

Gyrineum ranelloides, Reeve.

Triton ranelloides, Reeve, Proc. Zool. Soc., 1844, p. 111; Conch. Icon., 1844, No. 10, pl. iii., figs. 10a, 10b, *hab.* "Matnog, Province of Albay, Island of Luzon, Philippines (found on the reefs), Cuming"; Tryon, Man. Conch., 1881, vol. iii., p. 267, gives it as a synonym of *Ranella cruentata*, Sowerby.

Gyrineum ranelloides, Reeve, Hedley, Austr. Assoc. Adv. Sci., 1909, p. 361, "Queensland."

One living specimen was dredged in 101 fathoms 80 miles west of Eucla. The operculum is shown in pl. xvi., fig. 7, and the radula in pl. xvi., fig. 6. The shell is 50 mm. long by 24 mm. at its widest part, including the varix, with a shortly conical protoconch of five whorls. The first three are very depressed, scarcely rounded; the last two are convex, and rather rapidly increasing. The first four have two erect, sharp, hair-like spiral threads, at about equal distances from the sutures and each other, and numerous though not closely crowded, oblique similar axial threads. These gradually vanish towards the beginning of the last whorl; this ends abruptly where the ordinary sculpture of the spire-whorls begins. This consists of a row of large tubercles on the median angle, three rows of tiny tubercles above these and one below. On the body-whorl the last become successively larger, and another row succeeds them further forward, and several rows of large granules are intercalated. The tubercles are deeper yellowish-brown than the ground-colour, and there are stray axial flames of darker brown and articulated spirals of broken lines or tiny spots of brown. The reflected lip just beyond the varix is very daintily spotted on its inner margin with dark-brown, which clouds also the upper part of the inner lip between its white plicæ. The lower half of the columella is white, bordered above by the yellow of the back of the pre-

ceding snout. The round gutter at the back of the aperture is very marked. The varices do not run continuously from spire to spire as in *Ranella*, but stand one-fourth of the circumference behind that in the spire below.

An identical specimen was sent to me some years ago as from Japan by Mr. Sowerby under the name *Triton raneloides*, Reeve.

Argobuccinum australasia, Perry.

Biplex australasia, Perry, 1811, Conchology, pl. iv., figs. 2, 4, "New Holland and Van Diemen's Land."

Ranella leucostoma, Lamarck, 1822, Anim. S. Vert., vol. vii., p. 150.

Dredged in 101 fathoms 80 miles west of Eucla, 1 immature, 50 mm. by 27 mm., with a conical protoconch of four sloping convex whorls, the minute extreme apex appears to be absent; colour of shell, light bluish-grey, covered with a thin epidermis, like coarse muslin, with a minute erect hair at each intersection. Aperture quite white. Also, a mature shell 90 mm. by 43 mm., solid, and lighter in colour than those from Tasmania.

Nassaria torri, Verco. Pl. xiii., figs 3, 4.

Cominella torri, Verco, Trans. Roy. Soc., S.A., 1909, vol. xxxiii., p. 271, pl. xxi., figs. 10, 11.

The species was founded on several examples collected on St. Francis Island thrown up among the rocks, but none of them were full grown, and all of them were more or less rolled and damaged. But on May 27, 1912, the Federal trawler "Endeavour" obtained a perfect specimen from a depth varying from 77 to 105 fathoms, about 40 miles west of the meridian of Eucla. It was inhabited by a hermit crab. It has nine whorls. The protoconch, comprising one and a quarter turns, is blunt, slightly excentric and smooth. The suture ascends for about a sixth of the circumference on the last whorl, and forms with a curved callosity on the inner lip, a narrow gutter at the back of the aperture.

The aperture is obliquely axially ovate, narrowed posteriorly to a gutter and anteriorly to a short, wide, oblique canal. The outer lip is thin, simple, uniformly convex, slightly reflected, smooth within. The inner lip is an expanded glaze on the body-whorl, thickened internally into a curved callus, extending slightly above the back of the aperture at the suture; anteriorly the labium is thick, detached from the base of the whorl, and carried forward over the very valid varix of the canal to form a false, well-marked umbilicus, and to join almost at a right angle with the left margin of the

canal, which is dorsally curved to run almost vertically for about half an inch. The varix of the notch projects as a very faint oblique prominence on the columella. The columella is sigmoidally concave above and convex below.

The bent canal removes it from the genus *Cominella* and separates it from *Phos* and places it in *Nassaria*. If this location prove correct it is a gigantic member of the genus, measuring 69 mm. in length by 29 mm. in breadth. A second example, not full grown and not in very good condition, was taken in 100 fathoms 90 miles west of Eucla.

***Siphonalia dilatata*, Quoy and Gaimard**

Fusus dilatatus, Quoy and Gaimard, 1833, Voy. "Astrolabe," Zool., vol. ii., p. 498, pl. xxxiv., figs. 15, 16; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1898 (1897), vol. x. (New Series), part 2, p. 272.

Fusus tasmaniensis, Adams and Angas, 1863, Proc. Zool. Soc., London, p. 421, pl. xxxvii., fig. 1.

Siphonalia maxima, Tryon, 1881, Man. Conch., vol. iii., p. 135, pl. liv., fig. 335.

Siphonalia oligostira, Tate, Trans. Roy. Soc., S.A., 1891, vol. xiv., p. 258, pl. xi., fig. 6.

Taken in 105 fathoms 30 miles west of Eucla, with marked angulation, valid sharp transverse coronating tubercles, with numerous crowded fine deep-brown spiral cords, the colour deepest in a rather broad band revolving over the middle of the body-whorl, the interior a beautiful vivid salmon-tint or white, two examples.

Taken in 100 fathoms 90 miles west of Eucla, 2 much longer and narrower examples, one with a more rounded shoulder, with rounder and more pliciform tubercles, fewer broader spiral cords, pure white both outside and in; the second from this station comes midway between this and the first two in its colouring and sculpture. One immature, 48 mm. long, taken in 72 fathoms 40 miles west of Eucla.

***Fusus novæ hollandiæ*, Reeve.**

Fusus novæ hollandiæ, Reeve, Conch. Icon., 1847, vol. iv., p. 197, pl. xviii., fig. 70; Angas, Proc. Zool. Soc., 1877, p. 179, recorded for New South Wales; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., recorded for Tasmania; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1898, vol. x. (New Series), part 2, p. 269, recorded for Victoria; in vol. xviii., 1906, p. 43, they state that the type is in the National Museum, Victoria.

One example was dredged in 100 fathoms 90 miles west of Eucla, with the mouth somewhat broken, 67 mm. long by 22 mm. wide, spire 24 mm. long. Its shoulder is median and sharply angled, with nine pliciform axial ribs, more

marked below the angle than above, much narrower than their interspaces; the four spiral threads above the shoulder very fine, those below it very fine but slightly larger; those on the body-whorl finer than in Tasmanian specimens. A bright reddish-brown spot between the costæ at the angle.

Fasciolaria australasia, Perry.

Pyrgula australasia, Perry, 1811, Conchology, pl. liv., fig. 4, "New Holland and Van Diemen's Land."

Fasciolaria coronata, Lamarck, 1822, Anim. S. Vert., vol. vii., p. 120.

One individual, dredged in 72 fathoms 60 miles west of Eucla, is rather a marked variant. It is 143 mm. long by 55 mm. at its widest part. The protoconch of two rounded smooth whorls is less eccentric and pulloid than usual. The spire is unusually long, 62 mm., of six whorls, very sharply shouldered just above the middle and markedly contracted at the sutures, with about eleven pliciform tubercles with sharp transverse summits, corded with a spiral thread. A very thin horny epidermis. Colour, first three spire-whorls brownish, all the rest quite white; interior pure white. Another individual, taken in 100 fathoms 80 miles west of Eucla, was, as to protoconch, shape, and colouration, one of the common coronated forms.

Scaphella undulata, Lamarck.

Voluta undulata, Lamarck, Ann. du Mus. Hist. Nat., vol. v. 1804, p. 157, pl. xii., figs. 1a, 1b.

Four examples, taken 80 miles and 90 miles west of Eucla from 72 to 105 fathoms, all immature and dead and quite typical.

Scaphella fulgetrum, Sowerby. Pl. xi. and xii.

Voluta fulgetrum, Sowerby, Tankerville Catalogue, 1825, p. 81, No. 2149; Appendix, p. xxviii., pl. iv., v.: *Type locality* unknown; Broderip, Zool. Jour., 1826, vol. ii., p. 35; Wood, Index. Test. Supp., 1828, p. 59, pl. iii., fig. 3; Anim. S. Vert., 1844 (2nd Edition, Deshayes, etc.), vol. x., p. 414; Sowerby, Thes. Conch., 1847, vol. i., p. 207, Sp. 35, pl. xlvi., figs. 33, 34; Reeve, Conch. Icon., 1849, pl. vi., figs. 13a, 13b; Chenu, Man. de Conch., 1859, vol. i., p. 191, fig. 973; W. F. Petterd, Journ. Conch., 1879, p. 344; Tryon, Man. Conch., 1882, vol. iv., p. 96, pl. xxviii., figs. 104, 105.

This species was described by G. B. Sowerby, sen., in the Sale Catalogue of the Earl of Tankerville's collection—the only specimen he had ever seen. It was a fine individual, and two excellent full-sized coloured figures are given of it. Its *habitat* was unknown. Broderip reproduced the description of it about a year later in the Zool. Jour., attributing

it to Sowerby. In 1849 Reeve says, "It was first described by Mr. Broderip from a specimen of rather large size in the celebrated Tankerville Collection, now in the British Museum," and places Broderip's name before Sowerby's in his references. This strange mistake evidently misled Petherd, who cites Broderip as the author of the species; but later writers correctly give Sowerby his due. Reeve is the first to give the *habitat* of the species, namely, South Australia. In my copy of the Tankerville Catalogue the price against the type specimen is £31 10s.

Variations.—It is very variable; one from Adcock's collection, not quite mature, is 7 in. long by 17.7 cm. by 8.3 cm. The type is described as 6 in. by 3 in. Mr. Mathews tells me in a letter that the largest he has seen was 8 in. by 3½ in., taken on Troubridge Island. But a mature shell, with ascending suture and fully-formed lip, may be only 3 in. by 1.55 in.

Another example is 4.3 in. by 1.7 in., so that if it were 6 in. long it would be only 2.4 wide—more than ½ in. less in diameter than the type. The shoulder, too, may be more marked than in the type, which is rather high-shouldered, and may be somewhat more concave below the suture. When senile the inner lip may have a thick axial pad of callus extending a full inch beyond the aperture. The glaze of the inner lip not only extends very far laterally over the body-whorl, but towards the spire for half an inch or more above the suture, and in shells with rusty-brown staining this covers the stain over and leaves a broad, wavy, whitish band above the suture throughout the last spire-whorl.

Tryon says, "*V. fulgetrum*, in fact, is intermediate between *V. fusiformis* and *V. papillosa*, and very probably the three are merely diverse forms of one species." I think the three species are distinct, the protoconch of *S. fulgetrum* is a sufficient diagnostic from either of the other species.

Sowerby, in the *Thes. Conch.*, refers to one variety (*S. dictua*, n. var., Verco, *Trans. Roy. Soc., S.A.*, 1909, vol. xxxiii., p. 274, pl. xxi., fig. 7) which has only a delicate reticulate lace-like colouration, and a second which has two rows of chestnut spots on the last volution. But the colour variations are quite numerous.

1. There is the typical shell with the axial zigzag brown dashes from which the shell derives its name. It will be noticed these tend to have two spiral rows of blotches, one just below the shoulder and the other over the lower part of the body-whorl. The blotches are roughly crescentic or arrow-headed, with their concavity towards the outer lip. At the suture the markings are flame-like.

2. There may be two spirals of large crescentic or arrow-headed spots, with flames at the suture; var. *lunulisligata*.

3. These may be reduced to two spirals of small spots the size of peppercorns; var. *punctisligata*.

4. There may be no spots except a few small ones on the first and second spire-whorls, the surface being more or less deeply and densely reticulated with brown; var. *dictua*, Verco.

5. The axial lightning zigzags may be crossed by two continuous deep purple-brown bands, one below the shoulder, the other over the lower part of the volution; var. *connectens*.

6. The only colour ornament may be these two bands and some small flames at the suture, all the axial markings being absent; var. *bicineta*.

7. The subsutural flames may unite to form a third spiral band; var. *tricineta*.

8. Only the lower spiral band may be present, but this quite valid; var. *unicineta*.

9. There may be no colour-markings, the shell being pure white; var. *alba*.

I have had several of these colour varieties reproduced in pl. xi. and xii.

The *habitat* of the species is very restricted. It has been taken in both Gulf St. Vincent and Spencer Gulf, and at some points is a fairly common shell. Mr. Mathews says the blacks tell him the animal lives on sandbanks nine or ten chains from the shore, which are covered by about 18 in. of water at low spring tide. He has taken them crawling ashore. It has been collected as far to the east as Kingston, in Lacepede Bay. I found none on the beaches from Sceales Bay to Point Sinclair, nor on St. Francis Island nor at Esperance, Hopetoun, King George Sound, nor on the west coast of Australia. It has not been recorded from Victoria.

Its bathymetrical distribution is interesting. Taken alive, of large size and beautifully painted, in all its varieties in the shallow water of the gulfs, and with only the lace-like reticulations, from the lobster-pots at Port Victor, and in 75 to 120 fathoms of water from 40 to 120 miles west of Eucla, 9 examples. The shells from these greater depths were all dead, mostly the home of hermit crabs, and all had the faint reticulated ornament except two, which showed the single deep band; none had the axial lightning markings.

Scaphella verconis, Tate.

Voluta verconis, Tate, Trans. Roy. Soc., S.A., 1892, vol. xv., p. 125, pl. i., fig. 5: *Type locality*—Gulf St. Vincent (Verco).

Taken in 75 fathoms 80 miles west of Eucla, 1 dead, immature; in 80 fathoms same locality, 1 dead, mature; in 100 fathoms 90 miles west of Eucla, 3 dead, immature.

Scaphella translucida, Verco

Voluta translucida, Verco, Trans. Roy. Soc., S.A., 1896, vol. xx., p. 217, pl. vi., figs. 4, 4a.

In 100 fathoms 90 miles west of Eucla a large lump of coral was taken, and in a cavity of this when chopped open lay a perfect specimen dead, with a deciduous thin white smooth epidermis, 35 mm. long by 14 mm. broad, somewhat smaller than the type.

Scaphella dannevigii, n. sp. Pl. xiii. figs. 1, 2.

A large, thin, brown, polished, elliptical shell. Protoconch absent, the line of separation thin and jagged; the exposed pillar very oblique, thick, smooth, and rounded, concealing the projecting hemispherical apex of the shell. Whorls three, shouldered below the suture, at the upper fourth of the intersutural space. Shoulder coronated with tubercles, eleven on a whorl, none on the first whorl, the earlier tubercles pointed, the later becoming broad until about half as wide as the interspaces, shortly pliciform, but expanding, and vanishing before reaching the lower suture. Whorls sloping, concavely sub-gradate above the shoulder, sloping slightly convex below. Suture distinct, minutely channelled. Body-whorl large, oval, narrowed anteriorly. Aperture axially narrowly elliptical. Inner lip a thin extensive glaze over the whorl; outer lip immature, thin, uniformly convex, and (as the growth-lines show) curving roundly to a wide, rather shallow, anterior notch. Columella subconcave, three very oblique plaits, the lowest forming the margin of the canal.

Sculpture.—There are crowded, fine, wavy, spiral liræ, about twenty above the shoulder, less valid over this and soon becoming obsolete below it. Accremental striæ granulate these and become ruder towards the aperture. Colour, dark chestnut-brown, obscurely minutely spirally crowdedly flecked with white, with scattered darker-brown blotches, the tips of the tubercles a deep blackish-brown. A narrow creamy band, distinct on its under margin, indistinct along its upper border, starts just within the back of the aperture and winds round the body-whorl to the middle of the outer lip.

Dimensions.—Length, 16.3 cm., of the aperture 11.3 cm.; width, 8.33 cm., of the aperture 4.77 cm.; diameter of the protoconchal base, 18 mm.

Locality.—Type specimen taken in the trawl at 105 to 77 fathoms 90 miles west of the meridian of Eucla.

In 1896 off Newland Head, outside Backstairs Passage, I dredged a dilapidated broken specimen lacking the whole of its last whorl, but measuring 23.5 cm. in length, so that in life it must have been a very large shell. No others were taken by me till I secured the type and eight other examples from the material brought up by the trawl of the "Endeavour" in water ranging from 75 to 105 fathoms, and extending from 40 to 120 miles west of Eucla.

The protoconch was absent from every example. Apparently it is normally deciduous, and must be shed early, as it is absent from a well-preserved specimen 11 cm. long. It must be large, and probably resembles that of *S. mamilla*, which, however, is almost always intact. The whitish band may be centrally well marked and fade away at both margins.

The species is named after Mr. Dannevig, the Commonwealth Director of Fisheries, to whom I was indebted for much help in securing the material obtained during my short voyage on the "Endeavour."

Type in my collection.

Scaphella roadnightæ, McCoy. Pl. xvi., figs. 1, 2.

Voluta roadnightæ, McCoy, Ann. Mag. Nat. Hist., 1881, vol. viii., 5th Series, p. 89, pl. vii., figs. 1, 2: *Type locality*—Ninety-mile Beach, Gippsland, Victoria; Tryon, Man. Conch., 1882, vol. iv., p. 96, pl. xxx., fig. 128; Sowerby, Thes. Conch., 1887, p. 298, Sp. 78, pl. 573 (*Voluta*, pl. xiv.), fig. 143; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1897, vol. x. (New Series), part 2, p. 282, "Portland (Nat. Mus.)"; A. Kenyon, Proc., Mal. Soc., London, 1899, p. 267; Baldwin-Spencer, Proc. Mal. Soc., London, 1901, vol. iv., p. 184; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., part 3, p. 360, Maria Island (May), east coast, near Swansea (Mrs. Irvine), Tasmania; Pritchard and Gatliff, *op. cit.*, 1906 (1905), vol. xviii., part 2, p. 45.

This species was found by Baron von Mueller when on a visit to the Gippsland Lake District at his hotel, where it was in use to prop open his bedroom window. It had been found on the Ninety-mile Beach by Mrs. Roadnight, his landlord's mother, after whom it is named. It was given by Mueller to Sir Frederick McCoy, who described it in 1881. In 1899 some seven specimens were known, two of them from the eastern coast of Tasmania. Later, several were obtained from lobster-pots on the Victorian coast, and Mr. Bastow kindly sent me one. Mr. Dannevig, the Director of Fisheries, tells me he has taken several specimens when trawling off the coasts of Victoria and Tasmania, east of Bass Strait, all dead; and occasionally off the South Australian coast, but the first living examples were brought up from about 100 fathoms

some 40 miles west of Eucla. They were of medium size, mature, and almost destitute of the zigzag colour-markings. When the trawler was in the Great Australian Bight in 1912 several examples were taken along the 100-fathom line in various stages of preservation. All were inhabited by hermit crabs but one; from this a radula was obtained. From the material thus provided the following information is supplied:—The shell when mature may measure only 4 in. long by $2\frac{1}{2}$ in. broad, or it may reach 9 in. by $4\frac{3}{4}$ in. One example is 7 in. by $4\frac{1}{2}$ in., proportionately much more ventricose, with a shorter spire, though with the same number of whorls. The protoconch is very conspicuous and is never absent, which is remarkable, since fully three-fourths of a large hemisphere projects. It is set obliquely, so that the nuclear spheroid has its flattened pole on one side. The initial point is deep blackish-brown, and this colour runs along the nuclear suture, and gradually spreads and fades out. There is no defined inner lip, except in one example, a micromorph, which has a detectible glaze spreading over the base of the body-whorl. In mature shells the outer lip ascends well and rapidly at the suture for a full inch in larger examples, and is here markedly everted, and the whole of the outer lip is somewhat curved out. There is a well-marked anterior notch $\frac{3}{4}$ in. deep by 1 in. wide, and the low wide rounded varix of the notch winding round to the upper plait on the columella forms a low furrow, which in senile shells become filled up and even convex. The plaits are normally three, and remain unchanged in senile shells; but often another plait arises between the lowest two, sometimes between the highest two, and once above all the rest. When senile the shell becomes very heavy, thickened especially on the inner side of the everted lip and along the columella. Colour: the typical tint is pale-yellowish, but it may be a rich chestnut-brown. The ornament consists typically of axial series of oblique lines in zigzag arrangement; these oblique lines may be very long, going one-third round the shell, concealing any axial disposition, or they may be short and close set and blotchy at their junction, so as to exaggerate it. Sometimes they are altogether absent, leaving only the ground-tint, almost an albino variety, as in the two examples taken alive by Mr. Dannevig in 100 fathoms west of Eucla. In some specimens a white spiral band, starting from the aperture just below the suture, winds round the shell and interrupts all the colour-markings. The radula (pl. xvi., figs. 1, 2) from a living individual of 21 cm. in length measures 21 mm. by 1 mm., and consists of a single line of seventy imbricating, tricuspidate, rachidian teeth only. The old teeth have their cusps completely worn away, and are reduced to the crescent-shaped bases.

Scaphella papillosa, Swainson. Pl. xiv., figs. 1-3.

Voluta papillosa, Swainson. Appendix, Bligh Catalogue.

Voluta papillaris (*papillosa*), Swainson, Sowerby, Genera of Shells, 1820-1825, pl. ccli., no locality. According to a note by W. J. B., "the slight alteration here given in the trivial name is only to be considered in the light of a correction of the press." Mr. Sowerby, sen., or Mr. Broderip is, therefore, responsible for the change in the specific name. Kiener, in Coq. Viv., 1839, under the name of *Voluta sowerbyi nobis*, pl. 1., 2 figs., gives figures of *V. fusiformis*, Swainson, and refers to them in mistake as *V. papillaris*, Sowerby, and changes the name to *V. sowerbyi*.

Swainson, in Lardner's Cabinet Cyclopaedia, Natural History, Malacology, 1840, p. 108, calls his shell *Scaphella papillaris*, and figures it in the text 12A, and on page 318 refers to it as *Scaphella papillosa*, Sowerby, Gen., as though uncertain which name to retain. Sowerby, in Thes. Conch., vol. i., 1847, p. 207, Sp. 36, pl. xlvii., fig. 30, cites its *habitat* as "Fijee Islands." Reeve, Conch Icon., 1849, vol. vi., pl. iv., fig. 10, gives Port Lincoln as a *habitat*, under the name *Voluta papillaris*. He writes, "Mr. Swainson named this species *papillosa*, with the view of drawing attention to the remarkable papillary structure of the apex, but as the word signifies 'full of papillæ' it is better rendered *papillaris*. Taking it to refer to the painting, and confounding the species with *V. fusiformis*, M. Kiener has changed the name to do honour to Mr. Sowerby (calling it *V. sowerbyi*, Kiener), because the spots have so rarely the appearance of papillæ." Mr. Sowerby acknowledges the compliment in language severe but not the less true, by calling it "an absurdity." Gray, in Proc. Zool. Soc., London, p. 63, calls it *Volutella papillosa*, Gray. Crosse, Jour. de Conch., 1871, vol. xix., p. 297, refers to it as *Voluta (Alcithoe) papillosa*. Petterd, in Jour. of Conch., 1879, p. 343, as *Voluta papillosa*, Swainson, cites it as from the north coast of Tasmania and Encounter Bay, South Australia, and off the coast of New South Wales, between Montague Island and Twofold Bay, dredged in 1,900 fathoms (Brazier). He creates and describes a variety *macquariensis*, of a uniform yellowish colour without bands or reticulate markings, from Macquarie Harbour, west coast of Tasmania. Tryon, Man. Conch., 1882, vol. iv., p. 96, pl. xxviii., fig. 106, as *Voluta (Alcithoe)*. Brazier, in Proc. Linn. Soc., N.S.W., 1897, vol. xxii., p. 779, describes *Voluta kenyoniana*, from Cape Everard, Victoria, a form with 19-20 axial obtuse ribs, which in Proc. Mal. Soc., London, 1906-7, vol. vii., p. 6, was recognized as only a variety of *Voluta papillosa*, Swainson. Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1898 (1897), vol. x. (New Series), p. 282, give "Phillip Island, Western Port, Portland." Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 360.

Between 40 and 120 miles west of Eucla, about the 100-fathom line, 4 examples were taken. Two, which were mature, measured only 80 mm. in length by 32 mm. in breadth and 71 mm. by 30 mm. One nearly mature, 65 mm. by 29 mm., and one immature, 53 mm. by 22 mm. A specimen from Port Victor measures 105.2 mm. by 50 mm., and one from Victoria 124 mm. by 59 mm.; so that the deep-sea examples are much smaller and proportionately narrower. But their colour is typical, though faint (all were dead shells). They all show the typical proximity and heaping up of three plaits, with a very small plait behind these, and a distinct anterior plait close to and almost forming the border of the canal, though this last was absent from the juvenile example. One of the mature individuals showed obsolete axial costæ on the base of the body-whorl, just beyond the inner lip, so approximating to var. *kenyoniana*, Brazier. Further east the trawler "Endeavour" had taken several examples of this variety, probably to the east of Bass Straits, all dead. A mature micromorph was 65 mm. long by 32.5 mm. broad, the largest was 112 mm. long by 49 mm. broad. The costæ are more numerous than in the type of the variety described by Brazier (19 to 20), 54 being counted in the penultimate whorl. But their validity and their number vary in the examples examined. In the micromorph they are less crowded, and in another specimen they are almost absent from the body-whorl. The protoconch and ornament resemble those of the specific type. I have had one of these figured on pl. xiv., figs. 2, 3.

Since writing the above Mrs. Agnes Kenyon has kindly lent me the type specimen of Brazier's species for comparison. This can scarcely be said to have 19-20 obtuse ribs, as he describes it. On the body-whorl 44 axial costæ can be counted, and none in the last inch from the aperture. These are rather sharp at their summits, but broad at their bases, and vary very greatly in their size and proximity. In the penultimate there are about 50, but they are so irregular in size and nearness that it is difficult to count them, and they scarcely can be called ribs, but are rather irregular axial costulæ. The figs. 2 and 3 on pl. xiv. are an almost exact reproduction of the type, though taken from an "Endeavour" specimen in my collection.

***Cymbium flammeum*, Bolten.**

Cymbium flammeum, Bolten, Mus. Boltenianum, 1798, p. 151, No. 1899, No. 3.

Voluta diadema, Lamarck, Ann. du Mus., vol. xvii., p. 57, No. 1.

Var. Cymbium miltonis, Gray.

Voluta miltonis, Gray, 1833, Griffith's Cuvier's Animal Kingdom, vol. xii., Mollusca, 1834, pl. xxix. (1833); Kiener, Coq. Viv., 1839, p. 10, Sp. 6, pl. x.

Cymbium miltonis, Gray, Conch. Cab. (Ed. Küster), 1841, Band. v., Abt. 2, p. 213, Taf. xlii., fig. 1.

Voluta miltoni, Gray, Deshayes, Anim. S. Vert., 1844 (2nd Edition), vol. x., p. 406, Sp. 46.

Melo miltonis, Gray, Broderip, Thes. Conch., 1847, vol. i., p. 415, Sp. 7, pl. lxxxiii., figs. 24, 25.

Cymbium miltonis, Gray, Reeve, Conch. Icon., 1861, pl. xvi.

Melo miltonis, Gray, Angas, Proc. Zool. Soc., London, 1878, p. 865.

Melo diadema, Lamarck, *var. miltonis*, Gray, Tryon, Man. Conch., 1882, vol. iv., p. 82, pl. xxiii., fig. 28.

It is well figured in Griffiths' Edition of Cuvier's Animal Kingdom, but no description is given, and its name does not appear in the letterpress. Reeve says it was named in honour of Lord Milton, afterwards Earl Fitzwilliam. Its *habitat* was unknown, and is first recorded in Thes. Conch. as from Swan River, Australia. Later Mr. Angas cited it from Fowler Bay, on the South Australian coast, and Mr. Bednall gave me a specimen labelled Streaky Bay, a little distance further east. Three specimens were taken by the Federal trawler "Endeavour," all dead, one in 95 fathoms 90 miles west of Eucla, measuring 11 cm. by 6.2 cm., with four distinct columellar plaits; a second in 88 to 100 fathoms in the same locality, of 17.3 cm. by 9.7 cm., also with four distinct plaits; and a third 19.2 cm. long, with only three plaits, corresponding with the anterior three of the other specimens. It has a much more prominent protoconch and a more elate spire than the second, but otherwise they are quite similar.

Two individuals, from Fowler Bay, obtained from Mr. W. Reed, were taken alive. They have the typical narrow elliptic form, somewhat elate spire, the incurved spines, and four columellar plaits, with abundant white triangles in the ornament. Their walls are of medium thickness. One has in the body-whorl six well-marked axial costations, corresponding with similar axial gutters within, and running down from the spines, showing that the animal curved its shell outwards as it proceeded to form the scale of the spine, and curved it in as it completed the spine.

Ancilla oblonga, Sowerby.

Ancillaria oblonga, Sowerby, Spec. Conch., 1830, part 1, p. 7, figs. 38, 39; Kiener, Coq. Viv., 1843-44, p. 15, No. 10, pl. iv., fig. 2, "The shores of New Holland"; Reeve, Conch. Icon., 1864, vol. xv., pl. viii., figs. 24a, 24b; Sowerby, Thes. Conch., 1866, vol. iii., p. 65 (*Ancillaria*, p. 9), No. 38, pl. ccxiii. (*Ancillaria*, pl. iii.), figs. 57, 58; Tryon, Man. Conch., 1883, vol. v., p. 96, pl. xxxix.,

fig. 47, as a synonym of *A. marginata*, Lamarck; Watson (*Ancilla*), 1886, "Chall.," Zool., vol. xv., p. 231, "38 fathoms, off Bass Strait"; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 365, "Tasmania" = "*A. fusiformis*, Petterd"; Hedley (*Ancillaria*), Memoirs Austr. Mus., 1903, vol. iv., part 6, p. 364, "New South Wales"; Hedley (*Ancilla*), 1909, Austr. Assoc. Adv. Sci., p. 363, "Queensland."

Taken in 100 fathoms 90 miles west of Eucla. Mr. Gabriel has sent me two examples dredged in Western Port, Victoria.

Ancilla mucronata, Sowerby.

Ancillaria mucronata, Sowerby, Thes. Conch., vol. iii., 1866, p. 63, No. 30, pl. 211, figs. 11, 12, "Australia"; Reeve, Conch. Icon., 1864, Sp. 10, pl. iv., figs. 10a, 10b, "Tasmania"; Kiener, Coq. Viv., 1843-44, *Ancillaria*, p. 7, Sp. 4, pl. iii., fig. 3, "The shores of New Holland." This figure is most like our shell in colouring.

Taken in 75 fathoms 80 miles west of Eucla, 1; in 80 fathoms 80 miles west of Eucla, 3; in 100 fathoms 90 miles west of Eucla, 1; in 105 fathoms, 3; in 140 fathoms, 2.

They were all dead, but several in very good condition, of a cinnamon or salmon colour, palest in the upper part of the spire and deepest between the lowest white band and the white columella, not quite so deep in the wide space between the two narrow white bands on the body-whorl. Kiener's figure is a fair representation of it. It is quite unlike *A. beachportensis*, Verco.

Hemipleurotoma quoyi, Desmoulins.

Pleurotoma quoyi, Desmoulins, Actes. Soc. Linn., Bordeaux, 1842, p. 61.

Hemipleurotoma, Verco, Trans. Roy. Soc., S.A., 1909, vol. xxxiii., p. 294.

Taken in 100 fathoms 90 miles west of Eucla, 2.

EXPLANATION OF PLATES.

PLATE X.

- Fig. 1. *Cypræa armeniaca*, Verco, dorsal view.
 " 2. " " " ventral view.
 " 3. " " " side view.

PLATE XI.

- Fig. 1. *Scaphella fulgetrum*, Sowerby.
 " 2. " " " var. *lunulisligata*.
 " 3. " " " var. *connectens*.

PLATE XII.

- Fig. 1. *Scaphella fulgetrum*, Sowerby, var. *tricincta*.
 " 2. " " " var. *unicincta*.
 " 3. " " " var. *punctisligata*.

PLATE XIII.

- Fig. 1. *Scaphella dannevigii*, Verco,
 ,, 2. ,, ,, ,, apex.
 ,, 3. *Nassaria torri*, Verco, side view.
 ,, 4. ,, ,, ,, ventral view.

PLATE XIV.

- Fig. 1. *Scaphella papillosa*, Swainson, micromorph.
 ,, 2. ,, ,, ,, var. *kenyoniana*, Brazier,
 ventral view.
 ,, 3. ,, ,, ,, var. *kenyoniana*, Brazier,
 side view.

PLATE XV.

- Fig. 1. *Acmæa calamus*, Crosse and Fischer, var. *polyactina*, Verco.
 ,, 2. ,, ,, ,, ,, variety.
 ,, 3. *Patella axiaerata*, Verco, dorsal view.
 ,, 4. ,, ,, ,, side view.
 ,, 5. *Acmæa patellavecta*, Verco, dorsal view.
 ,, 6. ,, ,, ,, interior.
 ,, 7. ,, ,, ,, side view.

PLATE XVI.

- Fig. 1. *Scaphella roadnightæ*, McCoy, radula.
 ,, 2. ,, ,, ,, worn down.
 ,, 3. *Acmæa alticostata*, Angas, radula.
 ,, 4. ,, ,, ,, lateral tooth.
 ,, 5. ,, *patellavecta*, Verco, radula.
 ,, 6. *Gyrineum ranelloides*, Reeve, radula.
 ,, 7. ,, ,, ,, operculum.

NEW AUSTRALIAN DIPTERA FROM ANTS' NESTS.

By FREDERICK KNAB and J. R. MALLOCH, Bureau of Entomology, U.S. Department Agriculture, Washington, D.C.

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The *Diptera* described in the following are an interesting addition to the myrmecophilous fauna, particularly the two *Syrphidæ* here described as species of *Microdon*. While the *Microdontinæ* are believed to be generally myrmecophilous in the larva state, but very few species have been actually bred from ant nests. There has particularly been some doubt as to the habits of the more anomalous forms, such as these here described; it will thus be seen that differences in the organization of the imago bear no relation to the larval habits.

All the species of *Microdontinæ* so far reported from Australia show the pedunculate wasp-like abdomen, quite unlike the typical species of *Microdon*. We were, therefore, at first inclined to put the species from Victoria (*M. daveyi*) in a separate genus, but a review of the literature and examination of material from remote parts of the world has led us to a more conservative course. It was found that the genus *Mixogaster*, to which one of the Australian species has been wrongly referred, is quite a distinct concept, and apparently confined to America; *Ceratophya* was poorly defined, and it is extremely doubtful that the Australian species should be referred to it. A last objection arose in the fact that species occur elsewhere which intergrade with the Australian ones in the shape of the abdomen.

Microdon daveyi, n. sp.

♀. Dull-black, finely granulose, ornamented with golden pubescence. Frons at vertex at least one-third as wide as head, widening towards the antennæ, covered with golden pubescence except on a transverse patch at lower extremity of ocellar triangle; face projecting immediately below antennæ, flattened and nearly straight, perpendicular in profile, descending to slightly below lowest level of eyes, thickly covered with golden pubescence; postocular cilia yellow. Antennæ long, the two basal joints ferruginous, the third black, proportions 6-1-12; arista as long as basal joint (6), bare, ferruginous; third joint subcylindrical, very slightly

narrowed towards base, the apical half thickened, apex bluntly pointed. Thorax with a band of golden pubescence immediately in front of the suture, narrowed or broadly interrupted in the middle; lateral and posterior margins sparingly golden pubescent; the presutural band is carried down over the pleuræ. Scutellum transverse, rounded, unarmed, with distinct golden pubescence on disc. Abdomen petiolate, first and second segments about half as broad as thorax, the first short and thickened basally, the third to fifth segments together elongate, ovate, but slightly broader than thorax; first segment with a group of yellowish white hairs at the sides; second segment shining and only granulose on apical half, ridged in the middle, broadly yellowish laterally at middle and narrowly on posterior margin, posterior margin especially laterally, with golden pubescence; third and fourth segments with scattered golden hairs and broad apical, transverse, golden fasciæ formed of thickly-placed golden hairs, but imperfectly interrupted at middle; fifth segment with golden pubescence becoming denser towards apex; ovipositor bifid, pale-ferruginous, slightly hairy. Legs pale-ferruginous tinged with brown, femora mostly black, the apices pale-ferruginous; tibiæ thickened on apical half and somewhat curved, medianly more or less darkened; tarsi broader than tibiæ, the joints very short; all the legs with dense, short, yellowish white hairs; mid femora with long pubescence on posterior surface. Wings infuscated from base to middle of first posterior cell above fourth vein, beyond this point above third vein, broad infuscations along fifth vein, cross-veins, and particularly the veins closing first posterior and discal cells; veins black; venation typical for *Microdon*, the stump of third vein projecting about half-way across first posterior cell, last section of fourth vein straight, nearly rectangular with third vein, a minute stump at angulation; anterior cross-vein but slightly more than its own length from base of discal. Halteres ferruginous. Length, 7-9 mm.

Ararat, Victoria, Australia (H. W. Davey), five specimens reared from larvæ in ants' nest.

The puparium is of the shape usual in *Microdon*, elongate-elliptical, nearly straight-sided with very slight indications of constrictions near the middle, strongly convex, the ventral surface (by which it is attached) perfectly flat; colour ferruginous-yellow, the margin slightly darker, thoracic horns ferruginous-brown, posterior respiratory horn reddish-brown, pruinose; the dorsal surface shows a median longitudinal crease extending the entire length to the posterior respiratory tubercle; on each side of this the surface is broken into reticulations, larger and forming fairly regular rows towards

the middle, somewhat smaller and more irregular towards the sides, there being about ten longitudinal rows on each half; the surface is granular and the reticulations are produced by rows of closely approximated minute, white, tuberculate spines; the surface between the reticulations is somewhat depressed; the posterior respiratory tube is somewhat thickened at the base, with a dorsal basal swelling, bluntly rounded at tip, the surface coarsely granular. Length, 8.5 mm.; width, 5 mm.; height, 3 mm.

***Microdon brachycerus*, n. sp.**

♂. Black and ferruginous, ornamented with pale-golden pubescence. Frontal stripe at vertex one-fifth as wide as head, at frons half as wide as at vertex, with long hairs which are yellow at sides; face convex, prominent, slightly retreating towards mouth, polished; frons and face with whitish-yellow pubescence. Antennæ short and stout, ferruginous, comparative lengths 3-1-16; third joint thick, hardly compressed, bluntly pointed; arista thick, shorter than third joint: the two basal joints with numerous short hairs. Thorax black, margined with golden-yellow, long pubescence, most conspicuous on posterior margin; a transverse, arcuate fascia of golden hairs before the middle; pleuræ with long yellowish-white hairs on anterior half; scutellum prominent, with two short, stout teeth, black with short black pubescence similar to that on dorsum of thorax. Abdomen longer than broad, broadest at apex of second segment, ferruginous and black: first segment black, second dark basally and along apical margin, third darkened on apical half, the very long fourth segment with two large, indistinct, dark, lateral patches; all the segments with short golden pubescence, most conspicuous on posterior margin of third segment. Legs ferruginous, the femora darker, fore and mid femora with rather noticeable white pubescence posteriorly; all the tarsi thickened; fore tarsi shorter than tibiæ, the joints decreasing in length, except the last, fourth very short, twice as broad as long; hind tarsi similar but the first joint broader than tibiæ. Wing with the outer half grey above the third vein, and broadly tinged with grey along the cross-veins and the fourth and fifth veins, the darkening produced by dense, microscopic, downy hair; stump of the third vein well developed, extending more than half-way across first posterior cell; vein closing the discal cell bent strongly inward at first but finally joining the fourth vein at nearly a right angle. Length, 8 mm.

One male. Hobart, Tasmania, from ants' nest (A. M. Lea).

The puparium is of the shape usual in this genus: elliptical, strongly convex, flattened beneath where it is attached to a stone or other surface. The colour is dull yellowish-brown, obscured by irregularly attached particles of earth; the anterior pupal respiratory horns and the posterior larval ones are ferruginous; posterior respiratory tubercle bifid at tip. The dorsal surface is nearly smooth and shows none of the usual reticulations, but instead is studded with scattered prominent brown tubercles (somewhat obscured by the attached particles of earth). Length, 7 mm.; width, 5.5 mm.; height, about 3 mm.

Microdon brachycerus appears to be related to the Tasmanian species described by Macquart as *Aphritis vittatus* and *A. pictipennis*. The figure of the wing given by Macquart for the latter species (Dipt. Exot., Suppl. 4, pl. xii., fig. 12) agrees very well with the wing of our species; however, there are too many other differences (even allowing for Macquart's notorious inaccuracies) to admit the identity of the specimen before us with *pictipennis*. Furthermore, Macquart himself had some doubt that the male he described under *pictipennis* is correctly associated, and there is nothing to indicate whether the figure of the wing was taken from the female or male. In *M. brachycerus* the antennæ are unusually short and stout.

***Limosina mrymecophila*, n. sp**

♀. Shining black. Frons brown, shining, devoid of hairs, only the strong bristles present; these consist of two upwardly divergent central rows of three each, which are slightly incurved, of almost equal strength, and equidistant serially; a pair of closely-placed, nearly equal-sized bristles at above the middle near to eye margin, one near lateral posterior angle, one post-vertical on each side and one pair on ocellar triangle; antennæ clear yellow, first joint as long as third (the apparent second), first joint with several black bristles on inner surface, third joint slightly pubescent; arista very long and thin, slightly pubescent; face yellow, darker towards antennæ, one very long and strong and 2-3 very small bristles on jowls; palpi small, yellow. Thorax shining black, bare in front, the usual pubescent hairs increasing in number and length towards posterior margin, two distinct pairs of dorso-central bristles; scutellum large and broad, regularly rounded on posterior margin. Abdomen highly polished, bare except on posterior margin of last two and lateral margins of all segments; third segment with a raised transverse ridge at close to posterior margin. Legs

black, only the trochanters, extreme bases of tibiae, and tarsi yellowish; fore femora with 2-3 strong bristles near tip on antero-ventral surface; fore tibiae pubescent; mid femora with two antero-dorsal bristles at near tip; mid tibiae with one strong dorsal bristle at slightly beyond basal third and two at about apical fourth—one each on antero—and postero-dorsal surfaces, besides these strong bristles there are several weaker hair-like ones, two of which are at basal third and one at apical third, as well as many strong hairs; hind femora and tibiae with numerous hairs but no bristles. Wings with costa spined, more numerous and weaker beyond first vein; first costal division about twice longer than second, third four times as long as second and distinctly longer than fourth; second vein twice curved, nearer to costa on basal half than on apical half, striking costa at right angles; third vein only slightly bent upward and reaching margin at close to tip; fourth vein reaching fully half-way to wing margin; fifth vein distinct to mid-way to margin; cross-veins nearly upright; first costal cell brown, second clear, third dark at base, middle, and tip; second submarginal cell brown at tip; a brown streak from front margin to near hind margin at middle, and a large rounded spot at near basal third; first posterior cell with the tip brown and a rounded spot beyond and one before middle; the entire hind margin of wing brown, with only an inverted U-shaped clear patch in second posterior cell and two clear spots near anal angle; discal cell with a rather triangular patch of brown on lower margin at middle. Halteres black. Length, 2 mm.

One female. Otford, New South Wales, Australia (A. M. Lea). With the ant *Ectotomma metallicum*.

ABSTRACT OF PROCEEDINGS
OF THE
Royal Society of South Australia
(Incorporated)
FOR 1911-12.

ORDINARY MEETING, NOVEMBER 9, 1911.

THE PRESIDENT (J. C. Verco, M.D., F.R.C.S.) in the chair.

NOMINATIONS.—T. S. Poole, B.A., LL.B., solicitor, Adelaide, as Fellow, and Miss R. Stenhouse as Associate.

EXHIBITS.—Mr. A. M. LEA, F.E.S., exhibited weevils of the genus *Mandalotus*, and also *Frenchia*, which he said was the most extraordinary insect in the world, infesting *Banksias* and *Casuarinas*. The young are viviparous, and resemble the larvæ of the ordinary scale insects, but the metamorphosis is stranger than that of many insects. Mr. J. G. O. Tepper remarked that when parrots were abundant the *Frenchia* galls were rare, and that he had seen the young issuing from the tubes. Dr VERCO exhibited *Edentellina typica*, recently described by Pritchard and Gatliff, which he had met with while dredging in South Australia. The umbo is only on one valve, and remarkable in shape, like a tiny nautilus shell.

DISCUSSION.—Mr. S. DIXON initiated a discussion on "The Influence of Metallic Minerals on Vegetation." Mr. A. M. Lea thought that the Agricultural Department was the right body to take up this subject. Professor Rennie said that it was a complex matter, requiring prolonged biological and chemical investigation. Messrs. Edquist and Tepper also joined in the discussion.

ORDINARY MEETING, APRIL 11, 1912.

THE PRESIDENT (J. C. Verco, M.D., F.R.C.S.) in the chair.

ELECTION.—T. S. Poole, B.A., LL.B., solicitor, Adelaide, was elected a Fellow.

NOMINATIONS.—F. R. Zietz, ornithologist, South Australian Museum; L. K. Ward, B.A., B.E., Government Geologist, Adelaide; and R. L. Jack, B.E., Assistant Government Geologist, Adelaide, were nominated as Fellows.

EXHIBITS.—Mr. W. HOWCHIN, for Mr. C. E. Broughton, exhibited specimens of turquoise discovered by Mr. Greenwood, jun., at Mount Painter, South Australia. Turquoise is a hydrous phosphate of alumina. The determination was made at the Technological College, Sydney. This is its first recorded appearance in South Australia, and Mr. Howchin, in view of the value of the mineral, recommended that the locality be searched for better specimens. Mr. Dixon said that he had found turquoise on the Murchison goldfield, Western Australia. Mr. E. ASHBY exhibited birds of the Swift family, including *Salangana esculenta*, from New Guinea, which has also been recorded from South Australia, and which constructs the so-called edible birds' nests; the Australian spine-tailed swift (*Chatura caudacuta*); and the Javanese swallow (*Hirundo javanica*), also recorded from Australia. THE PRESIDENT exhibited a series of eight perfect adult specimens of "*Scaphella roadnightiæ*." This remarkable mollusc was first obtained on the Ninety-mile Beach, Victoria, by Baron von Mueller, who discovered the first specimen propping up a hotel window, and gave it to Mr. McCoy, who described it in 1881. None had been obtained alive until two were taken by the "Endeavour" off Eucla in 100 fathoms. This shell varies extremely in size, the micromorphs and macromorphs being respectively smaller and larger than the type. The apex or protoconch is always present and exceedingly adherent, while in many other species of *Voluta* it is invariably absent in adult specimens.

PAPERS.—"The Ionization produced by the Impact of Solid Bodies in Air," by Professor KERR GRANT, M.Sc. He described the experiments carried out by himself and Mr. G. E. M. Jauncey, B.Sc. "The occurrence of an Outlier of Lower Cainozoic Rocks, in the River Light, near Mallala," by WALTER HOWCHIN, F.G.S.

ORDINARY MEETING, MAY 9, 1912.

THE PRESIDENT (J. C. Verco, M.D., F.R.C.S.) in the chair.

ELECTIONS.—F. R. Zietz, ornithologist, South Australian Museum; L. K. Ward, B.A., B.E., Government Geologist, Adelaide; and R. L. Jack, B.E., Assistant Government Geologist, Adelaide, were elected Fellows.

NOMINATIONS.—J. G. O. Tepper, F.L.S., Norwood, as an Honorary Member, and A. C. Broughton, undergraduate, Adelaide University, as a Fellow.

EXHIBITS.—Mr. W. HOWCHIN exhibited a fine example of geological ripple marks on a face of Lower Cambrian

quartzite, obtained near Laura by Mr. M. H. Thiele, head teacher of Laura Public School, who had forwarded it to the University. Mr. A. M. LEA exhibited an insect-catching grass (*Cenchrus australis*) gathered by him near Cairns, Queensland. The outer glumes of the spikelets were armed with barbed hairs or bristles, on which numerous insects were impaled. The plant does not appear to draw nourishment from these. Mr. F. R. ZIETZ exhibited anchovies brought by Mr. W. B. Poole from the Glenelg River, where they appear to be the prey of bream. Others from Port Willunga had been secured by Mr. A. H. C. Zietz. He also exhibited an *Aplysia* brought from Port Lincoln by Mr. Randell. THE PRESIDENT exhibited a large new volute found off Newland Head, and more recently in the Australian Bight, in 100 fathoms; also a beautifully perfect specimen of *Cominella torri*, fragments of which he had previously found on St. Francis Island. This specimen was trawled in 100 fathoms. It locates the species in the genus *Nassaria*.

PAPER.—“Additions to the Flora of South Australia,” by J. M. BLACK.

ORDINARY MEETING, JUNE 13, 1912.

THE PRESIDENT (J. C. Verco, M.D., F.R.C.S.) in the chair.

DEATH OF CANON BLACKBURN.—THE PRESIDENT said:—“As President I have this evening with sincere regret to formally notify the Society of the death of our esteemed Fellow, the Rev. Thos. Blackburn, B.A. This furnishes an opportunity not to be missed of publicly expressing our high appreciation of him and our sense of the great loss we have sustained. He graduated Bachelor of Arts at the London University in 1868, and leaving England about eight years later, was in Honolulu for some six years, then in Port Lincoln for about four years, and finally he settled at Woodville, where he was Rector of St. Margaret’s Church. This was in 1886, the same year that his name first appears on our list of Fellows. He must, therefore, have come into touch with our Society directly after his arrival, and this immediate alliance with a scientific body is evidence of the keenness and energy of his scientific instincts. He has consequently been associated with us for rather more than a quarter of a century. He was no nominal member. In our Transactions for 1886-1887 are to be found five papers written by him, totalling together no fewer than 184 pages of printed matter; and as the whole volume contained only 303 pages,

the Society must have felt it had struck a rich lode when it discovered Mr. Blackburn. That was in the first year of his membership, and from then until he died not a volume of our Transactions has been issued which does not contain one or more of his valuable contributions. A sort of statistical curiosity prompted me to find out the extent to which he has enriched our Proceedings, and I have counted at least forty-one papers, extending over nearly 1,700 pages; so that his scientific contributions would equal four volumes of closely printed material of more than 400 pages each. One paper during his first year covered 110 pages, and another in 1902, 114 pages. I think it probable he established a record in our Society as to abundance of material supplied. The quality of his work equalled the quantity. All his specific definitions and descriptions are given in Latin, and to one like myself, who is unacquainted with entomology, the particular department of natural history he studied, the whole substance of his papers appears to be exact, clear, and detailed, and written in cultured language, making his productions equally classical and scientific. His contributions can, as a rule, be picked out at a glance, because he frequently employed a peculiar tabulated arrangement of his numerous species in groups, which suggests the quaint poetic composition of some aberrant genius, a strangely exaggerated instance of versification after the style of the "Samson Agonistes" of Milton, or "Alexander's Feast," by Dryden. One marked example of this occurs in his paper of 1910, where he discusses more than seventy species and gives their specific diagnostics, spreading them over seven closely printed pages, in lines which begin at different distances from the left-hand margin, with a sinuous or a step-like outline, each initialled by a single or double capital letter, each distance and letter having its characteristic significance, so as to indicate to the eye the several alliances and distinctions between all the species in the group. This tabular arrangement, so ingenious and effective, shows the thoroughness and clearness of his knowledge of the subject, and must have aided investigators who referred to it as much as, if not more so, than it tried the capabilities of his linotype printer. Mr. Mayo, who was for many years our Honorary Secretary, informs me that to Mr. Blackburn probably more than any other contributor to our Proceedings is due the wide exchange our Transactions enjoy, for Entomological Societies, especially, sought to effect arrangements by which they might regularly receive our annual volumes and obtain our back numbers. This is a practical testimony to his efficiency from ex-

perts in his own department. He had not that pleasurable incentive to scientific labour which some of us have, from our association with the Royal Society, in the opportunity of publicly showing fellow-members novel or unusual exhibits in illustration of our papers, and of enlarging in a familiar way upon their points of interest. His contributions were regarded by him as too technical and abstruse to permit this; and so he worked, as it were, alone, without this encouragement and happy extraneous aid, and hence deserved the greater commendation. Not only as an author, however, has he aided our Society; but also as a member of its Executive. In October, 1887, he became a member of the Council, and served upon it without intermission until his death. In 1889 he was elected Vice-President, a position which he filled for twelve years; and in 1890 he was elected to the Presidency, and filled the chair for two years. As a member of Council he was of great assistance. Being an expert in entomology he was our referee in this department of natural history on all questions of exchange and the acceptance and printing of papers presented to the Society in this subject; while his shrewdness, trueness, kindness, and general knowledge made him very helpful in the ordinary business of the Council. When President, in 1890, he delivered an excellent address at the annual meeting, in which he strove to show the ultimate aim of the study of natural history and the urgent necessity and great advantage of collecting and recording all available facts and describing all recognized novelties in our Australian continent, and to do this as quickly, accurately, and fully as possible while the opportunity is afforded, and before commerce, agriculture, and extending civilization shall prevent the possibility of such work. He certainly practised what he preached, and is one of the best examples of such industry, accuracy, and promptitude. And now that his work is done we trust others will take the subject up where he has left it, so realize his ideals, suffer his word of exhortation, and follow in his steps. We shall miss his well-known, delicate, almost ascetic, form, as though 'much study had made him very lean'; we shall miss his keen face, his dark, bright, intelligent eyes, his gentle and courteous manner, his quiet modesty and reserve; but we shall recall with pleasure and pride the many excellent qualities of our late Fellow; while our Transactions will ever remain a monument to his interest and delight in the scientific study and his wonderful knowledge of those humbler members of the animal kingdom—the creeping things of the earth." Mr. A. M. Lea added some reminiscences of Canon Blackburn,

ELECTIONS.—J. G. O. Tepper, F.L.S., Norwood, was elected an Honorary Fellow; A. C. Broughton, undergraduate, Adelaide University, was elected a Fellow; and Professor Kerr Grant, Adelaide University, was elected a member of Council to fill the vacancy caused by the death of Rev. Canon Blackburn, B.A.

EXHIBITS.—Mr. ASHBY exhibited some pigeons, robins, kingfishers, and rifle-birds. Mr. EDQUIST exhibited an abscess formation in the fat of a shoulder of mutton. Dr. E. A. JOHNSON exhibited a section of the aorta of one of the Pharaohs, received from the Curator of the Royal College of Surgeons of England.

PAPER.—“The Giant Monitor of Central Australia (*Varanus giganteus*), with a Note on the ‘Fat Bodies’ of this Species,” by Professor E. C. STIRLING, C.M.G., F.R.S., etc. The paper was illustrated by the exhibition of a large stuffed specimen of the species, and also the claws and vertebræ of a fossil species, immensely larger, for comparison.

SPECIAL MEETING, JULY 11, 1912.

THE PRESIDENT (J. C. Verco, M.D., F.R.C.S.) in the chair.

ALTERATION OF RULE 17.—On the motion of Mr. S. DIXON, seconded by Mr. W. B. POOLE, it was resolved—“That in Rule 17 the words ‘with the prescribed subscription (if any)’ be struck out.”

PROPOSED ALTERATION TO BY-LAW 1 OF SECTION I.—Mr. W. B. POOLE moved and Mr. S. DIXON seconded—“That this by-law be altered by the addition of the words ‘but if elected after June 1 the subscription shall be 10s. 6d. for the remainder of the year.’” After discussion the motion was lost.

ORDINARY MEETING, JULY 11, 1912.

THE PRESIDENT (J. C. Verco, M.D., F.R.C.S.) in the chair.

NOMINATION.—Captain S. A. White, “Weetunga,” Fulham, as a Fellow.

EXHIBITS.—Mr. A. M. LEA exhibited wasps’ nests from Queensland. The largest kind was built on the bark of a eucalypt, which in course of time shelled off and fell to the ground, carrying the nest with it. The specimen came from Mount Tambourine, Logan River district, and was estimated to contain 80,000 cells, made of a wood-paste prepared by the wasps, and then built up into the papery walled compartments. The nests of the two smaller species came from Townsville. Mr. HOWCHIN referred to the architecture of a British species observed by him in England. Mr. LEA also

exhibited *Anobium paniceum*, the so-called bread or biscuit beetle, recently found eating the poisonous seeds of *Strychnos nux-vomica* in a suburban pharmacy. Mr. JACK exhibited a strange fungus from Gawler Ranges for identification. He was advised to hand it to Professor Ewart in Melbourne or to the Victorian Mycological Society. THE PRESIDENT exhibited two species of Gasteropoda:—(1) *Cypræa umbilicata*, Sowerby, in Tankerville's Catalogue. Later this was regarded as a monstrosity of *C. tigris*, Linn., and then of *C. pantherina*, Linn. Afterwards a number were found at Barren Island by Gunn, a Tasmanian, and proved it to be a valid species. He also exhibited specimens taken by the Commonwealth trawler in the Great Australian Bight, which were more globular than the type, and lacked the peculiar projection of the anterior part of the aperture found in the more eastern examples, and had a rich uniform apricot colour on the base. He proposed to call the western examples exhibited *C. umbilicata*, var. *armeniaca*, Verco. (2) *Scaphella fulgetrum*, Gray. The exhibited series of this beautiful shell contained specimens from as far east as Kingston, and others dredged as far west as the longitude of Eucla. It showed remarkable variations, some shells being unicolored and some having spot-bands or lightning marks, or spiral-bands, either alone or in conjunction. It also included both macromorphic and micro-morphic forms.

PAPER.—“Notes on Recurrent Transgressions of the Sea near Dry Creek,” by WALTER HOWCHIN, F.G.S.

ORDINARY MEETING, AUGUST 8, 1912.

THE VICE-PRESIDENT (Walter Rutt, C.E.) in the chair.

ELECTION.—Captain S. A. White, “Weetunga,” Fulham, was elected a Fellow.

NOMINATIONS. — Hugh Corbin, B.Sc., Lecturer in Forestry, Adelaide University, and J. Desmond, veterinary surgeon, Adelaide, as Fellows.

EXHIBITS.—Mr. A. M. LEA exhibited ant commensals, including species of *Saragus*, *Trox*, *Histerida*, *Staphylinida*, and *Chlamydopsis*; also a hippoboscid fly from a wallaby. Mr. F. R. ZIETZ exhibited a large sub-fossil, *Turbo stamineus*, Martyn, from the travertine limestone at Brentwood, Yorke Peninsula.

PAPER.—“Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species,” by the late CANON BLACKBURN, B.A. Communicated by Mr. A. M. LEA.

ORDINARY MEETING, SEPTEMBER 12, 1912.

THE PRESIDENT (J. C. Verco, M.D., F.R.C.S.) in the chair.

EXHIBITS.—Mr. J. G. O. TEPPER exhibited a photograph of a species of *Podargus*, taken on the nest; also pictures of icebergs painted in 1858 by the late Mr. F. S. Crawford on his voyage from England in the ship "Istamboul." Mr. A. M. LEA exhibited fine specimens of the very dissimilar sexes of *Ornithoptera priamus* or *Proides*. THE PRESIDENT exhibited a fine series of *Voluta papillosa*, Swains, from Tasmania, Victoria, and South Australia, including the rare ribbed variety and macromorphic and micromorphic forms. This series showed the necessity of having many specimens from different localities to prove the continuity of form and prevent the multiplication of species, the ribbed form having been described by Brazier as a separate species, *Voluta kenyoniana*.

PAPERS.—"The Polyplacophora of South Australia," by W. G. TORR, LL.D., M.A., B.C.L., illustrated by the exhibition of Chitons. "The Curculionidæ of Australia, Part x., *Cryptorhynchidæ*," by A. M. LEA, F.E.S., illustrated by exhibits of many of the species described.

ANNUAL MEETING, OCTOBER 10, 1912.

THE VICE-PRESIDENT (Professor E. H. Rennie, M.A., D.Sc., F.C.S.) in the chair.

An apology on account of illness was received from the President.

A letter was received from Dr. Pulleine resigning the office of Secretary on account of pressure of business.

The Annual Report was taken as read and adopted.

The Balance-sheet was read by the Hon. Treasurer and adopted.

ELECTION OF OFFICERS.—*President*, J. C. Verco, M.D., F.R.C.S.; *Vice-Presidents*, Professor E. H. Rennie, M.A., D.Sc., F.C.S., and R. H. Pulleine, M.B.; *Hon. Treasurer*, W. B. Poole; *Members of Council*, Samuel Dixon and G. G. Mayo, C.E.; *Hon. Secretary*, Walter Rutt, C.E.; *Hon. Auditors*, W. L. Ware and H. Whitbread.

It was resolved—"That a letter be forwarded to Mr. J. S. Lloyd, F.I.A., S.A., who is relinquishing the position of Auditor on account of age, expressing regret and appreciation of his long-continued past services."

EXHIBITS.—Mr. A. M. LEA exhibited a case of contents of birds' stomachs; also a case of insects collected by Captain White during his rambles in the Gawler Ranges.

PAPERS.—"The late Rev. T. Blackburn, B.A., and his Entomological Work," by A. M. LEA, F.E.S. "Notes on the Marine Mollusca of South Australia, with Descriptions of

New Species, Part XV.," "Notes on the Marine Mollusca of Western Australia, with Descriptions of New Species, Part II.," and "Mollusca from the Great Australian Bight," by J. C. VERCO, M.D., F.R.C.S. "Notes on the Occurrences of Silica near Mount Painter, Flinders Range," by A. C. BROUGHTON. "Description of Wild Hybrids of Australian Ducks," by F. R. ZIETZ. "New Australian Diptera from Ants' Nests," by FREDERICK KNAB and J. R. MALLOCK, communicated by A. M. LEA. "Additions to the Flora of South Australia," by J. M. BLACK.

ANNUAL REPORT, 1911-12.

The Council has the pleasure to report that the contributions to the Society's proceedings during the year were of great scientific value and of considerable local interest, while the exhibits at its meetings have been of a varied and interesting character.

The annual volume of Transactions will include, amongst other papers, one by Professor E. C. Stirling, C.M.G., F.R.S., on "The Giant *Veranus* of Central Australia," which contains much unpublished information. Dr. W. G. Torr, in his paper on "The Polyplacophora of South Australia," has brought our knowledge of this interesting family of Mollusca up to date and described several new forms. Professor Kerr Grant, in his paper on "The Ionization Produced by the Impact of Solid Bodies in Air," has again introduced physical subjects into our Transactions, and the Council hopes in future to receive many of his valuable contributions.

Several series of papers which have been running through the Transactions for some years have been continued during the present session. Dr. J. C. Verco deals again with the South Australian Marine Mollusca and with the Marine Shells of Western Australia; Mr. A. M. Lea, F.E.S., with Australian Curculionidæ; Mr. J. M. Black with South Australian Introduced and Indigenous Plants; and Mr. W. Howchin, F.G.S., with the Geology of South Australia.

The Society has suffered a great loss by the death of the Rev. Canon Blackburn, B.A., F.E.S., who, since his election as a Fellow in 1887, has been the most voluminous contributor to the Society's Transactions. Part xlii. of his "Notes on Australian Coleoptera," which was almost ready for

publication at the time of his death, was prepared for publication and communicated by Mr. A. M. Lea, who has also contributed an able paper upon the late Canon's life and entomological work.

One of our Fellows, Dr. Mawson, has again been engaged throughout the whole of this year in scientific exploration in the Antarctic.

A great advance has been made towards securing the western portion of Kangaroo Island as a reserve (which it is proposed to name Flinders Chase), the Commissioner of Crown Lands having asked for and received from your Council an outlined scheme for the formation and working of the Reserve and an estimate of the cost of initiating and maintaining the same, with a view to the preparation of a Bill to be laid before Parliament. The Fauna and Flora Protection Committee of our Field Naturalists' Section is to be congratulated upon having progressed so far in this matter.

Great progress has been made, under Mr. Clucas and his assistant, towards placing the Society's valuable library in a satisfactory condition. More shelving has been provided, the books have been reshelved, and the indicator will soon be affixed. A considerable number of volumes has been bound, and many more are in the binder's hands. Arrangements have been made for the Assistant Librarian to be present prior to each meeting of the Society for the purpose of lending books to the Fellows.

The demand for the Society's publications still continues, and several important exchanges of whole sets have been arranged with other learned Societies.

During the year seven new Fellows have been elected, and Mr. J. G. O. Tepper, in recognition of his past scientific services, has been transferred to the class of Honorary Fellows. The membership now comprises 10 Honorary Fellows, 5 Corresponding Members, 75 Fellows, and 1 Associate.

JOS. C. VERCO, *President.*

ROBERT PULLEINE, *Hon. Secretary.*

DONATIONS TO THE LIBRARY

FOR THE YEAR 1911-12.

TRANSACTIONS, JOURNALS, REPORTS, ETC.,

presented by the respective editors, societies, and governments.

AUSTRALIA.

- AUSTRALIA. *Bureau of Census and Statistics*. Official year book, no. 5, 1901-11. Melb. 1912.
- Shipping and oversea migration, 1910. Melb.
- Social insurance. Melb. 1910.
- *Bureau of Meteorology*. Average rainfall map of Western Australia. Melb. 1912.
- Climate of the Yass-Canberra district. Melb. 1912.
- Monthly report, vol. 1, no. 12-13. Melb. 1912.
- Report on observations during official visit to Europe. Melb. 1911.
- Results of rainfall observations in Victoria, 1840-1910. Melb. 1912.
- *Dep't of Trade and Customs*. Zoological results of the fishing experiments carried out by F.T.S. *Endeavour*, pt. 1-3. Melb. 1912.
- ROYAL ANTHROPOLOGICAL SOCIETY OF AUSTRALIA. *Journal: Science of man*, vol. 13, no. 1-10. Syd. 1911-12.

NEW SOUTH WALES.

- AGRICULTURAL GAZETTE OF NEW SOUTH WALES, vol. 22, pt. 10-12; vol. 23, pt. 1-10. Syd. 1911-12.
- AUSTRALIAN MUSEUM. *Memoir* 4, pt. 16. Syd. 1911.
- *Miscellaneous ser.* 7. Syd. 1912.
- *Records*, vol. 8, no. 3; vol. 9, no. 1-2. Syd. 1912.
- Report of the trustees, to June, 1911. Syd. 1911.
- *Special catalogue*, vol. 3, pt. 4. Syd. 1912.
- LINNEAN SOCIETY OF NEW SOUTH WALES. *Abstract of proceedings*, no. 296-304. Syd. 1911-12.
- *Proceedings*, vol. 35, pt. 4; vol. 36, pt. 1-4; vol. 37, pt. 1. Syd. 1911-12.
- MAIDEN, J. H. Critical revision of the genus *eucalyptus*, pt. 14-16. Syd. 1912.
- *Forest flora of New South Wales*, vol. 5, pt. 6-9. Syd. 1912.

- NEW SOUTH WALES. *Board of Fisheries*. Future of commercial marine fishing in New South Wales; by D. G. Stead. Syd. 1911.
- On the need for more uniformity in the vernacular names of Australian edible fishes; by D. G. Stead. Syd. 1911.
- *Botanic Gardens and Government Domains*. Report of the director, 1910. Syd. 1911.
- *Dep't of Agriculture*. Science bulletin, no. 1-4. Syd. 1912.
- *Dep't of Mines*. Annual report, 1911. Syd. 1912.
- *Geological Survey*. Mineral resources, no. 13-16. Syd. 1912.
- NEW SOUTH WALES NATURALISTS' CLUB. Journal: The Australian naturalist, vol. 2, pt. 9-12. Syd. 1912.
- ROYAL SOCIETY OF NEW SOUTH WALES. Journal and proceedings, vol. 44, pt. 4; vol. 45, pt. 1, pt. 3.
- UNIVERSITY OF SYDNEY. Calendar, 1912. Syd. 1912.

QUEENSLAND.

- QUEENSLAND. *Dep't of Mines*. Geological Survey publications, no. 235, 237. Brisb. 1912.
- ROYAL SOCIETY OF QUEENSLAND. Proceedings, vol. 23, pt. 2. Brisb. 1912.

SOUTH AUSTRALIA.

- PUBLIC LIBRARY, MUSEUM, AND ART GALLERY OF SOUTH AUSTRALIA. Report of the Board of Governors, 1910-11. Adel. 1912.
- SOUTH AUSTRALIA. *Dep't of Mines*. Review of mining operations, no. 14-16. Adel. 1911-12.
- Government Geologist's report on the uranium ores of South Australia. Adel. 1911.
- *Woods and Forests Dep't*. Annual progress report, 1910-11. Adel. 1911.
- SOUTH AUSTRALIAN SCHOOL OF MINES AND INDUSTRIES. Annual report, 1910-11. Adel. 1911-12.

TASMANIA.

- ROYAL SOCIETY OF TASMANIA. Papers and proceedings, 1911. Hobart. 1911.
- TASMANIA. *Dep't of Mines*. Progress of the mineral industry of Tasmania, Sept., 1911; Dec., 1911; March, 1912; June, 1912. Hobart. 1911-12.
- *Geological Survey*. Bulletin, 10-12. Hobart. 1912.

VICTORIA.

- NATIONAL MUSEUM. Memoirs, no. 4. Melb. 1912.
- ROYAL SOCIETY OF VICTORIA. Proceedings, n.s., vol. 24, no. 1-2; vol. 25, no. 1. Melb. 1911-12.
- VICTORIA. *Dep't of Agriculture*. Journal, vol. 9, pt. 12; vol. 10, pt. 1-10. Melb. 1912.
- *Dep't of Mines*. Annual report of the Secretary for Mines, 1911. Melb. 1912.
- Bulletin of the Geological Survey, no. 24, 26. Melb. 1912.
- Memoirs of the Geological Survey, no. 10-11. Melb. 1912.
- Records of the Geological Survey, vol. 3, no. 2. Melb. 1912.
- VICTORIAN GEOGRAPHICAL JOURNAL, vol. 28. Melb. 1912.
- VICTORIAN NATURALIST, vol. 28, no. 8, 10-12; vol. 29, no. 1-6. Melb. 1912.
- VICTORIAN YEAR BOOK, vol. 31, 1910-11. Melb. 1912.

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LIST OF FELLOWS, MEMBERS, ETC.,

OCTOBER, 1912.

Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any change in address should be notified to the Secretary.

NOTE.—The publications of the Society will not be sent to those whose subscriptions are in arrears.

Date of
Election.

HONORARY FELLOWS.

1910. *BRAGG, W. H., M.A., F.R.S., Professor of Physics, University of Leeds, England (Fellow 1886).
1893. *COSSMAN, M., Rue de Maubeuge, 95, Paris.
1897. *DAVID, T. W. EDGEWORTH, C.M.G., B.A., D.Sc., F.R.S., F.G.S., Professor of Geology, University of Sydney.
1890. *ETHERIDGE, ROBERT, Director of the Australian Museum of New South Wales, Sydney.
1905. GILL, THOMAS, I.S.O., Under-Treasurer, Adelaide.
1905. *HEDLEY, CHAS. H., Naturalist, Australian Museum, Sydney.
1892. *MAIDEN, J. H., F.L.S., F.C.S., Director Botanic Gardens, Sydney, New South Wales.
1898. *MEYRICK, E. T., B.A., F.R.S., F.Z.S., Tohrnhanger, Marlborough, Wilts, England.
1894. *WILSON, J. T., M.D., Professor of Anatomy, University of Sydney, New South Wales.
1912. *TEPPER, J. G. O., F.L.S., Elizabeth Street, Norwood (Corresponding Member 1878, Fellow 1886).

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1880. *FOELSCHKE, PAUL, Palmerston, Northern Territory.
1893. STRETTON, W. G., Palmerston, Northern Territory.
1905. THOMSON, G. M., F.L.S., F.C.S., Dunedin, New Zealand.
1908. *WOOLNOUGH, WALTER GEORGE, D.Sc., F.G.S., Lecturer in Geology, University of Sydney (Fellow 1902).

FELLOWS.

1895. *ASHBY, EDWIN, 111, King William Street, Adelaide.
1902. *BAKER, W. H., F.L.S., Glen Osmond Road, Parkside.
1908. *BENSON, W. NOEL, B.Sc., c/o W. Benson, 63, Pitt Street, Sydney.
1907. *BLACK, J. McCONNELL, Alfred Street, Norwood.
1909. *BRADLEY, EDGAR J., C.E., Hydraulic Engineer's Department, Adelaide.
1912. BROUGHTON, A. C., University of Adelaide.
1911. BROWN, EDGAR J., M.B., D.Ph., 3, North Terrace.
1883. BROWN, H. Y. L., F.G.S.
1893. BRUMMITT, ROBERT, M.R.C.S., Medindie
1904. BRUNSKILL, GEORGE, Semaphore, South Australia

1906. BUNDEY, Miss ELLEN MILNE, 148, Molesworth Street, North Adelaide.
1907. *CHAPMAN, R. W., M.A., B.C.E., Professor of Mathematics and Mechanics, University of Adelaide.
1904. CHRISTIE, W., Rundle Street, Adelaide.
1910. *CLARK, E. V., B.Sc., Lecturer in Electrical Engineering, University of Adelaide.
1867. CLARK, M. SYMONDS, Knightsbridge.
1879. *CLELAND, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer, Parkside Lunatic Asylum.
1895. CLELAND, JOHN B., M.D., Government Bureau of Microbiology, Sydney, New South Wales.
1907. *COOKE, T. W., D.Sc., Lecturer, University of Adelaide.
1912. CORBIN, H., B.Sc., Forest Department, Adelaide.
1907. DARLING, JOHN, Kent Terrace, Norwood.
1912. DESMOND, J., Currie Street, Adelaide.
1887. *DIXON, SAMUEL, Bath Street, New Glenelg.
1911. DUTTON, H. H., Anlaby.
1902. EDQUIST, A. G., Tate Terrace, Croydon.
1911. GILLESPIE, H. R., 51, Angas Street.
1904. GORDON, DAVID, Gawler Place, Adelaide.
1880. *GOYDER, GEORGE, A.M., F.C.S., Analyst and Assayer, Adelaide.
1910. *GRANT, KERR, M.Sc., Professor of Physics, University of Adelaide.
1904. GRIFFITH, H., Henley Beach.
1896. HAWKER, E. W., F.C.S., East Bungaree, Clare.
1891. *HOLTZE, MAURICE, F.L.S., Director Botanic Gardens, Adelaide.
1883. *HOWCHIN, WALTER, F.G.S., Lecturer in Geology and Palæontology, University of Adelaide.
1911. HUGHES, W. H., Booyoolie, Gladstone.
1912. JACK, R. L., B.E., Assistant Government Geologist, Adelaide.
1893. JAMES, THOMAS, M.R.C.S., Moonta.
1910. *JOHNSON, E. A., M.D., M.R.C.S., Pirie Street, Adelaide.
1897. *LEA, A. M., F.E.S., South Australian Museum, Adelaide.
1884. LONDON, A. A., M.D. (Lond.), M.R.C.S., Lecturer in Obstetrics, University of Adelaide, and Hon. Physician, Children's Hospital, North Adelaide.
1856. LLOYD, J. S., Alma Chambers, Adelaide.
1888. *LOWER, OSWALD B., F.E.S. (Lond.), Broken Hill, New South Wales.
1905. *MAWSON, DOUGLAS, D.Sc., B.E., Lecturer in Mineralogy and Petrology, University of Adelaide.
1874. MAYO, GEO. G., C.E., 116, Franklin Street, Adelaide.
1907. MELROSE, ROBERT THOMSON, Mount Pleasant.
1897. *MORGAN, A. M., M.B., Ch.B., Angas Street, Adelaide.
1907. MUECKE, HUGO, C.E., Grenfell Street, Adelaide.
1884. MUNTON, H. S., North Terrace, Adelaide.
1886. POOLE, W. B., Savings Bank, Adelaide.
1911. POOLE, T. S., B.A., LL.B., Solicitor, Adelaide.
1908. POPE, WILLIAM, Solicitor, Adelaide.
1907. PULLEINE, R. H., M.B., North Terrace, Adelaide.
1907. PURDUE, R. F., Mining Agent, St. Helen's, Tasmania.
1885. *RENNIE, EDWARD H., M.A., D.Sc. (Lond.), F.C.S., Professor of Chemistry, University of Adelaide.

1911. ROACH, B. S., Education Department, Flinders Street, Adelaide.
1905. *ROGERS, R. S., M.A., M.D., Flinders Street, Adelaide.
1869. *RUTT, WALTER, C.E., College Park, Adelaide.
1891. SELWAY, W. H., Treasury, Adelaide.
1893. SIMSON, AUGUSTUS, Launceston, Tasmania.
1871. SMITH, ROBERT BARR, Adelaide.
1906. SNOW, FRANCIS H., Adelaide.
1910. *STANLEY E. R., Government Geologist, Port Moresby, Papua.
1881. *STIRLING, EDWARD C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Professor of Physiology, University of Adelaide, Director of South Australian Museum.
1907. SWEETAPPLE, H. A., M.D., Park Terrace, Parkside.
1904. TAYLOR, WILLIAM, St. Andrew's, North Adelaide.
1897. *TORR, W. G., LL.D., M.A., B.C.L., Brighton, South Australia.
1894. *TURNER, A. JEFFERIS, M.D., Wickham Terrace, Brisbane, Queensland.
1889. VARDON, SENATOR JOSEPH, Gresham Street, Adelaide.
1878. *VERCO, JOSEPH C., M.D. (Lond.), F.R.C.S., Lecturer on the Principles and Practice of Medicine, University of Adelaide, and Consulting Physician Adelaide Hospital and Children's Hospital.
1883. WAINWRIGHT, E. H., B.Sc. (Lond.), McLaren Vale.
1912. WARD, LEONARD KEITH, B.A., B.E., Government Geologist, Adelaide.
1878. WARE, W. L., Adelaide.
1859. WAY, RIGHT HON. SIR SAMUEL JAMES, Bart., P.C., D.C.L., Chief Justice and Lieutenant-Governor of South Australia, Adelaide.
1907. WEBB, NOEL A., Barrister, Waymouth Street, Adelaide.
1904. WHITBREAD, HOWARD, Currie Street, Adelaide.
1912. WHITE, CAPTAIN S. A., "Weetunga," Fulham, South Australia.
1912. *ZIETZ, F. R., South Australian Museum.
- ASSOCIATE.
1904. ROBINSON, MRS. H. R., "Las Conchas," Largs Bay, South Australia.
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APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia (Incorporated).

TWENTY-NINTH ANNUAL REPORT OF THE
COMMITTEE

FOR THE YEAR ENDED SEPTEMBER 17, 1912.

MONTHLY MEETINGS, LECTURES, AND ADDRESSES.

September 19, 1911.—The Annual Meeting of this Section was held on this date, when the formal business of receiving the Committee's Report and the Hon. Treasurer's Statement of Accounts was transacted. The Report of the Fauna and Flora Protection Committee was read, and the election of officers took place for the ensuing year as follows:—

FIELD NATURALISTS' COMMITTEE—*Chairman*, Dr. R. H. Pulleine; *Vice-Chairmen*, Messrs. A. G. Edquist and J. M. Black; *Hon. Secretary*, Mr. E. H. Lock; *Hon. Treasurer*, Mr. S. S. Stokes; *Hon. Minute Secretary*, Miss E. Hocking; *Committee*, Messrs. M. S. Clark, J. Willmott, J. G. O. Tepper, and J. W. Mellor, Dr. R. S. Rogers, Mr. W. H. Selway, and Mesdames J. F. Mellor and R. S. Rogers; *Auditors*, Messrs. J. S. Lloyd and Walter D. Reed.

FAUNA AND FLORA PROTECTION COMMITTEE—Messrs. M. S. Clark and S. Dixon, Drs. R. S. Rogers and W. Ramsay Smith, Messrs. E. Ashby, E. H. Lock, J. W. Mellor, A. Zietz, W. H. Selway, J. M. Black, and A. G. Edquist, and the Chairman and Secretary of the Section *ex officio*.

Mr. S. Dixon read a farewell address as Chairman of the Fauna and Flora Protection Committee. Mr. Dixon regretted having to resign the position of Chairman after an occupation of the position for twenty-three successive years. He wished now to make way for a younger man. He referred to the first resolution made by the late Mr. A. F. Robin that was passed by the committee twenty-three years ago as follows—"That in furtherance of the proposed objects, this Sec-

tion desires to recommend that the Government Farm (now National Park, Belair) be declared a 'public park' and handed over to Trustees to manage." Mr. Dixon mentioned what had been done in securing more adequate protective game laws, in urging Nature studies in the State schools, and in protests against the alienation of forest reserves. After further reference to the fact that Mr. James Page, of Mitcham, was practically the founder of the National Park at Belair, and that the idea had been warmly taken up by the Field Naturalists' Section, Mr. Dixon referred at length to the work that had been done to secure what is to be known as the "Flinders Chase," on Kangaroo Island, for the preservation of native fauna and flora, and put in a special plea that the Natural History scientific bodies should be the preponderating influence on the new governing body of the Chase. He referred to the necessity for a strong Society of sympathetic observers to watch over the conservation interests and for the publication of literature dealing with our Natural History. Such a Society should use its influence in the propagation and planting our own native flora in the parks, as it was unfortunate that in the landscape gardening the distinctive beauties peculiarly Australian should be sacrificed to uniform imitations of European gardens. Mr. Dixon also pleaded for about 700 acres, instead of 40, which had been set apart in the National Park for the preservation of native fauna. The address was listened to with keen attention and loudly applauded.

November 21.—The Chairman of the Section (Dr. Robert Pulleine) delivered the Annual Address, and took as his subject "Prehistoric Man." The lecturer showed a fine collection of implements, and in explaining them stated that the evolution of ideas of civilization among all races in all lands was the same. He pointed out that most people were not aware of the vastly interesting subjects they had around them in Australia, and urged a study of ethnological and anthropological works as subjects for investigation by members of the Section.

April 16, 1912.—The second course of monthly meetings for the year was begun on this date, and was devoted to the description of exhibits by members. Mr. Stokes showed flowers and ferns taken on a holiday trip to New South Wales, in the district of Ourimbah. Botanical exhibits were forwarded by Mr. Hosking from the Northern Territory. Miss Hunt tabled exhibits from New Zealand and Australia. Dr. Watson sent a specimen of a hawk-moth obtained on board a steamer at sea a day and a half distant from Booby Island. Dr. Pulleine described a ceremonial staff-sign used

by the natives of Woodlark Island, New Guinea. Mr. Stokes brought greetings from the Sydney Field Naturalists' Club, with which he had spent a pleasant excursion during his holiday.

May 21.—Captain S. A. White gave an interesting address on a visit to Kangaroo Island, especially dealing with lantern illustrations of the proposed reserve for native fauna and flora. The lecturer read some extracts of the early history of the island, and remarked that it was the only land left on the Australian coast which could be made a national sanctuary for the native birds and animals of South Australia. The land was unfit for pastoral or agricultural purposes, and the fauna was being rapidly exterminated by trappers, who even encroached on the land already reserved. He entered a strong plea for their preservation.

June 18.—Mr. A. G. Edquist (Vice-Chairman) delivered a lecture with experiments and exhibits illustrative of the life of plants. By interesting demonstrations he showed how life was maintained and plants grew on land and in water, the breathing process and food absorption receiving particular attention.

July 16.—Mr. J. W. Mellor gave an account of a journey he had taken through the north-west country from Port Augusta as far as the Tarcoola and Wilgena districts. The study of the native in this country was full of interest. A number of ornithological, botanical, and mineral specimens were tabled and explained, and photographs of the country, taken by Mr. J. W. Mellor, exhibited.

August 20.—The Chairman (Dr. Robert Pulleine) gave an address on Spiders. The lecturer dealt briefly with the classification of spiders, their anatomy and development. He spoke of their economic value to producers, and showed how they kept in check the ravages of destructive enemies to various kinds of crops. The common trapdoor spider was particularly serviceable in this respect, as it was the producers' best friend in keeping down the growth of land vermin. The means of offence and defence in poison fangs were illustrated. The methods of obtaining food and migration by webs were also shown. Hunting spiders were interesting in their habits and in their methods of securing their natural food. The lecture was illustrated by a large collection of photographs thrown upon the lantern screen.

EXHIBITS.

A feature of the monthly meetings was the number of exhibits tabled by members for general observation and explanation.

On June 18 Mr. A. M. Lea exhibited a case of rare butterflies and moths. Mr. Kimber showed a shell which was regarded as new to science, which he had obtained on a dredging excursion carried out by the Section in St. Vincent Gulf. Mr. J. W. Mellor exhibited specimens from the Flinders Ranges; Mr. H. H. D. Griffith, the tsetse fly, of evil repute in sleeping sickness, also fibre of *Posidonia*, which is of commercial value; Mr. J. G. O. Tepper, the base of a grass-tree from Kangaroo Island; Mr. M. S. Clark, a pearl-shell chain, 3 ft. long, without joins in the links—the chain had probably been carved out of one shell, and was 100 years old.

On July 16 Mr. J. F. Mellor showed specimens of snail shells found at Robe and recorded for the first time on the mainland of Australia. They are a European species, and were probably transported by shipping. He also showed galls formed on a shea oak log by *Coccidæ*. Miss Kruger tabled a beautiful bloom of a Western Australian plant which had been grown here. Mr. A. M. Lea showed and described a case of dragon flies taken during a journey to Queensland. Mr. J. G. O. Tepper exhibited a collection of photographs of the early days of Lyndoch and views of Kintore Avenue before the old trees had been removed. A large acorn barnacle from a jetty pile was shown by Mr. M. S. Clark.

Exhibits were also shown at all the meetings to demonstrate the subjects taken by the lecturers. This feature of the Section's work is exceedingly instructive and interesting, and the committee hopes that the members will continue to bring exhibits of such interest to the meetings.

The evening set apart for exhibits alone was a success, and the committee will probably make further arrangements of a like character.

EXCURSIONS.

The following excursions were held during the year:—October 11, 1911, Hallett's Cove; October 28, Sturt River; November 11, Montacute; November 25, Scott's Creek; March 2, 1912, Dredging Excursion in Gulf St. Vincent; May 4, Mount Lofty; June 29, Aldgate; July 20, Brighton; August 3, Norton Summit; August 17, Black Hill; August 31, Upper Sturt.

The above excursions have been well attended, except the last, which was on Wattle Day, and a number of members were engaged at the functions arranged to celebrate that occasion.

Mr. Kimber was the fortunate member this year to report a new find in excursion work, but many members have added in their own line of study valued collections and many

specimens of interest. It should be noted that a number of the members have been working, as opportunity offered, far afield in our own State and in the other States. Wherever they have travelled their collections have been carefully noted, and those who have not had the good fortune to get far away from the usual fields for work have shared in the benefit of observations and collections by others on their return at the evening meetings.

The membership of the Section has been largely added to during the year, and the evening meetings well attended.

The committee looks back upon the year's work with considerable satisfaction from scientific, collecting, and social points of view.

R. PULLEINE, *Chairman*.

E. H. LOCK, *Hon. Secretary*.

TWENTY - FOURTH ANNUAL REPORT OF THE
NATIVE FAUNA AND FLORA PROTECTION
COMMITTEE OF THE FIELD NATURALISTS'
SECTION OF THE ROYAL SOCIETY OF SOUTH
AUSTRALIA FOR THE YEAR ENDED SEPTEMBER,
1912.

NEW CHAIRMAN:

Your committee has to report that Mr. Samuel Dixon, after acting as Chairman for twenty-three years, had at the last Annual Meeting of this Section resigned the position and retired from the committee. Mr. Edwin Ashby was appointed Chairman in his place.

FLINDERS CHASE, KANGAROO ISLAND.

The committee is pleased to report that, though no longer one of its number, Mr. Dixon has continued to take an active interest in the work, and recently, with the President of the Royal Society (Dr. Verco), Mr. Ashby, and Captain White, waited upon the Commissioner of Crown Lands (the Hon. F. W. Young) to again urge upon the Government the desirability of further extending the area of the Reserve, the fencing off with a vermin-proof fence, the appointment of a ranger to protect the fauna and flora, and the vesting of the land in Trustees. The committee understands that the suggestions were favourably received by the Commissioner, who said he would introduce into Parliament a Bill for the purpose of carrying them out.

THE WILD ANIMALS' PROTECTION BILL.

The committee understands that this Bill, embodying many amendments suggested by them, will shortly be laid before Parliament. When carried into law the long-desired protection for opossums can be given effect to, and it is hoped that protection may be extended to several other of our native animals. Under the Bill the only introduced animals which it is proposed to protect are deer. If at any time it should be decided to protect any others, their names can by proclamation be added to the schedule of wholly protected or to that of partially protected animals. Under the existing legislation many species of vermin might be introduced which would automatically come into the list of partially protected animals.

EDWIN ASHBY, *Chairman.*

M. SYMONDS CLARK, *Hon. Secretary.*

September 17, 1912.

BALANCE-SHEET OF FIELD NATURALISTS' SECTION OF THE
ROYAL SOCIETY.

DR.		£	s.	d.
To Postages	... ..	4	7	0
„ Printing and Advertising	... ..	5	14	6
„ Subscriptions paid to Royal Society	... ..	18	0	0
„ Balance in Bank	... ..	1	6	5
		<hr/>		
		£29	7	11
CR.		£	s.	d.
By Balance brought forward	... ..	1	5	0
„ Grant from Royal Society	... ..	10	0	0
„ Subscriptions received	... ..	18	0	0
„ Bank Interest	... ..	0	2	11
		<hr/>		
		£29	7	11

Audited and found correct,

(Signed) W. D. REED, }
J. S. LLOYD. } *Auditors.*

MALACOLOGICAL SECTION

OF THE

Royal Society of South Australia (Incorporated).

ANNUAL REPORT FOR THE YEAR 1911-12.

Eleven meetings were held during the year. There are thirteen members on the roll and there has been an average attendance of six. The members are:—Dr. Verco, Dr. Pulleine, Mrs. Robinson, Messrs. W. Howchin, F. R. Zeitz, W. D. Reed, W. J. Kimber, and F. S. Saunders, Miss Stenhouse, and Dr. Torr. The following new members have been elected this year:—Miss Robinson, Messrs. E. G. Saunders and Errol Hanley.

During the year about 140 species of shells have been identified and classified, consisting, among others, of *Haliotidæ*, *Cocculinidæ*, *Fissurellidæ*, *Stomatellidæ*, *Turbinidæ*, *Delphinulidæ*, *Cyclostrematidæ*, and *Trochidæ*. Dr. Verco is elected President for 1912-13 and Dr. Torr Hon. Secretary and Treasurer.

RECEIPTS AND EXPENDITURE FOR THE YEAR 1911-12.

Receipts.				£	s.	d.
To Credit Balance	...	...	...	1	4	5
„ Subscriptions	...	...	...	1	15	0
„ Debit Balance	...	...	...	1	12	7
				<hr/>		
				£4	12	0
Expenditure.				£	s.	d.
By Post Cards printed and Postages	...	...	...	1	17	6
„ Deed Box	...	...	...	0	19	6
„ Subscription to Royal Society	...	...	...	1	15	0
				<hr/>		
				£4	12	0

WILLIAM G. TORR,

Hon. Secretary and Treasurer.

MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia (Incorporated).

ANNUAL REPORT, 1910-11.

[This Report was omitted from the Volume of last year's Transactions, as the manuscript was not supplied in time.—Ed.]

OFFICERS.—*Chairman*, Mr. E. J. Bradley; *Vice-Chairman*, Mr. W. Fuller; *Committee*, Messrs. D. Gordon, B. S. Roach, and E. H. Matthews; *Auditors*, Messrs. A. G. Rendall and H. Whitbread; *Hon. Secretary*, Mr. H. W. H. Hale.

Your committee has to report that the conclusion of the eighth session of this Section since its reinstatement shows that it continues to make progress. A considerable number of new members have been enrolled, the exhibits have been numerous and varied, and some interesting papers contributed.

The following meetings were held during the year:—

September 27, 1910.—General Annual Meeting, when an address was given by Dr. Ray upon "Progress in Modern Methods in Medicine," dealing specially with microscopic research by means of dark-ground illumination and differential staining, the enquiry by means of the microscope into anti-toxins, immunizations, and hæmatological analysis.

October 25.—Meeting held at the laboratory of Veterinary Surgeon Desmond, who demonstrated his newly received Zeiss, dark-ground illuminating apparatus.

February 28, 1911.—Diatoms and Algæ, exhibited by Mr. Edquist; specimens of Anthropods, exhibited by Mr. Baker, who also showed the hydroid *Aglaophemia*. Address by the Chairman upon various Polyzoa, illustrated by mounts and specimens.

March 28.—Address by Mr. W. Fuller upon "Blood Relationships and Modern Discoveries in Hæmatology."

April 24.—Specimens of various Pulices exhibited by Mr. Bradley; mounts of *Demodex folliculorum*, taken from a case of red mange in the dog, by Mr. Desmond, who also exhibited balsam mounts of human blood, showing enormous macrophages. Mr. Fuller showed mounts of the blood of the

Murray turtle containing Hæmatozoa; and Mr. Showell exhibited specimens of larva and imago of midge.

May 23.—Mr. Baker showed mounts of *Astracella*, an isopod exhibiting protective mimicry.

June 27.—A committee was appointed to deal with the question of a laboratory.

August 22.—A discussion as to the future arrangements of the meetings was held, and it was decided that a less formal method of procedure should be adopted. Mr. Bradley exhibited mounts of the feather mite of the magpie and of the feathers of the humming bird, and demonstrated an electric-motor turntable, designed and made by Mr. Rendall.

EDGAR J. BRADLEY, *Chairman*.

BALANCE-SHEET, SESSION 1910-11.

Receipts.		£	s.	d.
To Subscriptions, 1910-11	... ..	6	2	6
„ Grant from Royal Society, 1910-11	... ..	5	17	6
		£12	0	0
Expenditure.		£	s.	d.
By Subscription, 1910-11, paid to Royal Society	...	5	17	6
„ Stationery, Printing, etc., 1910-11	... ..	2	17	6
„ Cash in Hand	... ..	3	5	0
		£12	0	0

EDGAR J. BRADLEY, *Chairman*.

Audited and found correct with Vouchers produced—

ALEXR. G. RENDALL, } *Auditors*.
 HOWARD WHITBREAD, }

September 25, 1911.

ANNUAL REPORT, 1911-12.

OFFICERS.—*Chairman*, Mr. W. B. Poole; *Vice-Chairman*, Mr. W. Fuller; *Committee*, Messrs. B. S. Roach, D. Gordon, and W. H. Baker; *Auditors*, Messrs. A. G. Rendall and H. Whitbread; *Hon. Secretary*, Mr. E. J. Bradley.

Your committee has to report that the ninth session, now concluded, has shown continued progress of the Society. A number of new members have been enrolled. A feature of this session has been the abandonment of the more formal method of having papers and the adoption of the system of

"Conversation Meetings," so that the evenings during the session with two exceptions have been devoted to exhibits of objects of interest, etc., and discussions by the members thereon. The innovation has proved successful.

June 25 was devoted to a public lecture on the poultry tick (*Argus persicus*) by Mr. D. C. F. Laurie, Government Poultry Expert, the appreciation of the public being shown by an attendance of about 300 members and visitors.

At the Section's suggestion the Royal Society has purchased a microscope for the use of the affiliated sections. The instrument is a Watson's Circuit No. 1 Van Heurck microscope stand with substage, and fittings for polariscope and holoscopic eyepiece.

The following meetings have been held during the year:—

September 26, 1911.—Annual General Meeting. Election of officers and a paper by Mr. W. H. Baker on "Some Crustacean Parasites"; also exhibit of pond-life specimens from Blackwood by Mr. E. J. Bradley.

October 24.—Conversation Meeting. Mr. Desmond exhibited "Culpepper-Scarlett" microscope, dated 1740. Mr. W. B. Poole exhibited rotifers, *Philodenia* (sp. ?). Rev. T. Ward exhibited "commercial" microscopic slides sent out by dealers in London. Amazement was expressed that such unsatisfactory slides should be sent out by reputable dealers.

November 28.—Mr. W. H. Baker exhibited mounts of small insects cleared with chloral and phenol (equal parts). Mr. Bradley exhibited parasites on the aphids of orange-trees. Mr. W. B. Poole exhibited mounts of Diatoms, and initiated a discussion on mountings in media of high refractive indices.

March 26, 1912.—Mr. Desmond exhibited Botriocephalous worms, *Ligula replans* (*sparganum*), from the subcutaneous tissues of a fox and cow. Mr. Fuller exhibited Bausch & Lomb's 1912 model student's microscope. Mr. Bradley exhibited specimens illustrating the life history of the *Anopheles* mosquito from the River Torrens.

April 23.—Mr. Poole exhibited mounts of "Thrip," and slides of Diatoms from Pomonky, U.S.A., mounted by Mr. Showell, of Renmark. Mr. Bradley exhibited insect preparations and gave particulars for making preparations with the caustic potash method of maceration. Mr. Broughton exhibited petrological preparations. Mr. Desmond exhibited specimens of the red-tailed larva of the botfly of the horse, and also specimens of a new parasite of the fox (*Dibotriocephalus latus*).

May 28.—Mr. Poole exhibited *Gamasus coleopratorum*, a parasite on the dung beetle. Mr. Bradley exhibited four species of Gamasids obtained as parasites on the dung beetle

(*Onthophagus mninzechi*); also mounts of the ferment fly (*Drosophilus*, sp. ?), found hovering over decaying fruit, and of the larva of the red-tailed botfly of the horse.

June 25.—The Section adjourned the ordinary business for this evening and invited the general public to a lecture on the "Poultry Tick" by Mr. D. C. F. Laurie.

July 23.—Mr. Poole exhibited "arranged" mounts of Diatoms by Mr. Showell, of Renmark. Mr. Fuller exhibited section of the aorta of King Pharoah (Menephtah, the Pharoah of the Exodus), presented to the Adelaide University by Dr. Angus Johnson, and received by him from Dr. Arthur Keith, Curator of the Museum of the Royal College of Surgeons. Mr. Desmond exhibited specimens of *Hæmatopinus*, sp.—a species of louse from the sheep, considered by him to be new.

August 27.—The new microscope for the use of the Royal Society and the Sections, a Watson's Circuit No. 1 Van Heurck, was exhibited, and its use explained by Mr. Bradley. Mr. Huston exhibited a grand model Bausch and Lomb's microscope. Mr. Baker exhibited slides of *Cumacea* (sp. ?), and also mounted mites. Mr. Bradley exhibited various specimens of gamasids and dipterous insects from Broken Hill; also "natural" dissection of lingual ribbon of a species of limpet from Bass Straits.

W. B. POOLE, *Chairman.*

BALANCE-SHEET, SESSION 1911-12.

Receipts.		£	s.	d.
To Cash handed over by outgoing Hon. Secretary		3	5	0
„ Subscriptions, 1911-12	... ..	4	5	0
„ Grant from Royal Society, 1911-12	... ..	4	5	0
		<hr/>		
		£11	15	0
Expenditure.		£	s.	d.
By Stationery, Postage, and Printing, 1911-12		3	12	3
„ Subscriptions paid to Royal Society	... ..	4	5	0
„ Cash in Hand	... ..	3	17	9
		<hr/>		
		£11	15	0

EDGAR J. BRADLEY, *Hon. Secretary.*

Audited and found correct with Vouchers produced—

ALEXR. G. RENDALL, } *Auditors.*
HOWARD WHITBREAD, }

September 24, 1912.

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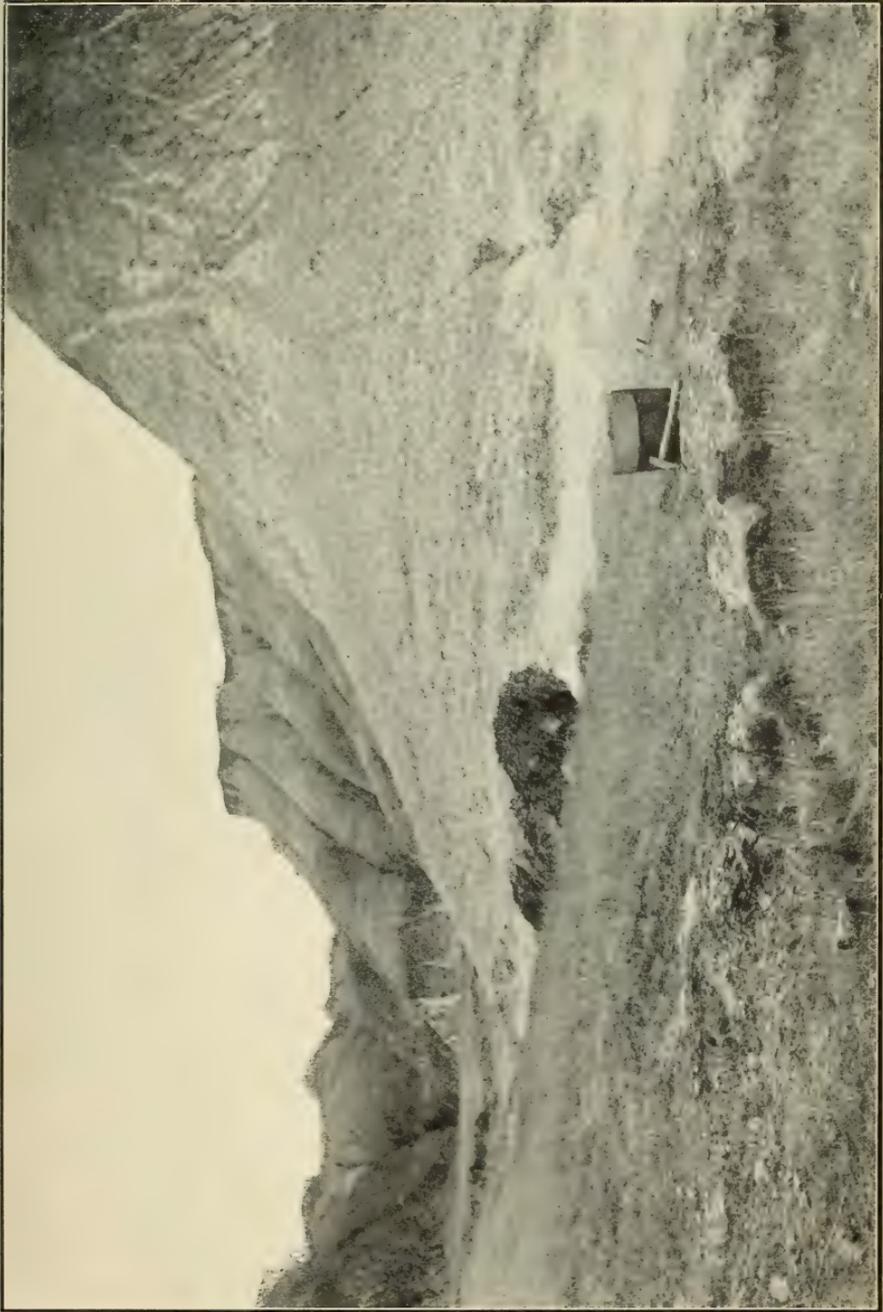
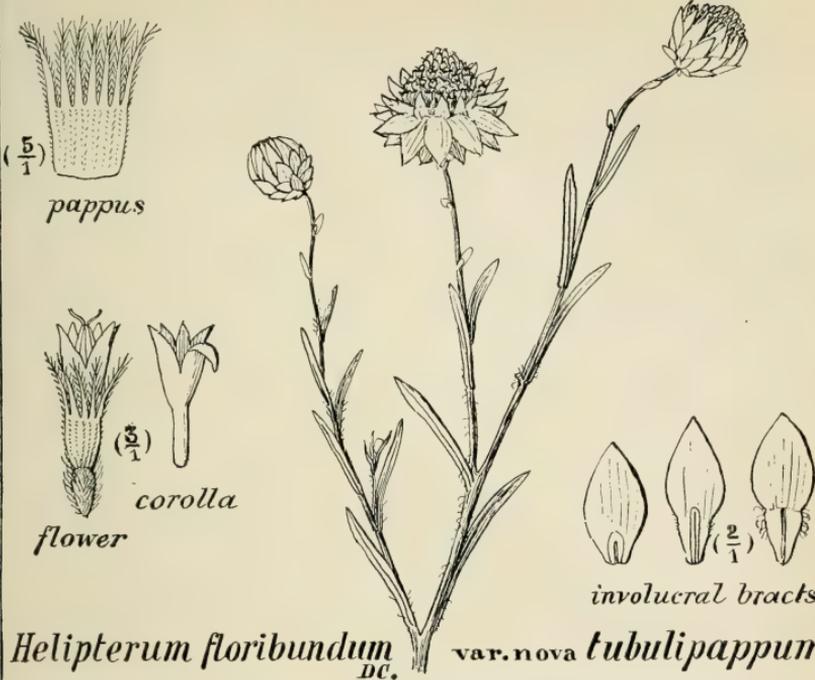
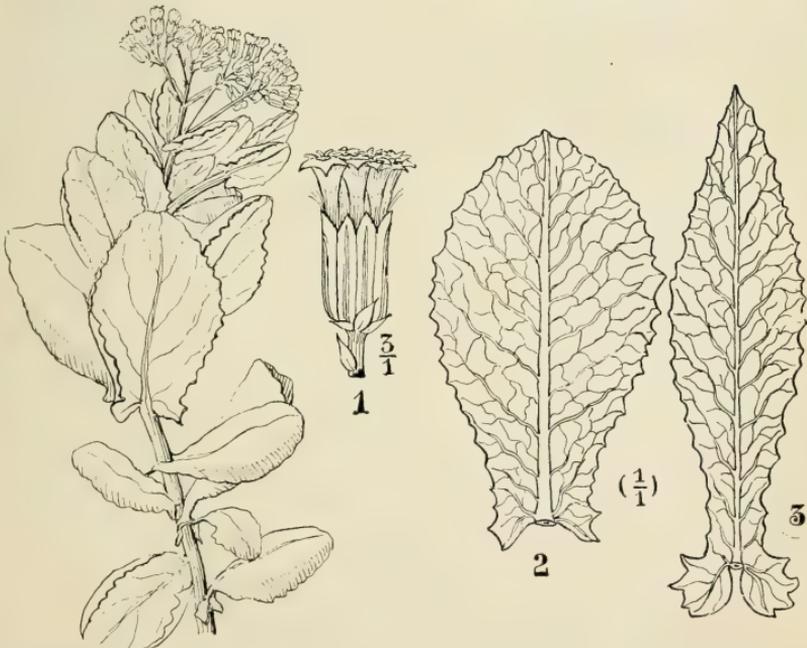
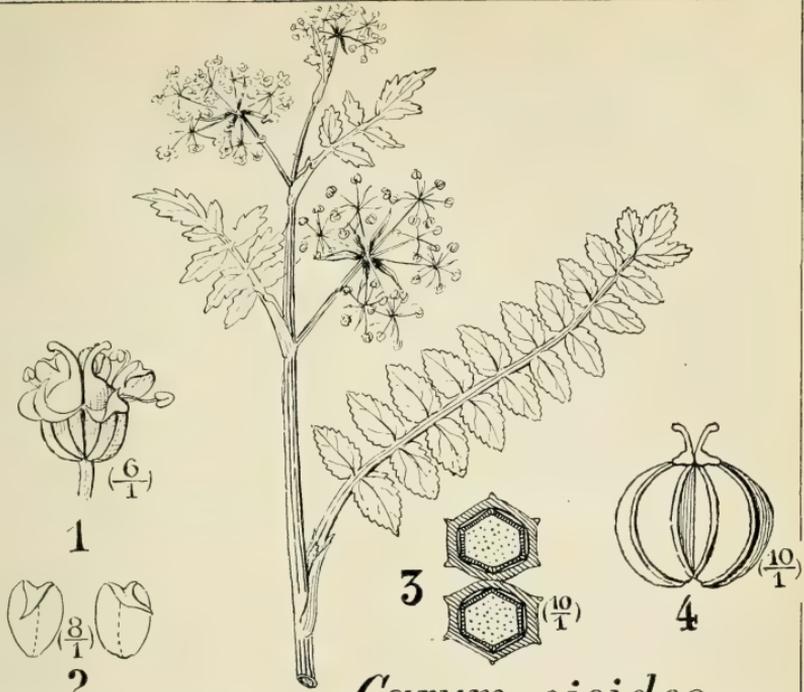
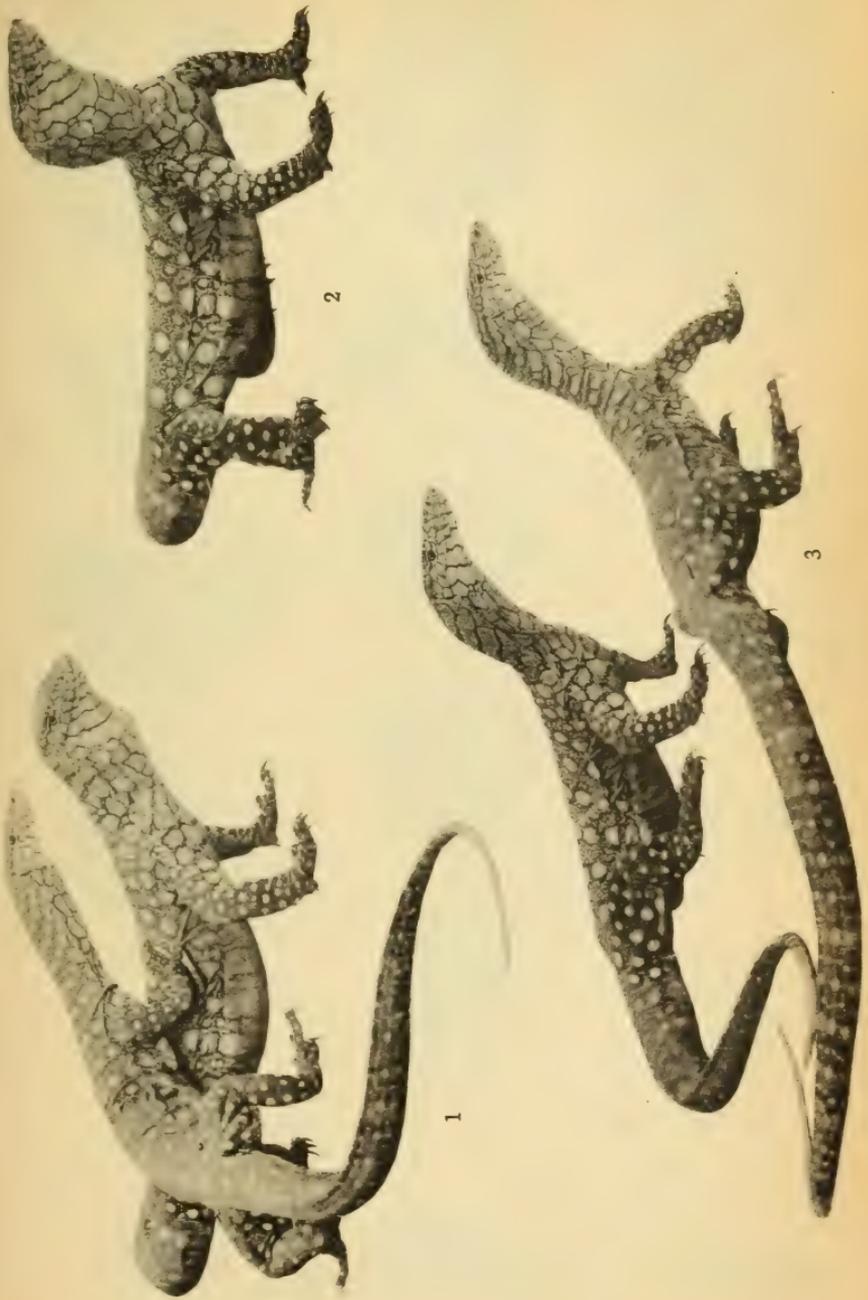


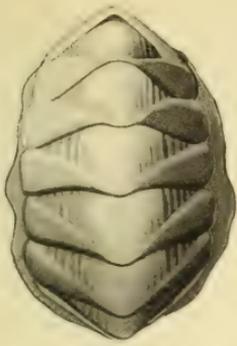
Photo. by W. Howchin.

Washout in Red Banks, River Light. The ledge where bag and hammer rest is upper limit of Cainozoic outcrop.





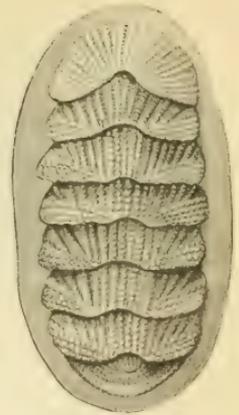




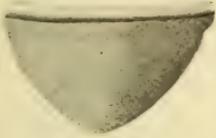
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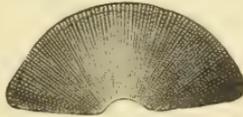
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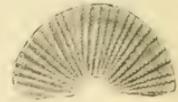
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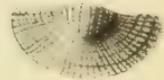
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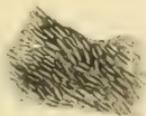
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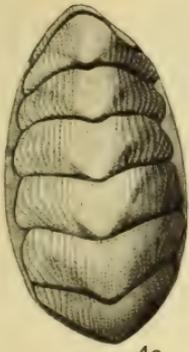
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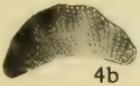
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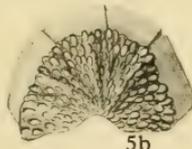
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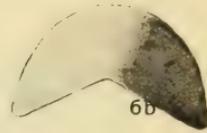
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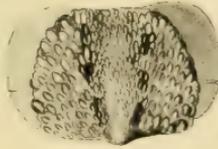
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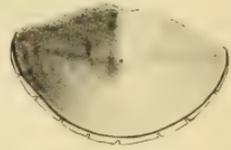
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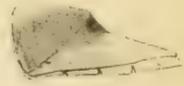
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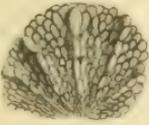
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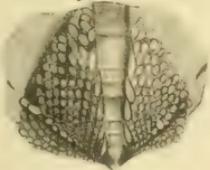
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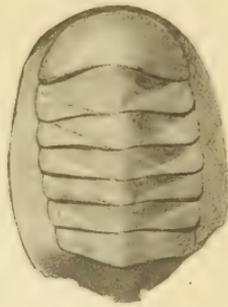
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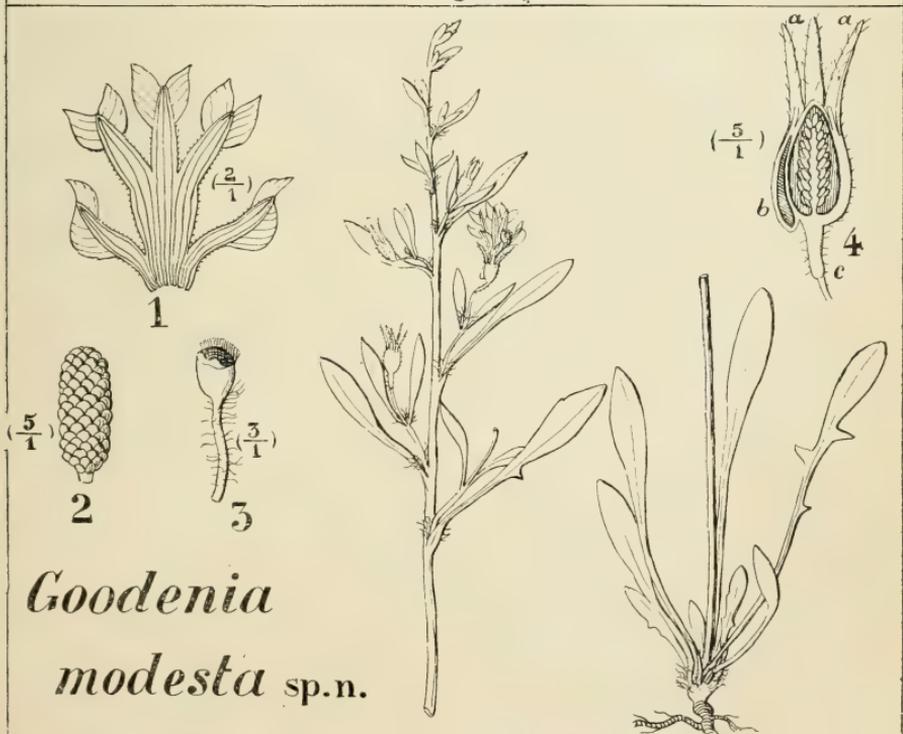
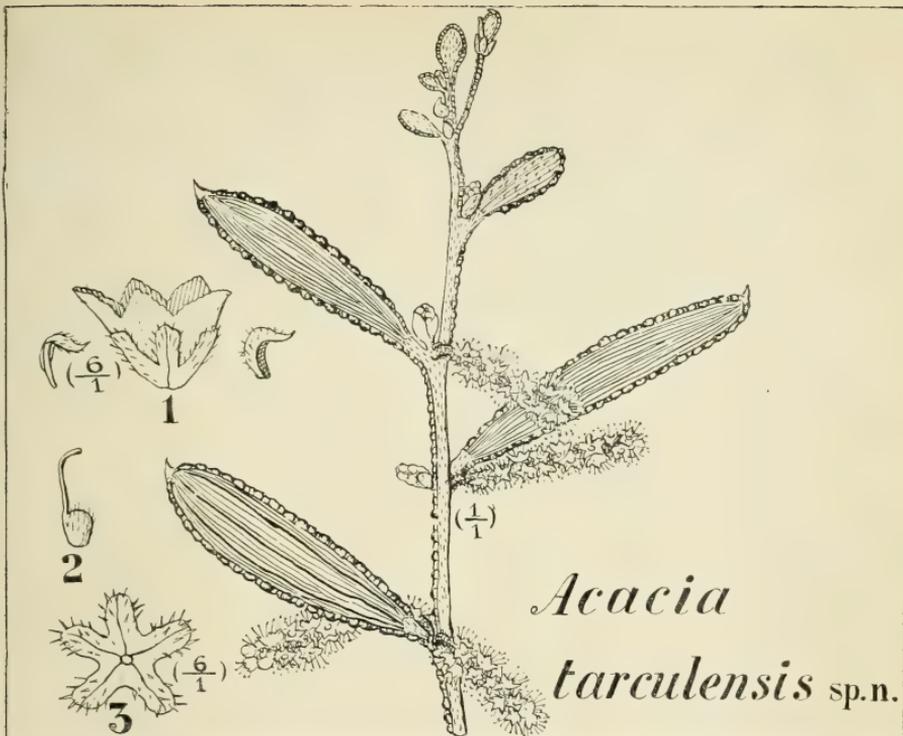
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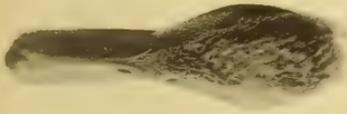
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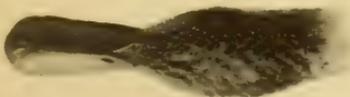
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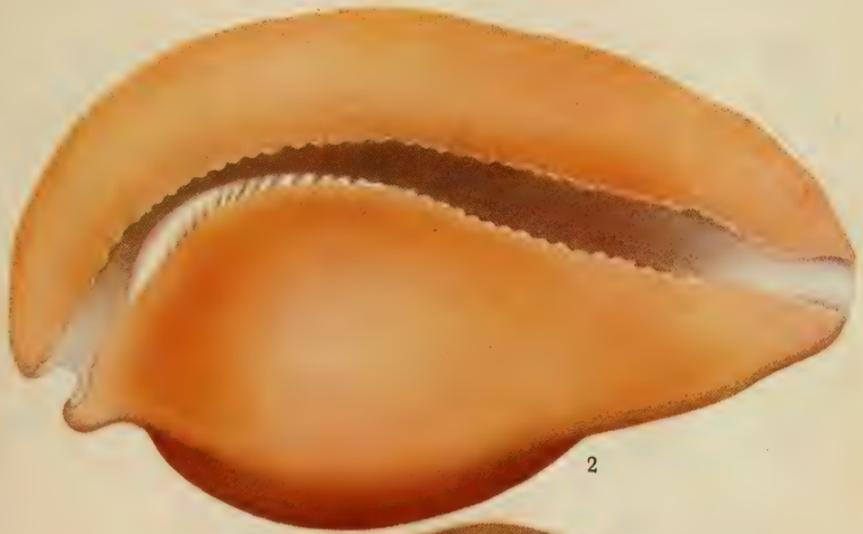


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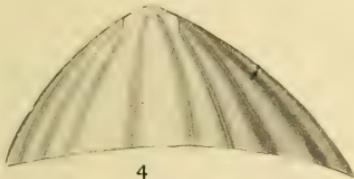




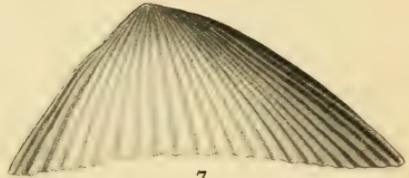
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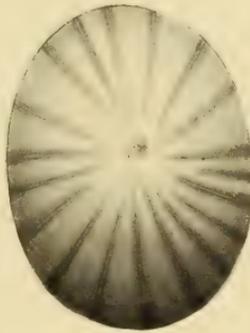
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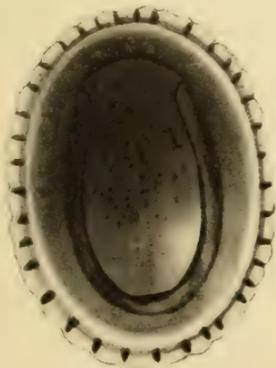
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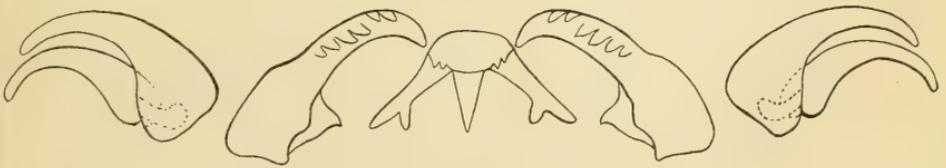
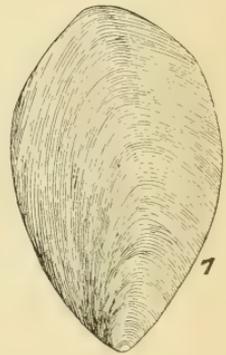
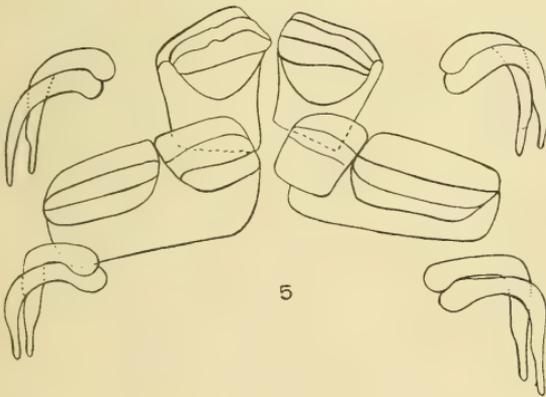
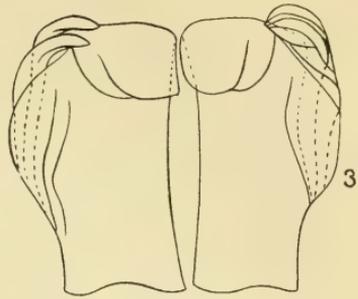
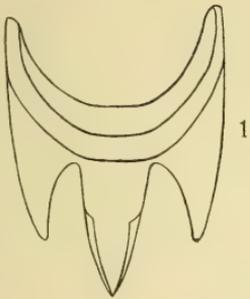
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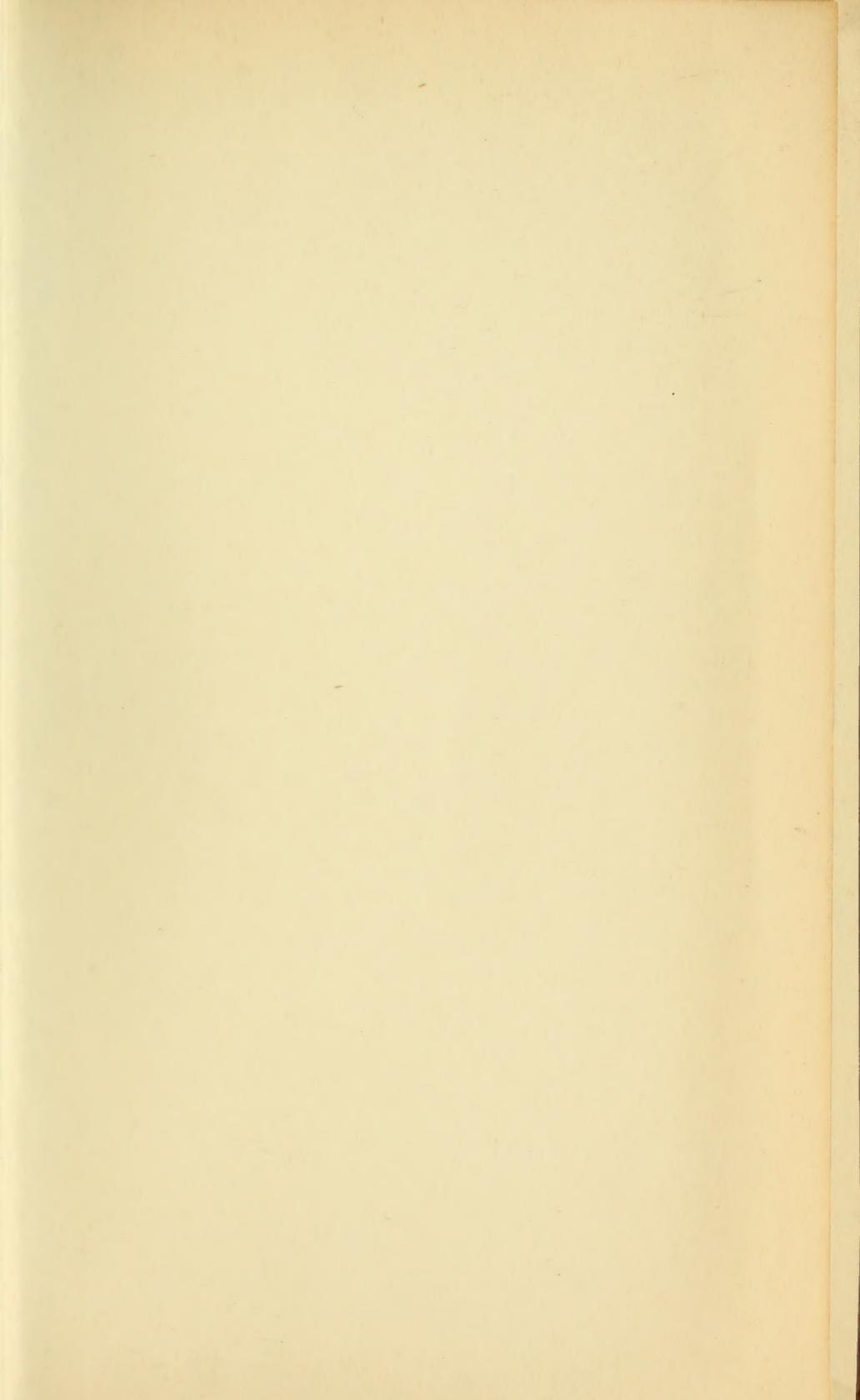


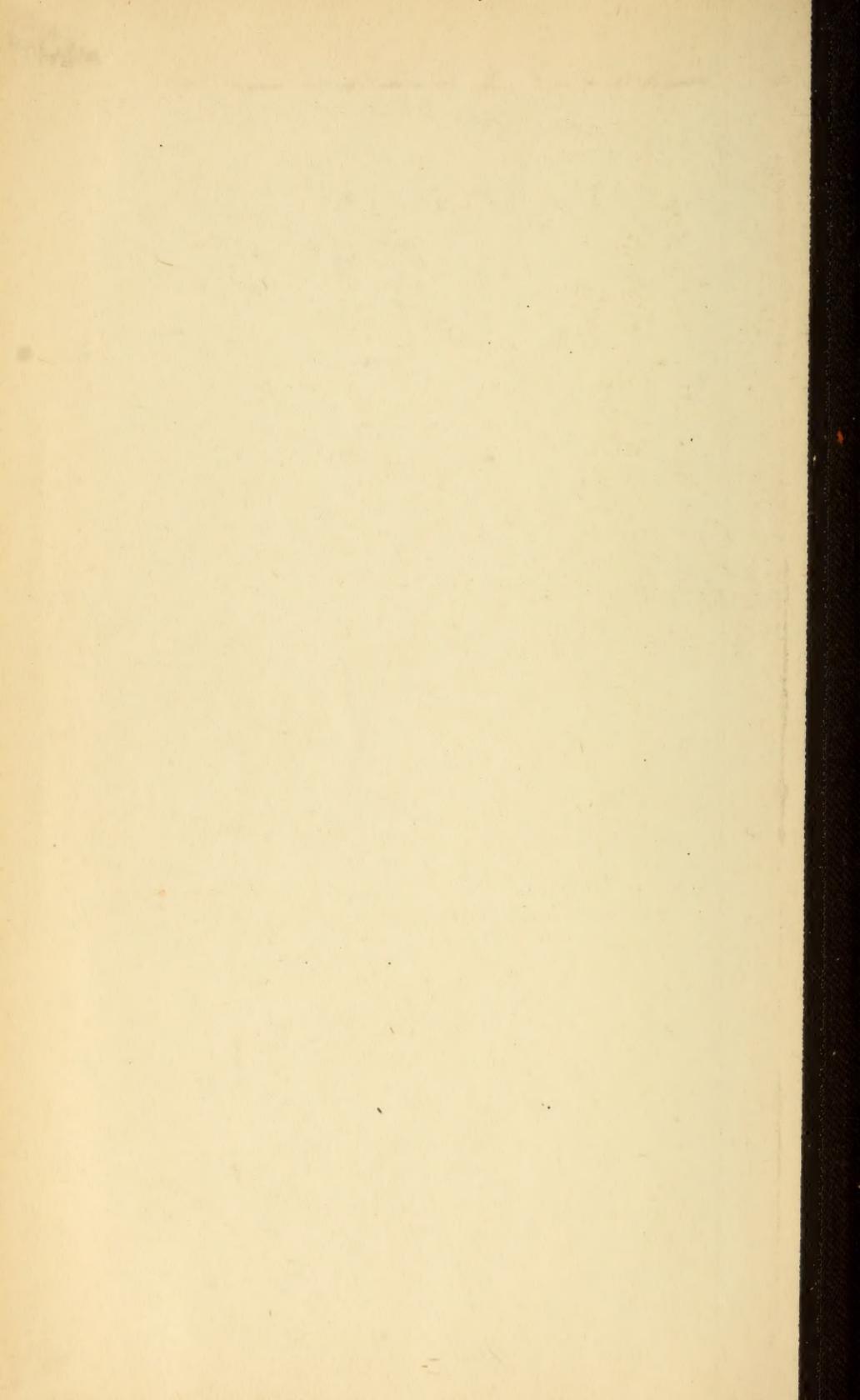
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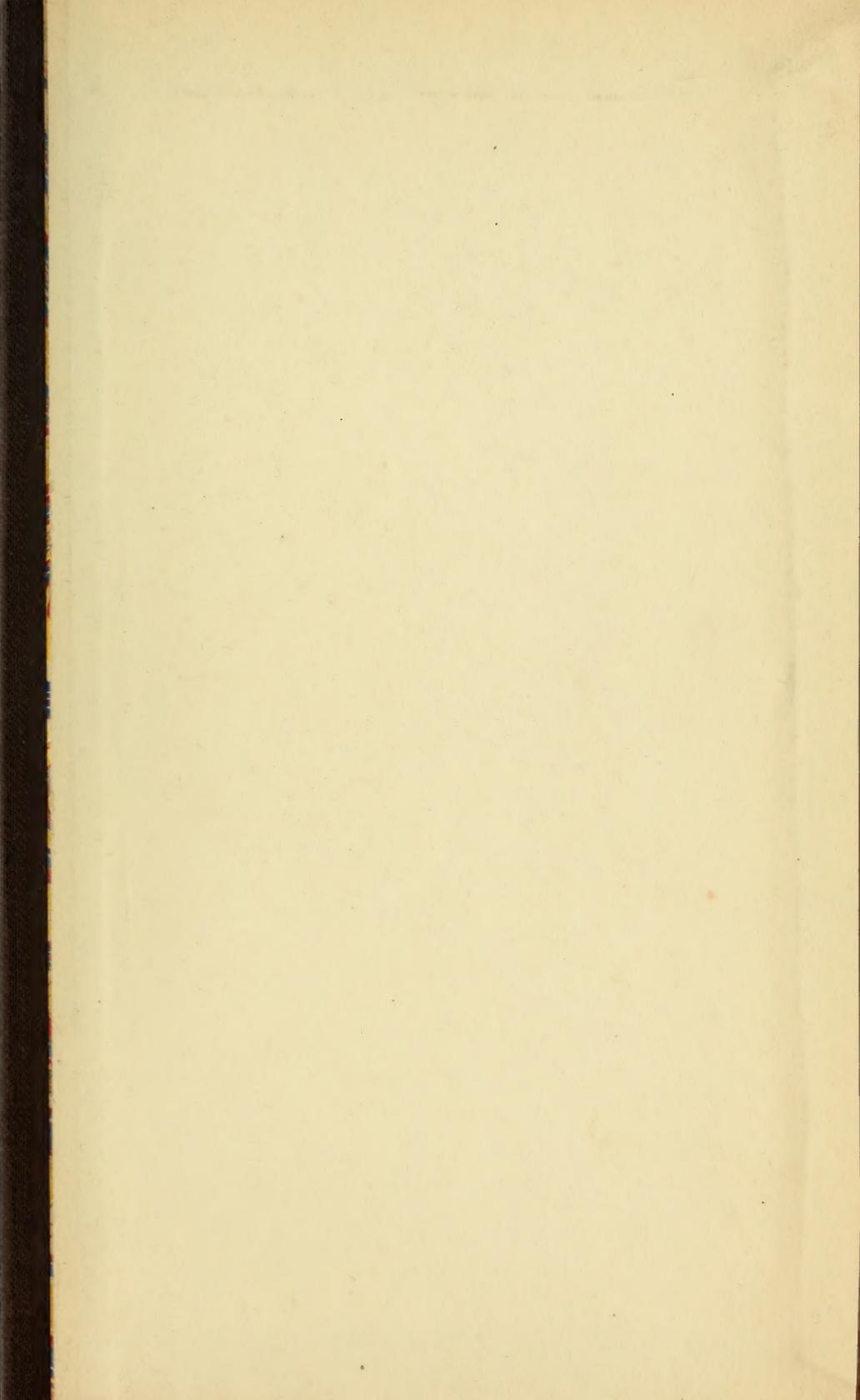


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