MEMOIRS

OF THE

NATIONAL MUSEUM OF VICTORIA

MELBOURNE

(World List abbrev. Mem. Nat. Mus. Vic.)

No. 17

Issued March, 1951

R. T. M. PESCOTT, M.Agr.Sc., F.R.E.S.
DIRECTOR

PUBLISHED BY ORDER OF THE TRUSTEES

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BROWN, PRIOR, ANDERSON PTY. LTD., 430 LITTLE BOURKE ST., MELBOURNE, C.1

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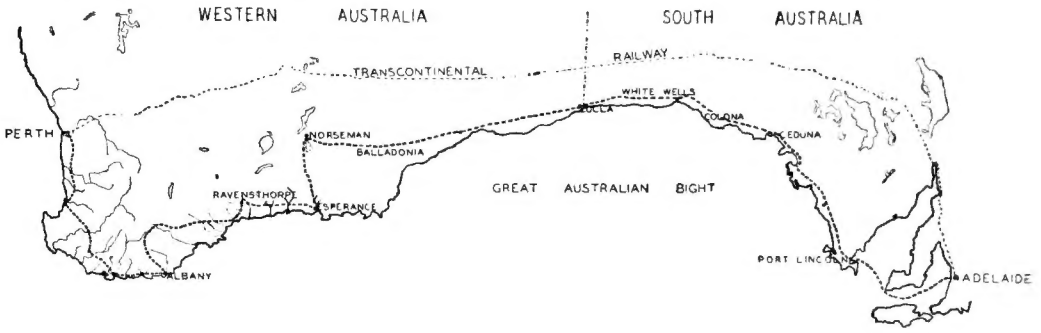
THE RUSSELL GRIMWADE EXPEDITION TO SOUTH AND WESTERN AUSTRALIA AUGUST-SEPTEMBER, 1947

INTRODUCTION

By Sir Russell Grimwade

In the winter of 1947 I was privileged to organize and lead a party of scientists by road from Port Lincoln to Perth. The party included a forester, naturalist, entomologist, botanist, ethnologist, bird observers and plant collectors.

The journey took sixteen days, and was made in a large touring bus that accommodated the party of nine and a crew of four, with a trailer that carried reserve supplies of fuel, water, tyres and necessary camping gear. Travel was done by day only, the nights being spent in camp, or in hotels if they were available.



GRIMWADE EXPEDITION TO SOUTH-WEST AUSTRALIA

ROUTE SHOWN --------

AUGUST - SEPTEMBER 1947

The route from east to west coincided very closely with that travelled by Edward John Eyre on his historic journey in the years 1840-41, and every member of the party was conscious of and humbled by the comfort and safety of the trip, in contrast with the ardours and dangers experienced by the great explorer.

Large collections, especially in the botanical and entomological fields, were made, and these specimens are now deposited in the National Herbarium, Melbourne, and the National Museum of Victoria respectively.

Since the completion of the journey, specialists have worked upon these specimens, comparing them with the specimens already held by these two great institutions.

The results of this expedition were many — they included a manifestation of the comparative ease and comfort with which such trips can be made nowadays with motor transport, and illustrate the rapidity with which a full knowledge of our country may be acquired by its aid with improved roads and tracks.

Of the nine hundred botanical specimens and the three hundred natural history specimens brought to the permanent collections of the National Herbarium and the National Museum, the great majority was well known, having been previously collected and recorded. A few were old friends found in new places, and a few were entirely new to science. It is with these collections that the remainder of this paper deals.

The pleasant and lasting memories of such an expedition have their real foundation in the belief that a small contribution was made on this occasion to the general knowledge of the Australian environment, and my thanks and congratulations go to those enthusiastic companions who so freely shared their knowledge with those of the party who were less informed than they, and for their companionship on an occasion that was both useful and pleasurable.

SPIDERS OF THE RUSSELL GRIMWADE EXPEDITION

By R. A. Dunn, Honorary Arachnologist,
National Museum of Victoria.

(Received for publication May 6, 1949.)

By the courtesy of the Director of the National Museum, to whom I am consequently indebted, I have been permitted to examine the spiders collected in Western Australia by the Russell Grimwade Expedition. Though much of the material consists of species that are already known from that State, several specimens have either not been recorded from there, or are entirely new. These specimens alone are mentioned in this paper, and the species represented are detailed hereunder.

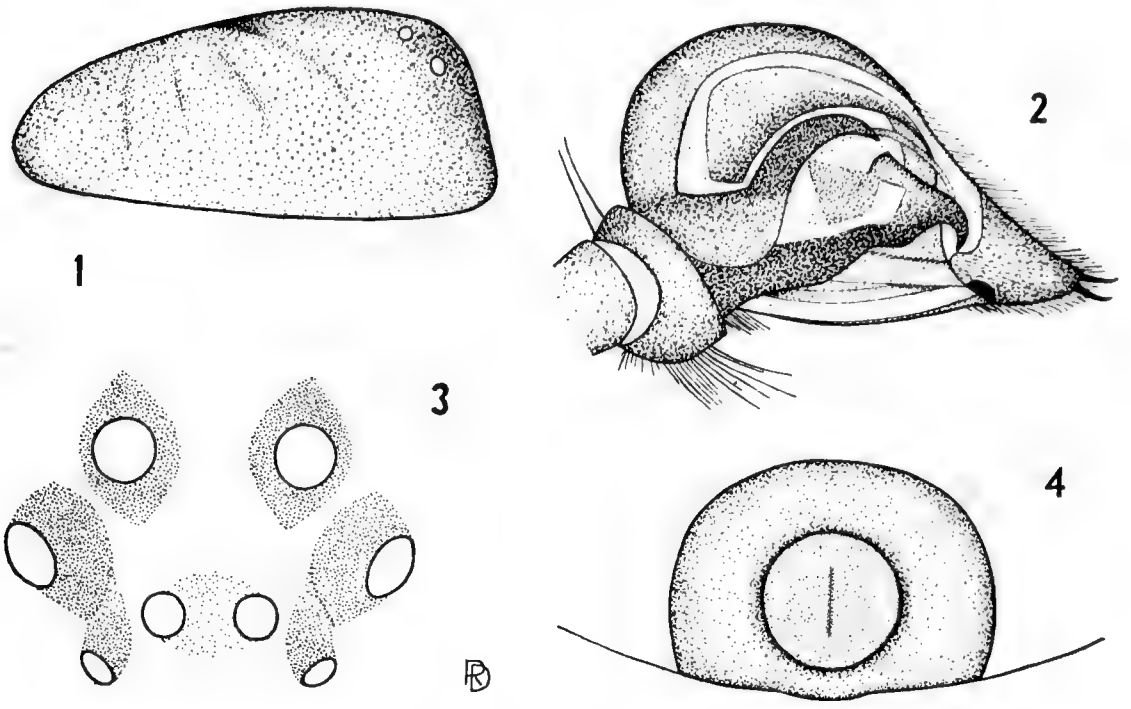
Acknowledgments are made to Mr. L. S. G. Butler, of Melbourne, for literature not otherwise available.

Order ARANEAE
Suborder DIPNEUMONOMORPHAE
Branch TRIONYCHAE
Family ZODARIIDAE
Subfamily ZODARIINAE
Genus STORENA Walckenaer, 1805

Synopsis of Australian Species

1.	Leg iii longer than leg iv.	*S. cyanea* Walck.
–	Leg iv longer than leg iii	2.
2.	Both rows of eyes procurved.	3.
–	Anterior row of eyes strongly recurved.	*S. variepes* Rainb.
3.	Femorae each of two strongly contrasting colours.	4.
–	Femorae uniform in colour.	11.
4.	Femorae lighter in colour apically.	5.
–	Femorae lighter in colour at base only.	6.
5.	Dorsal surface of abdomen dark brown in colour, ornamented with white patches.	*S. auripes* Rainb.
–	Dorsal surface of abdomen yellow-brown, spotted with pale yellow, but not ornamented.	*S. inornata* Rainb.
6.	A.M.E. the largest of all eyes.	7.
–	A.M.E. smaller than P.M.E. and P.L.E.	8.

7. A.M.E. and P.L.E. forming a recurved row. *S. macedonensis* Hogg.
– A.M.E. and P.L.E. forming almost a straight row. *S. tricolor* Simon.
8. A.M.E. and P.L.E. forming a straight row. *S. annulipes* (L. Koch).
– A.M.E. and P.L.E. forming a recurved row. 9.
9. Cephalothorax as broad as the length of tibia and patella iv. *S. braccata* (L. Koch).
– Cephalothorax not broader than the length of tibia iv. 10.
10. P.M.E. their diameter apart. *S. picta* (L. Koch).
– P.M.E. their radius apart. *S. striatipes* (L. Koch).
11. All eyes about equal in size. 12.
– Eyes unequal in size. 15.
12. Sternum glossy black in colour. 13.
– Sternum dark reddish-brown in colour. 14.
13. Area of median eyes subparallel. *S. tetrica* Simon.
– Area of median eyes narrower in front than at rear. *S. albomaculata* Rainb.
14. A.M.E. and P.L.E. forming a procurved row. *S. variegata* O. P. Cambr.
– A.M.E. and P.L.E. forming a recurved row. *S. scintillans* O. P. Cambr.
15. A.M.E. larger or at least not smaller than P.M.E. 16.
– A.M.E. smaller than P.M.E. 22.
16. A.M.E. and P.L.E. forming a procurved row. 17.
– A.M.E. and P.L.E. forming a straight row. 18.
– A.M.E. and P.L.E. forming a recurved row. 21.
17. Cephalothorax strongly wrinkled. *S. torosa* Simon.
– Cephalothorax finely striated. *S. procera* Thorell.
18. Cephalothorax coarsely granular. *S. formosa* Thorell.
– Cephalothorax very finely granular. 19.
19. Caput black, thorax yellowish-red in colour. *S. eximia* Simon.
– Cephalothorax either uniform in colour or else more brightly coloured on the caput. 20.
20. Sternum coarsely wrinkled. *S. spirafer* (L. Koch).
– Sternum smooth, finely granular. *S. graeffei* L. Koch.
21. P.M.E. about their diameter apart. *S. rastellata* Strand.
– P.M.E. one-and-a-half diameters apart. *S. toddi* Hickman.
22. A.L.E. smaller than A.M.E. 23.
– A.L.E. larger or at least not smaller than A.M.E. 25.
23. Legs 4, 3, 2, 1, or 4, 3, 1, 2. 24.
– Legs 4, 1, 2, 3. *S. flavipes* (Urquhart).
24. Profile of cephalothorax depressed near the thoracic fovea. *S. bradleyi* O. P. Cambr.
– Profile of cephalothorax an even curve. *S. grimwadei* sp. nov.
25. A.M.E. and P.L.E. forming a procurved row. 26.
– A.M.E. and P.L.E. forming a straight row. *S. scenica* (L. Koch).
– A.M.E. and P.L.E. forming a recurved row (if belonging to this genus). *S. lycosoides* (Hogg).
26. Legs 4, 2, 3, 1. *S. australiensis* O. P. Cambr.
– Legs, 4, 1, 2 = 3. *S. maculata* O. P. Cambr.



Storena grimwadei sp. nov.

Fig. 1. ♂ Profile of cephalothorax.
Fig. 2. ♂ Ventral view of left palpus.
Fig. 3. ♀ Dorso-anterior view of eyes.
Fig. 4. ♀ Epigynum.

Storena grimwadei sp. nov.

Figs. 1-4

Male (holotype).

	mm.
Total Length	4·36
Length of Cephalothorax	2·30
Width of Cephalothorax	1·67
Length of Abdomen	2·06
Width of Abdomen	1·53

	Femur	Patella	Tibia	Meta-tarsus	Tarsus		Total
Leg i	1·70	0·59	1·59	1·72	1·30	=	6·90
ii	1·76	0·62	1·55	1·81	1·34	=	7·08
iii	1·76	0·66	1·52	2·33	1·37	=	7·64
iv	2·65	0·66	2·26	3·57	1·89	=	11·03
Palp	0·90	0·37	0·19	—	1·12	=	2·58

Carapace light brown, eyes edged with black, a few black bristles around eyes and on clypeus. Chelicerae light brown. Maxillae, labium, and coxae yellowish brown. Sternum light brown, with scattered black bristles directed backwards. Legs and palpi light brown, with black spines. Abdomen dark brown, with a bluish sheen laterally; dorsal surface with four white spots, of which two are large and oval and are placed opposite each other near the middle, the other two nearer the apex in the median line, the first being semi-circular, truncate

behind, and the other long and shaped somewhat like an hour-glass. There are also two long, oblique, light brown stripes laterally; the anterior one extends round the front of the abdomen and almost joins in front. Ventrally, the abdomen is brown; spinnerets yellowish brown.

Carapace with finely granulate tegument, without hair; rounded laterally, only slightly narrower in front; profile as in Fig. 1. Thoracic fovea short, longitudinal.

Eyes arranged in two strongly procurved rows, occupying area broader than long in the ratio of approximately 36 : 30. Ratio of eyes A.M.E. : A.L.E. : P.M.E. : P.L.E. = 5 : 4·5 : 7 : 7·5. The A.M.E. are separated from each other by 5/5, and from A.L.E. by 5/5 of the diameter of A.M.E. The P.M.E. are separated from each other by 7/5, and from P.L.E. by 10/5 of the diameter of A.M.E. The P.L.E. are separated from A.L.E. by 6/5, and from A.M.E. by 8/5 of the diameter of A.M.E. The P.L.E. and A.M.E form a recurved row when viewed from in front.

Chelicerae conical; lateral condyles present; margins of furrow without teeth, promargin with scopula. Fang short.

Maxillae strongly converging, with scopulae. *Labium* triangular, almost as broad as long.

Sternum shield-shaped, almost as broad as long, extended posteriorly into a short point between coxae iv, anterior margin straight.

Legs 4, 3, 2, 1. Trichobothria in two rows on tibiae, in one row on metatarsi and tarsi. Three tarsal claws, the superior claws with about ten teeth, the inferior claw small and unarmed. Palpal bulb has the form shown in Fig. 2.

Spines on legs and palpi arranged as follows: *First leg*—Femur: dorsal 1.1.1, prolateral 1, elsewhere 0. Patella: 0. Tibia: dorsal 1 near base, prolateral 1.1.1, retrolateral 0, ventral 2.2.2. Metatarsus: dorsal 0, prolateral 1.1, retrolateral 1 apical, ventral 2.2.2. *Second leg*—as in leg i. *Third leg*—Femur: dorsal 1.1.1, elsewhere 0. Patella: dorsal 1, prolateral 2, elsewhere 0. Tibia: dorsal 2.1.1.1.2.1.1.1.2, prolateral 1.1.1, retrolateral 1, ventral 2.2.2. Metatarsus: dorsal 1.1.2, prolateral 1.1.1, retrolateral 1.1.1, ventral 2.2.2.2.2. *Fourth leg*—Femur: dorsal 1.1.1, elsewhere 0. Patella: prolateral 1, retrolateral 1, elsewhere 0. Tibia: dorsal 1.1.1, prolateral 1.1.1, retrolateral 1, ventral 2.2.2. Metatarsus: dorsal 1.1.2, prolateral 1.1.1, retrolateral 1.1.1, ventral 2.2.2.2.2.2. All tarsi have numerous short spines ventrally. *Palp*—Femur: dorsal 1.1, elsewhere 0. Patella: prolateral 1, elsewhere 0. Tibia: prolateral 1 long, elsewhere 0.

Abdomen oval; anterior spinnerets longer than the posterior pair.

Female (allotype).

	mm.
Total Length	5·46
Length of Cephalothorax	2·73
Width of Cephalothorax	2·04
Length of Abdomen	2·73
Width of Abdomen	2·06

	Femur	Patella	Tibia	Metatarsus	Tarsus		Total
Leg i	1·84	0·71	1·55	1·86	1·28	=	7·24
ii	2·02	0·78	1·52	1·87	1·26	=	7·45
iii	2·02	0·86	1·64	2·43	1·36	=	8·31
iv	2·61	0·86	2·30	3·61	1·84	=	11·22
Palp	0·96	0·58	0·50	—	0·81	=	2·85

Except for the following details, the description of the female is similar to that of the male.

The dorsal surface of the abdomen has, towards the base, an additional pair of white spots which are much smaller than the median pair; and the lateral stripes are white.

Eyes as in Fig. 3, occupying area broader than long in the ratio of approximately 46 : 35. Ratio of eyes A.M.E. : A.L.E. : P.M.E. : P.L.E. = 5 : 4·5 : 7 : 8. The A.M.E. are separated from each other by 5/5, and from A.L.E. by 6/5 of the diameter of A.M.E. The P.M.E. are separated from each other by 12/5, and from P.L.E. by 11/5 of the diameter of A.M.E. The P.L.E. are separated from A.L.E. by 9/5, and from A.M.E. by 10/5 of the diameter of A.M.E.

Palp with a single tarsal claw provided with about seven short teeth.

Spines on legs as in male, except for tibia iii dorsally, which has 1.1.1 only. Palp—Tibia: dorsal 1 bristle, prolateral 2.1 bristles, elsewhere 0. Tarsus with numerous spines ventrally.

Epigynum has the form shown in Fig. 4.

Locality. About 40 miles west of Eucla, W.A.; one male and two females, collected by R. T. M. Pescott, August 30, 1947. Mr. Pescott remarked that they were captured in the act of preying on the ant *Iridomyrmex* (?)*detectus* (Smith).

Types in the National Museum of Victoria. Named in honour of the Chairman of Trustees and Expedition leader, Sir Russell Grimwade.

Branch DIONYCHAE
Family GNAPHOSIDAE
Subfamily DRASSODINAE
Genus PRIONOSTERNUM nov.

Cephalothorax suboval, only slightly narrowed anteriorly; thoracic fovea short, longitudinal.

Eyes eight, in two procurved rows, heterogeneous, A.M.E. alone diurnal. A.M.E. smaller than A.L.E. and closer to them than the space between each other. Median ocular quadrangle broader than long, and broader at rear than in front.

Chelicerae with both margins armed with two teeth.

Maxillae parallel, inner margin bevelled; palpi inserted at base. *Labium* longer than broad, slightly tapered, apex truncate.

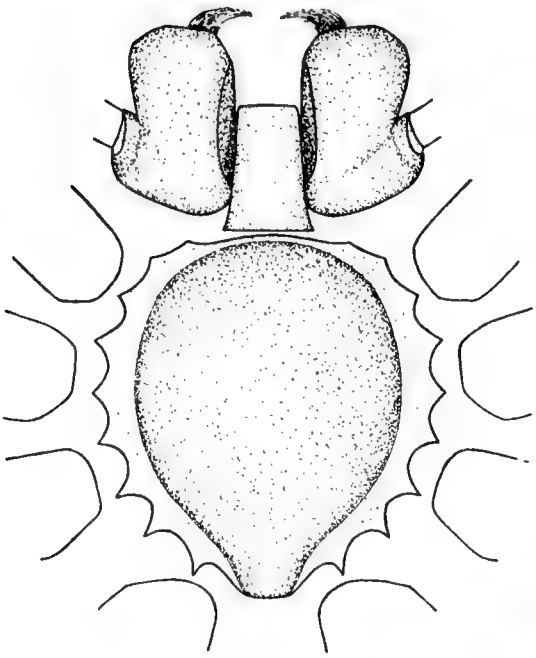
Sternum cordate, with serrated flange; coxae iv well separated.

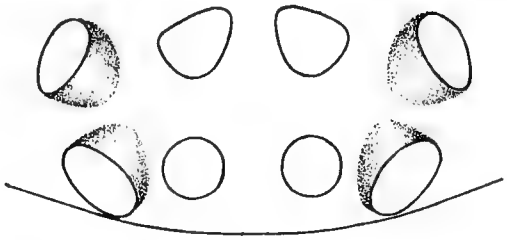
Legs 4, 1, 2, 3, prograde; i and ii without spines, iii and iv almost likewise.

Abdomen oval, with dorsal scuta; anterior spinnerets close together.

Differs from *Anzacia* Dalmas principally in having the A.M.E. smaller than A.L.E., the sternum with a serrated flange, legs i and ii unarmed and legs iii and iv almost so, and the abdomen with a dorsal scuta.

Genotype: *P. scutatum* sp. nov.





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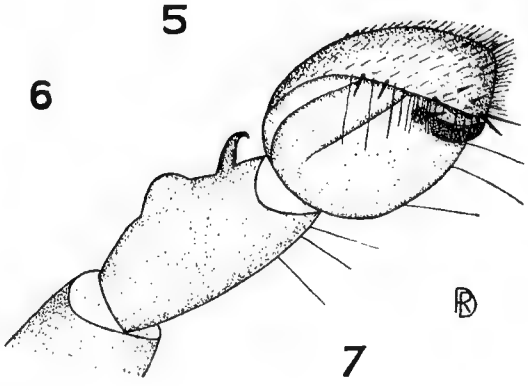

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Prionosternum scutatum gen. et sp. nov.

Fig. 5. Dorso-anterior view of eyes.
Fig. 6. Maxillae, labium, and sternum.
Fig. 7. Ventral view of right palpus.

Prionosternum scutatum sp. nov.

Figs. 5-7

Male (holotype).

	mm.
Total Length	4·14
Length of Cephalothorax	1·99
Width of Cephalothorax	1·53
Length of Abdomen	2·15
Width of Abdomen	1·25

	Femur	Patella	Tibia	Meta-tarsus	Tarsus		Total
Leg i	1·53	0·80	1·30	1·09	0·74	=	5·46
ii	1·36	0·77	1·11	0·90	0·65	=	4·79
iii	1·12	0·59	0·84	0·78	0·44	=	3·77
iv	1·56	0·78	1·36	1·31	0·65	=	5·66
Palp	0·53	0·37	0·34	—	0·52	=	1·76

Width of Patella i at "knee": 0·22 mm. Tibial Index 11.
Width of Patella iv at "knee": 0·24 mm. Tibial Index 11.

Carapace brown, thorax with black granules. Chelicerae brown. Maxillae, labium, and sternum light brown. Legs and palpi yellowish, the femorae greyish yellow. Abdomen dark grey above; sides and apex whitish; ventral surface light grey, with four converging longitudinal lines of whitish spots; between the epigastric furrow and the base of the abdomen yellowish; spinnerets whitish, encircled by a line of dark grey.

Carapace suboval, slightly narrowed anteriorly, anterior margin obtusely truncate, posterior margin excavated; convex; caput smooth, thorax with granulations forming a pattern radiating from the fovea. Thoracic fovea short, longitudinal. Clypeus equal to approximately 3/7 of the diameter of A.M.E.

Eyes as in Fig. 5, in two procurved rows, heterogeneous, A.M.E. alone diurnal. Ratio of eyes A.M.E. : A.L.E. : P.M.E. : P.L.E. = 7 : 10 : 10 : 9·5. The A.M.E. are separated from each other by 7/7, from A.L.E. by 4/7, and from P.M.E. by 7/7 of the diameter of A.M.E. The P.M.E. are ovate, separated from each other by 5/7, and from P.L.E. by 8/7 of the diameter of A.M.E. The P.L.E. are separated from A.L.E. by 5/7 of the diameter of A.M.E. Median ocular quadrangle occupying area broader at rear than in front in the ratio of approximately 25 : 21, and broader, at rear, than long in the ratio of approximately 25 : 22.

Chelicerae conical, sparsely covered with long setae, margins oblique. Promargin with scopula and two teeth, the one nearer the base of the fang the larger. Retromargin with two teeth, the one further from the base of the fang the larger. Fang short.

Maxillae as in Fig. 6, parallel, with apical scopulae, impressed transversely; outer margin concave, palpi inserted at base; inner margin bevelled. *Labium* reaching to almost two-thirds of the height of the maxilliae, slightly tapered anteriorly, longer than broad in the approximate proportion of 4 : 3, apex truncate.

Sternum cordate, convex, with serrated flange, longer than broad in the ratio of approximately 8 : 7, surface sparsely provided with setae. Coxae iv well separated.

Legs 4, 1, 2, 3; sparsely provided with setae, those under tibiae and metatarsi i and ii being longer and almost erect; apices of metatarsi iii and iv ventrally with more numerous bristles. Tarsi with two claws and claw-tufts, each claw with three teeth of which the basal is much the smallest; no scopulae. Trichobothria in three rows on tibiae, in one row on metatarsi, and in two rows on tarsi. *Palpi* with a short, spur-like apophysis on the retrolateral apex of the tibia. Palpal bulb has the form shown in Fig. 7.

Spines on legs and palpi present only as follows: Tibia iii : ventral 1.2. Tibia iv : retrolateral 0.1, ventral 1.2. Metatarsus iv : ventral 1.0.

Abdomen oval, provided with oval dorsal scuta; clothed with short black setae. Spinnerets six, cylindrical; anterior pair separated by less than half their diameter, slightly stouter than posterior pair.

Locality. Pimlea, W.A.; a single male, collected by R. T. M. Pescott, September 7, 1947.

Holotype in the National Museum of Victoria.

Family SALTICIDAE
Division UNIDENTATI
Subfamily MARPISSINAE
Genus CLYNOTIS Simon, 1901
Clynotis viduus (L. Koch)

1879. *Icius viduus* L. Koch, Die Arach. Austr., ii, p. 1129, tab. xcviii, figs. 4-4d, 5-5d.

1901. *Clynotis viduus,* Simon, Hist. Nat. Araign., ii, p. 600.

A single male specimen from Koonalda, W.A., collected by R. T. M. Pescott, August 29, 1947, which I ascribe to this species. The markings are very different from those figured by L. Koch, but, as he has already pointed out, the pattern is not constant.

Previously recorded from Queensland and New South Wales.

Division FISSIDENTATI
Subfamily CYTAEINAE
Genus CYTAEA Keyserling, 1882

Synopsis of Australian Species

1. Leg i the longest. 2.
– Legs iii and iv longer than leg i. 4.
2. Sternum about one-third longer than broad. 3.
– Sternum twice as long as broad. *C. albiventris* (Keys.).
3. Labium truncate at apex. *C. alburna* Keys.
– Labium rounded at apex. *C. morrisoni* sp. nov.
4. Labium rounded at apex. 5.
– Labium excavated at apex. *C. grisea* Keys.
5. Metatarsi iii and iv more than twice the length of their tarsi. *C. clarovittatus* (Keys.).
– Metatarsi iii and iv only slightly longer than their tarsi. 6.
6. Patellae i and ii with 1 prolateral, tibiae i and ii with 3 prolateral spines. *C. infrastriatus* (Keys.).
– Patellae i and ii without any, tibiae i and ii with 1 prolateral spine. *C. piligera* Keys.

Cytaea morrisoni sp. nov.

Figs. 8-9

Male (holotype).

	mm.
Total Length	7·9
Length of Cephalothorax	3·8
Width of Cephalothorax	3·2
Length of Abdomen	4·1
Width of Abdomen	3·5

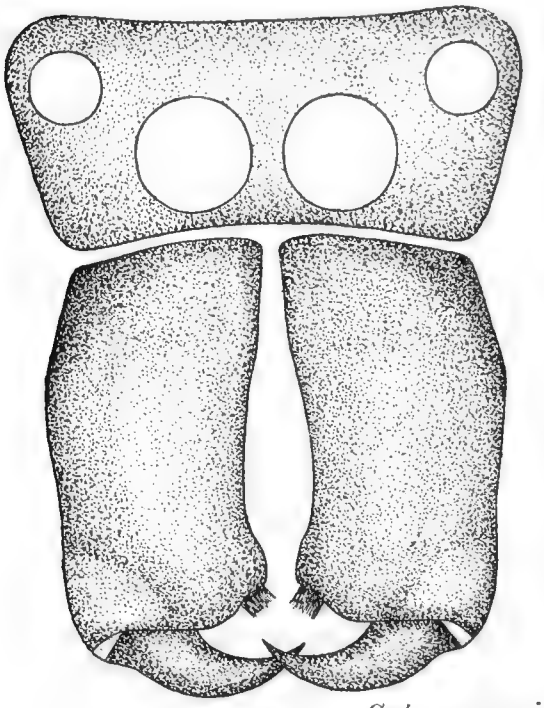
	Femur	Patella	Tibia	Metatarsus	Tarsus		Total
Leg i	2·76	1·74	1·99	1·61	0·75	=	8·85
ii	2·42	1·52	1·62	1·50	0·61	=	7·67
iii	2·36	1·25	1·26	1·59	0·62	=	7·08
iv	2·36	1·24	1·50	1·85	0·62	=	7·57
Palp	1·25	0·61	0·46	—	1·34	=	3·66

Carapace brown, with light brown and greyish fusiform hairs; caput dark brown; eyes pearly. Chelicerae and maxillae brown, labium dark brown; maxillae and labium lighter, almost yellowish, apically. Sternum brown. Legs and palpi brown; femorae dark brown; tarsus and apical two-thirds of metatarsus of leg i light brown, of legs ii, iii, and iv, yellowish, all metatarsi darker apically. Abdomen mottled in grey and yellowish, with black bristles, and light

brown and greyish hairs; extending from near the middorsal position towards the apex, is an indistinct, darker grey pattern of about five chevrons; ventral surface light brown, with a lenticular figure outlined by lines of yellowish spots.

Carapace high, convex; caput almost flat, thorax declivious. Thoracic fovea short and longitudinal. Clypeus retreating, fringed with long bristles, equal to approximately 1/6 of the diameter of A.M.E.

Eyes arranged in three rows, the anterior row recurved so that a line joining the lower edges of the A.L.E. passes through the upper half of the A.M.E. Ratio of eyes A.M.E. : A.L.E. : P.M.E. : P.L.E. = 21 : 13 : 3 : 11. The A.M.E. are separated from each other by 5/21, and from A.L.E. by 9/21 of the diameter of A.M.E. The P.M.E. are separated from A.L.E. by 16/21, and from P.L.E. by 17/21 of the diameter of A.M.E. The P.L.E. are separated from each other by 63/21 of the diameter of A.M.E., and are raised somewhat on black mounds. Ocular quadrangle occupies an area broader in front than at rear in the ratio of approximately 49 : 47, and broader, in front, than long in the ratio of approximately 49 : 37.



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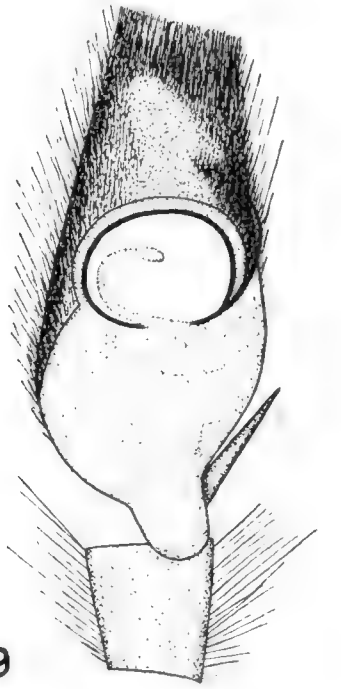

9

Cytaea morrisoni sp. nov.

Fig. 8. Front view of chelicerae and anterior eyes.
Fig. 9. Ventral view of left palpus.

Chelicerae as in Fig. 8, arcuated, provided with long bristles in front, with oblique margins. Retromargin with a large bicuspid tooth. Promargin with three teeth.

Maxillae converging, with apical scopulae. *Labium* more than half the length of the maxillae, longer than broad in the ratio of approximately 6 : 5, subtriangular, apex and corners of base rounded.

Sternum oval, convex, broadly truncate in front, longer than broad in the ratio of approximately 6 : 5.

Legs 1, 2, 4, 3, with two tarsal claws and claw-tufts. Claws dissimilar, retrolateral with about 19 teeth, prolateral with about 9 teeth. Trichobothria in two rows on tibiae, in one row on metatarsi and tarsi. *Palpi* with a short, pointed apophysis at the retrolateral apex of tibia; a few long bristles are present, but no spines. Palpal bulb has the form shown in Fig. 9.

Spines on legs arranged as follows: First leg—Femur: dorsal 1.1.1, prolateral 2 apical, retrolateral 1, ventral 0. Patella: prolateral 1, retrolateral 1, elsewhere 0. Tibia: dorsal 0, prolateral 1.1, retrolateral 1, ventral 2.2.2. Metatarsus: dorsal 0, prolateral 1.1, retrolateral 1.1, ventral 2.2 *Second leg*—as in leg i. *Third leg*—Femur and patella: as in leg i. Tibia: dorsal 0, prolateral 1.1, retrolateral 1.1, ventral 2 apical. Metatarsus: dorsal 0, prolateral 1.2, retrolateral 1.2, ventral 2.2. *Fourth leg*—Femur and patella: as in leg i. Tibia: dorsal 0, prolateral 1.1, retrolateral 1.1.1, ventral 2 apical. Metatarsus: as in leg iii. There are no spines on the tarsi.

Abdomen oval, somewhat flattened dorsally. Spinnerets six, subcylindrical, the anterior pair the stoutest.

Locality. Ravensthorpe-Ongerup, W.A., a single male, collected by R. T. M. Pescott, September 3, 1947.

Holotype in the National Museum of Victoria. Named in honour of Mr. P. Crosbie Morrison, M.Sc., a Museum Trustee and a member of the Expedition.

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THE COLEOPTERA OF THE RUSSELL GRIMWADE EXPEDITION

By Charles G. Oke, Assistant Entomologist, National Museum of Victoria

Family CARABIDAE

Amblytelus brunnicolor Sl. 2 specimens.
W.A.: Pimelea.

Sarothrocrepis benifica Newm. 1 specimen.
W.A.: Pimelea.

Agonochila punctulata Sl. 1 specimen.
W.A.: Pimelea.

Trigonothops lineata Dej. 1 specimen.
W.A.: Pimelea.

Xanthophoea Pescotti n.sp.

Dark testaceous, head and pronotum slightly reddish, femora paler; disc of pronotum lightly infuscated towards sides; elytra with three vittae, the sutural vitta rather faint, commencing just before middle and not quite reaching apex; the lateral vittae starting at the humeral angle on the seventh interstice, extending almost to apex and gradually spreading on to the sixth and eighth interstices; the vittae connected near apex by a zigzag fascia. Glabrous. Subnitid.

Head convex, obliquely narrowed behind eyes, impunctate, frontal sulci deeper than usual; eyes large and protruding, finely facetted; antennae with three basal segments nonpubescent. Prothorax cordate (as $3\frac{1}{2}$ x $4\frac{1}{2}$), widest at apical third, sides explanate, margins reflexed, anterior angles rounded, base truncate with angles acute; anterior marginal seta at widest part, posterior at angle; median line strongly impressed, foveate at basal third; with a few, fine, wavy, transverse lines, impunctate. Elytra slightly dilated to apex; humeral and apical angles rounded off; striae deep, interstices lightly convex, with microscopic punctures; two fixed punctures on inner side of third interstice. Abdomen of male with one fixed seta on either side of apex; female with two. Tarsal segments with four setae near apex on upper surface.

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

Hab. W. Australia: Pimelea.

A large robust species, very distinct from any other known to me. In Sloane's table (I) it would be associated with *dorsalis* Sl., which is a small, narrow species of peculiar colour, with only one fixed puncture on third interstice. In appearance it is more like *grandis* Chaud., but is paler and wider, the third antennal segment is not pubescent and the tarsi and apex of abdomen are not plurisetose.

Named in honour of Mr. R. T. M. Pescott, Director of the National Museum, who collected the insects of the Expedition.

Holotype, allotype, and paratype in National Museum, Melbourne.

Family STAPHYLINIDAE

Paederus Meyricki Bl. 4 specimens.
W.A.: Walpole.

Oedichirus Andersoni Bl. 1 specimen.
W.A.: Pimelea.

Family LEIODIDAE

Dietta sperata Sh. 1 specimen.
W.A.: Ongerup.

A very fine specimen of this interesting species, a little larger than usual.

Family HISTERIDAE

Saprinus cyaneus Fab. 2 specimens.
W.A.: Norseman.

Family ELATERIDAE

Lacon caliginosus Guer. 7 specimens.
W.A.: Pimelea and Pemberton.

L. costipennis Germ. 1 specimen.
W.A.: Cocklebiddy.

Monocrepidius nitidulis Cand. 4 specimens.
W.A.: Koonalda.

Family DERMESTIDAE

Dermestes vulpinus Fab. 4 specimens.
W.A.: Norseman.

Family TEMNOCHILIDAE

Ancyrona Lewisi Reitt. 4 specimens.
W.A.: Pemberton and Ongerup.

Family CUCUJIDAE

Myrabolia Haroldiana Reitt. 1 specimen.
W.A.: Koonalda.

Oryzaephilus ?surinamensis (Linn.). 1 specimen.
W.A.: Koonalda.

This specimen appears to be a variety, shorter, though not narrower, than usual. I have seen other examples like it from the Victorian Grampians.

Family EROTYLIDAE

Diplocoelus latus Lea. 12 specimens.
W.A.: Pimelea and Pemberton.

Family COCCINELLIDAE

Rhizobiellus nom. nov.

Rhizobius Agassiz (1846) was preoccupied by Burmeister (1835) *Hemiptera.*

Rhizobiellus alphabeticus Lea. 3 specimens.
W.A.: Pimelea.

Rhizobiellus, 3 species. 3 specimens.

Small obscure species each represented by a single specimen.

Family CISTELIDAE

Dimorphochilus Gouldi Hope. 1 specimen.
W.A.: Pimelea.

Family TENEBRIONIDAE

Latometus lunatus Pasc. 10 specimens.
W.A.: Pimelea and Pemberton.

Elascus lunatus Pasc.[2]
Latometus differens Cart.[3]

Specimens of this species in perfect condition are covered with dense scale-like hairs and present quite a different appearance when abraded. Carter mentions seven differences between *lunatus* and his supposed new species: five structural and two colour. Taking a freshly caught specimen which was in perfect condition, I compared with the five characters given by Carter for his new species, as follows:

1. Eyes subconic. The eyes appeared to be a blunted cone until the scales or hairs were scraped off with a pin, when they were quite round in outline. 2. Two (should have been three) apical segments of antennae wider than preceding. Yes, until the antennae were turned over so as to see them from the side, when the third and fourth appear to be the widest and from there narrowing to the apex. 3. Anterior angles of prothorax directed outwards: when scales were removed the angle was seen to be pointed forwards. 4. Inner costae continuous. Removal of scales shows these to be pseudo-costae and my specimen now has one elytron as in *lunatus*, the other as in *differens*. 5. Diverging apices. If carefully examined it is seen that it is the rows of scales that diverge and not the actual apices. The shape of the posterior mark varies considerably, from a narrow chevron shape to a fairly wide triangle, quite straight posteriorly.

In preparing this note I have had Pascoe's type; Carter's type and three other specimens identified by him; the ten specimens from this trip, also two from Albany; and the following specimens collected by myself:—Victoria: Warburton 3, Belgrave 2, Emerald 1, Gembrook 2, Grampians 2; Tasmania: Ridgeway 8, Launceston 1.

Pterohelaeus nitidissimus Pasc. 1 specimen.
W.A.: Koonalda.

Chalcopterus eyrensis Bl. 1 specimen.
S.A.: Colona.

C. difficilis Bl. 1 specimen.
W.A.: Koonalda.

C. iridescens Cart. 1 specimen.
W.A.: Cocklebiddy.

A very fine example, 4½ mm. longer and in every way larger than the type.

Omolipus Grimwadei n.sp. 1 specimen.

Black, with dark metallic blue reflections, more noticeable on pronotum than elsewhere; antennae and tarsi piceus. Apex of tibiae and tarsi with bright reddish vestiture; antennae finely pubescent; elsewhere glabrous.

Head transverse, lightly convex; sides obliquely widened from base to eyes, thence narrowed to clypeus; anterior margin of clypeus lightly emarginate; clypeal suture lightly impressed; with very fine and rather close punctures. Eyes large, strongly transverse, with rather small facets. Antennae short, scarcely reaching middle of prothorax, moderately thick; third segment longest, fifth to tenth transverse, eleventh large, bluntly pointed. Prothorax lightly transverse, truncate across base, lightly recurved on apex; widest at apical third, sinuately narrowed to base; with fine, fairly close punctures. Scutellum transversely triangular, laevigate. Elytra elongate-ovate, striate punctate, the punctures oblong and irregular, much wider than the interstices, which are quite flat. Under surface finely punctate. Legs moderately long and thin. Length, 8 mm.

Hab. W. Australia: Denmark. (Unique.)

An interesting species, nearer to *O. cyaneus* Pasc. than to any other described species, but the sculpture of the elytra is very different. In *cyaneus* the punctures are more regular and the interstices are strongly convex. It is with pleasure that I associate the name of Mr. Russell Grimwade, who organized and led the Expedition, with this fine species.

Holotype in National Museum.

Family SCARABAEIDAE

Aphodius granarius Linn. 1 specimen.
W.A.: Pimelea.

Trox eucelensis Bl. 8 specimens.
S.A.: White Wells.

Diphucephala dentipes n.sp. 3 specimens.

Bright metallic-green, becoming blue on sides of elytra and femora; coppery reflections on base of head and anterior tibiae; tarsi purple; antennal club, palpi and claws black; tips of tibial spurs and claws reddish. Head with minute upright white setae, longer on legs and fairly dense on under surface and forming a narrow depressed fringe on sides of pronotum. Anterior and middle tarsi clothed with bright yellowish setae, much paler on posterior. A fascicle of pale yellowish setae on front angles of eyes.

♂ Head finely shagreened and with dense, fine punctures; with an arcuate impressed line marking suture of frons. Clypeus with a strong U-shaped excision, the base marked with a well raised, sharp carina. Prothorax feebly

transverse, median line narrow, nowhere dilated, lightly impressed; with an oblique impression on either side, running to the angulate point of sides; each side angulate behind middle; the surface finely shagreened and with dense, fine punctures, becoming confluent in parts. Scutellum with a fine impressed line and a few small punctures. Elytra with first (suture), fourth and seventh interstices fairly raised, and with large rough punctures, many of which are confluent and cross the interstices; with a strong impression on base between scutellum and humeral angle. Legs fairly long; anterior tibiae strongly grooved; inner apical spur, or tooth, sharply pointed; outer apical spur strong and a well developed spur, or tooth, above it; anterior tarsi with three basal segments dilated and densely clothed.

♀ Differs in having a much shorter clypeus, with a wide open notch; the pronotum more convex, with the median line scarcely traceable and not shagreened; anterior tarsi not dilated and without dense clothing. Length, 7-8 mm.

Very close to *D. furcata* Guer., but differs therefrom by the anterior tibiae having two spurs on outside of apex, *furcata* having only one; also, if constant, by the pronotum of female without shagreening. This latter seems rather peculiar, as it does not occur in other species, but the sexes were taken together and agree in all other non-sexual characters.

Holotype ♂, allotype ♀, and paratype ♂ in National Museum, Melbourne.

Heteronyx Randalli Bl. 1 specimen.
W.A.: Cocklebiddy.

Maechidius major Bl. 1 specimen.
W.A.: Pimelea.

Ateromonocheila longipes Bl. 3 specimens.
W.A.: Pimelea.

The three specimens taken, as also one I have from Albany (J. M. Andrew) are all females; Blackburn only knew the male.[4] They agree fairly well with his description, particularly of antennae, palps, anterior tibiae, sculpture of elytra and clothing, but the mentum is not transverse and the posterior tibiae with its tarsus is shorter than the length of the elytra, also the clypeus is lightly emarginate: the last two may be sexual characters. The pygidium is sharply declivous, without impressions, and the abdomen is evenly rounded throughout.

Aneurystypus calvus Bl. 1 specimen.
S.A.: Nullarbor.

Novapus sp.?
S.A.: Colona.

A female specimen which is not satisfactory to identify.

Family CHRYSOMELIDAE

Calomela maculicollis Boi. 1 specimen.
W.A.: Pimelea.

Edusa Meyricki Bl. 1 specimen.
W.A.: Esperance.

Paropsis mentitrix Bl. 1 specimen.
W.A.: Pimelea.

P. festiva Chp. 1 specimen.
W.A.: Pimelea.

Arsipoda acuminata Warterh. 1 specimen.
W.A.: Pimelea.

Family CURCULIONIDAE

Pascoellus nom. nov.
Pephricus Pasc.

Pephricus had been used by Amyot and Serville (1843) when proposed by Pascoe (1870). Lea sank *Pephricus* and *Chaodius* as synonyms of *Essolithna,* but this was certainly a mistake as Pascoe's *Pephricus* belong to the Eremninae, while *Essolithna* and *Chaodius* are Leptopiinae.

Pascoellus umbratus Bl. 5 specimens.
W.A.: Pimelea.

Polyphrades aesalon Pasc. 8 specimens.
W.A.: Pimelea and Pemberton.

Subfamily LEPTOPIINAE

A slight emendation, necessary by the change of the typical genus.

Leptopius nom. nov.

This name is proposed for the well known *Leptops,* which had been used by Rafinesque (1820) for *Pisces* before being used by Schoenherr (1833). Both Lea[5] and McKeown[6] have suggested that *Leptops* and *Baryopadus* are the same, but this is not so. *Baryopadus* has very different tarsi, as already noted by Marshall.[7]

Leptopius cacozelus Lea. 2 specimens.
S.A.: White Wells.

Cubicorrhynchus morosus Boi. 2 specimens.
S.A.: White Wells.

Ethemaia sellata Pasc. 2 specimens.
W.A.: Norseman.

Rhinaria tragocephala Lea. 1 specimen.
W.A.: Koonalda.

Paryzeta vittata Bl. 1 specimen.
W.A.: Koonalda.

Desiantha trivitticollis Lea. 1 specimen.
W.A.: Denmark.

Haplonyx nasutus Lea. 1 specimen.
W.A.: Esperance.

Decilaus distans Pasc. 1 specimen.
W.A.: Pemberton.

D. moluris Lea. 1 specimen.
W.A.: Pimelea.

Ophrythyreocis vigilans Lea. 1 specimen.
W.A.: Pimelea.

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LEPIDOPTERA OF THE RUSSELL GRIMWADE EXPEDITION

By R. T. M. Pescott, M.Agr.Sc.,
Director, National Museum of Victoria.

Owing to the fact that the Expedition made the journey across Australia at the end of winter, there were very few specimens of moths seen on the wing.

The following species, one of which is new, were recorded, and, in some cases, considerably extend the range of known species:

Family NOCTUIDAE

Subfamily ACRONYCTINAE

Radinogoes tenuis Butl.

Locality: Nullarbor Homestead, S.A. (R.T.M.P.), 28/8/47—1 specimen.

Subfamily AGROTINAE

Euxoa radians Gn.

Locality: Nullarbor Homestead, S.A. (R.T.M.P.), 28/8/47—3 specimens.

Subfamily MELANCHRINAE

Sideridis ewingi West.

Locality: Nullarbor Homestead, S.A. (R.T.M.P.), 28/8/47—2 specimens.

Family BOARMIDAE

Idiodes apicata Gn.

Locality: Pimelea, W.A. (R.T.M.P.), 7/9/47—1 specimen.

Family ARCTIIDAE

Subfamily LITHOSIANAE

Genus THALLARCHA

Thallarcha eremicola n. sp.

Plate I, Figs. a, b.

♂ ♀ 18-21 mms. Head white; face black. Palpi and antennae fuscous. Thorax black, flecked with white; patagia and apices of tegulae white. Abdomen chamois (Ridgeway Colour Chart, 1912). Legs ochreous, anterior pair fuscous.

Forewings elongate-oval, costa very slightly arched, apex flat-pointed, termen slightly curved, oblique, greyish-white with dark fuscous markings, particularly

in distal apex region; a fuscous costal streak from 1/5 to 3/5 of costa, a costal dot at 4/5; a series of seven black dots along whole length of termen; a curved fuscous streak on dorsum at 1/5, two parallel longitudinal fuscous markings at ½ dorsum, running halfway up discal area, indefinite smoky dots between these and tornus; dark spot at tornus.

Hindwings with termen distinctly rounded, cream-buff (Ridgeway Colour Chart, 1912); an elongate dot in anterior discal area; apical blotch fuscous running half down termen. Cilia cream-buff, at apex fuscous.

This species comes closest to *T. jocularis* Ros., from which it differs considerably in the markings on the forewings and the elongated discal dot on the hind wings.

Six specimens, all collected on the surface of a pool of water on extensive granite outcrops, half a mile south of the Balladonia Homestead, Western Australia (R.T.M.P.), on August 31, 1947.

Type in collection of National Museum of Victoria.

Family LASIOCAMPIDAE

Digglesia rufescens Walk.

Locality: Pimelea, W.A., 7/9/47—1 specimen.

Family GEOMETRIDAE

Prasinocyma semicrocea Walk.

Locality: Pimelea, W.A., 7/9/47—1 specimen.


a
c
b
d

LAND MOLLUSCA OF THE RUSSELL GRIMWADE EXPEDITION

By J. Hope Macpherson, B.Sc., Conchologist,
National Museum of Victoria

On their coastal journey westward from Adelaide, the Grimwade Expedition passed through two of the main faunal areas of Australia. The eastern half of the Great Australian Bight lies within the Centralian area, whilst the remainder of the south-western coast bounds the Leeuwinian area. The species collected are typical of the areas and may be listed as follows:

Phylum MOLLUSCA
Class GASTROPODA
Subclass PROSOBRANCHIA
Order PECTINIBRANCHIA
Family BOTHRIEMBRYONTIDAE
Genus BOTHRIEMBRYON Pilsbry, 1894

Bothriembryon esperantia Iredale

1939. *Bothriembryon esperantia* Iredale, Journ. Roy. Soc. W.A., 25, 1939, p. 21, Pl. 2, Fig. 8.

Locality. Esperance, W. Australia.

Observations. These specimens were collected on sand dunes.

Bothriembryon balteolus Iredale

1939. *Bothriembryon balteolus* Iredale, Journ. Roy Soc. W.A., 25, 1939, p. 21, Pl. 2, Fig. 9.

Locality. Salmon Gums, W. Australia.

Bothriembryon dux (Pfieffer)

1861. *Bulimus dux* Pfieffer, Proc. Zool. Soc. (Lond.), 1861, p. 24.
1900. *Bothriembryon dux* Pilsbry, Man. Conch. (Tryon), Ser. 2, Vol. 13, p. 3, Pl. 3, Fig. 62, April 23.

Localities. Salmon Gums, W.A.; west of Madura, W.A.

Observations. In isolated areas there were large numbers of dead shells on the ground (Plate II, fig. 1).

Bothriembryon distinctus Iredale

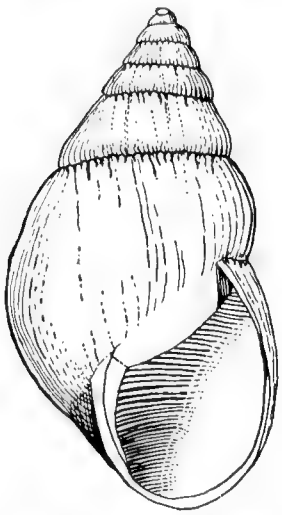
1939. *Bothriembryon distinctus* Iredale, Journ. Roy. Soc. W.A., 25, 1939, p. 36, Pl. 2, Fig. 43.

Locality. 17 miles west of Balladonia, W.A.

Observations. Two shells from the locality mentioned in Iredale's description agree perfectly with it. Numbers of dead shells were noted.

Bothriembryon multispirus sp. nov.

Shell perforate, acutely conical, white. Surface of live shells shining, irregularly striated, the striae stronger near the suture, and traversed by one or two spiral incised lines below the suture. Spire long, tapering to a comparatively acute point, nepionic whorls 2, pitted. Whorls 6½-7, not markedly convex.



Bothriembryon multispirus, sp. nov.

Aperture slightly oblique, small, narrowly ovate, acute above; columella broadly dilated above; parietal callus indistinct.

Type. — Dimensions. Length 24 mm.; breadth 12 mm.; spire 14 mm.; longest axis of aperture 12 mm.

Locality. Twenty miles west of Cocklebiddy Waterhole, W. Australia.

Type in National Museum of Victoria, Reg. No. F.5716. Paratypes (4), F.3068 (4 shells), F.3073 (2 spirit specimens).

The Cocklebiddy shell is near Iredale's *distinctus* but differs from his description in the following—

(1) it is longer and slimmer;

(2) the spiral lines dissecting the growth lines are confined to the area near the sutures, are shallow and do not form square nodules.

Observations. Members of the expedition said that dead shells of this species were numerous at the type locality. The series is uniform in appearance but varies in size, the largest being 27 mm. by 14 mm.

Bothriembryon barretti Iredale

1930. *Bothriembryon barretti* Iredale, Viet. Naturalist, Vol. 47, p. 119, fig. in text.

Localities. Head of the Bight, S.A.; Murrawijinie Cave, S.A.; Colona, S.A.; 42 miles west of Colona, S.A.

Family DIPNELICIDAE

Genus ANNOSELEX Iredale, 1939

Annoselix dolosa Iredale

1939. *Annoselix dolosa* Iredale, Journ. Roy. Soc. W.A., 25, 1939, p. 39, Pl. 1, Figs. 24, 27.

Fig. 1

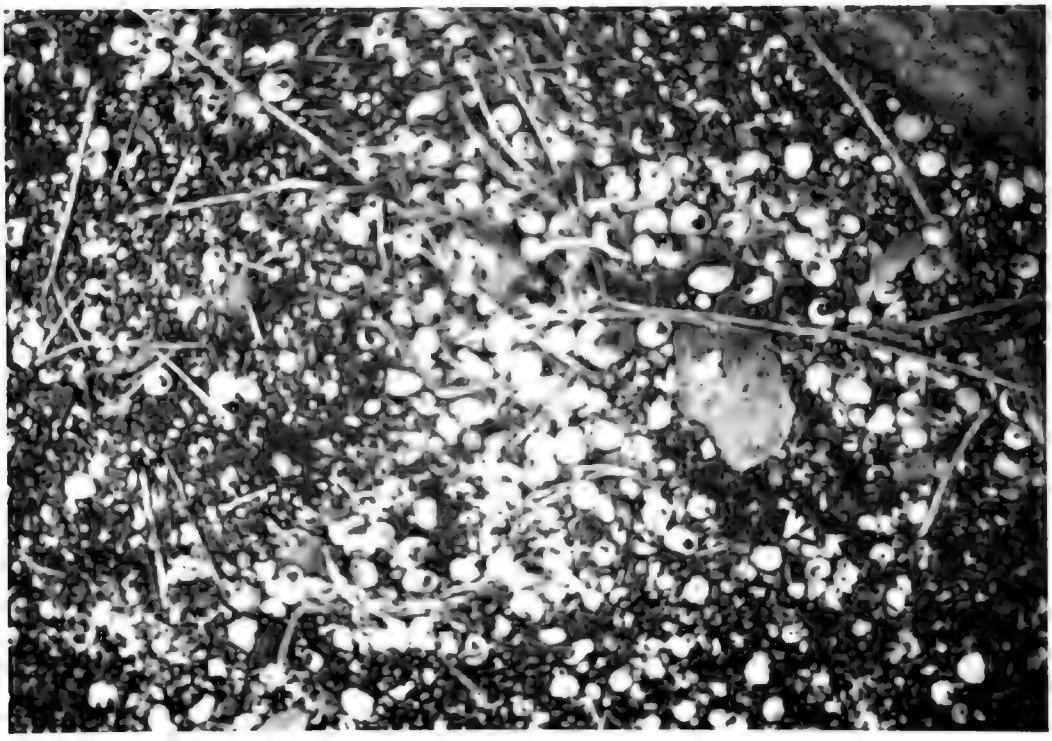


Fig. 2

Locality. Pimelea, West Australia.

Observations. Found in very damp conditions under the bark of a Jarrah tree, 12 inches above the ground.

Family XANTHOMELONTIDAE

Genus SINUMELON Iredale, 1930

Sinumelon nullarboricum Tate

1879. *Helix nullarborica* Tate, Trans. Proc. Phil. Soc. S.A., 1878-9, p. 133, Pl. 6, Fig. 1 a-b.
1930. *Sinumelon nullarboricum* Iredale, Vict. Naturalist, Vol. 47, p. 120.

Locality. Head of Bight, S.A.; 42 miles west of Colona, S.A.; 6 miles north of Koonalda, W.A.

Observations. At Koonalda there were isolated areas with large numbers of dead shells on the ground. (Plate II, Fig. 2.)

Genus PLEUROXIA Aucey, 1887

Pleuroxia polypleura Tate

1899. *Angasella polypleura* Tate, Trans. Roy. Soc. S.A., Vol. 23, p. 246, Pl. 6, Figs. 2 a-c.
1938. *Pleuroxia polypleura* Iredale, The South Aust. Naturalist, Vol. 18, 1937, p. 48.

Localities. Murrawidjinie Cave, S.A.; 20 miles west of Cocklebiddy Waterhole, W.A.; 6 miles north of Koonalda, W.A.

Observations. These shells were found buried under shrubs, often at the bottom of depressions. (Plate III.)

Family HELICIDAE

Genus EUPARYPHA Hartmann, 1844

Euparypha pisana (Muller)

1774. *Helix pisana* Muller, Verm. Hist., 2, 1774, p. 60.
1902. *Euparypha pisana* Westerlund, Rad. Jugoslav. Akad., 151, 1902, p. 100.

Localities. Esperance, W.A.; Bunbury, W.A.

Observations. This introduced species of European origin is colonizing the whole southern coast of Australia.

Typical depression in Nullabor Plain, near Koonalda.

Head of the Great Australian Bight, near White Wells, South Australia. The limestone cliffs are 300 feet high at this point. Note the whitish band, mentioned by John Eyre in his diary, about two-thirds of the distance down the cliffs.

Sand-dunes at Eucla, Western Australia.

BOTANY OF THE RUSSELL GRIMWADE EXPEDITION

By James H. Willis, B.Sc., National Herbarium, South Yarra.

General Report

Introduction

Sundry notes on vegetational features of the changing South Australian landscape between Murray Bridge and Adelaide were made by the writer from windows of the Adelaide Express on Monday morning, August 25, 1947, and during the afternoon he had opportunity to inspect the Botanical Gardens, Botany School (University) and Museum of that city, viewing the Tate and Ising herbaria and excellent carpological collection more recently brought together by E. Stirling Booth. But the Grimwade Expedition really commenced the following day at Port Lincoln, where its personnel had travelled overnight by ship from Adelaide.

Eyre's Peninsula

Before boarding the parlour coach that was to carry us over 1800 miles to Perth, via Eucla, Norseman, Esperance, Ravensthorpe, Albany, Pemberton and Bunbury, opportunity was taken to visit a patch of natural scrub right in the township and to secure good flowering and fruiting specimens of *Eucalyptus diversifolia* and *E. incrassata* var. *angulosa* (Port Lincoln is type locality of this mallee eucalypt with large strongly ribbed fruits, up to an inch long; Robert Brown collected it there in March, 1802).

Travertine outcrops are conspicuous everywhere near Mt. Dutton, the Marble Range and toward Elliston, the limestone being used extensively for farm buildings and fences. *Eucalyptus cladocalyx* (Sugar Gum) occurs naturally in several places along the coast road, in groves of rather stunted broad-leaved trees, while *Melaleuca pubescens* (Moonah) and *Casuarina stricta* (Drooping Sheoak) are abundant everywhere—Crocker remarks [*Trans. Royal Soc. S. Aust.*, LXVIII, 162 (1944)] that they form "probably the most widespread association on Eyre's Peninsula." *Oxalis pes-caprae* and *Romulea rosea* were observed as common wayside weeds.

Along the limestone sea cliffs at Elliston we stopped for a glimpse of the Investigator Group (Flinders and Pearson

Islands) and were able to examine a formation of extremely stunted, almost prostrate *Eucalyptus incrassata* var. *angulosa,* no higher than its associate low tussocks of *Triodia irritans* (Porcupine Grass) and bushes of *Westringia Dampieri* in honey-scented bloom—the vegetation here has doubtless been dwarfed by the combined unfavourable effects of low rainfall on poor soil and frequent high winds from the sea.

About five miles west of Port Kenny on Venus Bay, lateritic cappings in mallee scrub have provided a veritable "wildflower garden" of small shrubs. Sixteen species were collected in the few minutes that we alighted there: the rich scarlet *Prostanthera calycina* (a mint-bush endemic in South Australia), paler *Correa pulchella,* light mauve *Lasiopetalum discolor,* golden *Acacia spinescens* and *Cassia eremophila,* and five orchids (including *Caladenia filamentosa,* the "Daddy-longlegs") contributed to the riot of colour. Farther along the road toward Streaky Bay, the large bluish flowers of *Hibiscus Huegelii* were occasionally seen and admired.

Eucalyptus gomphocephala (Tuart) is the principal street tree at Streaky Bay; few other trees could be used to more advantage there than this one, thriving in the limestone terrain under a rainfall of about 10 inches. Ceduna, 248 miles from Port Lincoln and the last sizeable township on the South Australian west coast, has interesting patches of indigenous vegetation; outside the Post Office, flowering material was secured of *Atriplex paludosa, Kochia erioclada, Trichinium obovatum, Geijera linearifolia,* blue *Eremophila Weldii* and *Olearia pimeleoides* var. *minor.*

Near Colona Station (controlling 1400 square miles), the southern highway passes into a more arid region, where rainfall is unreliable and generally below 10 inches per annum. This belt of country (chiefly calcareous) is the "Eremea" of C. A. Gardner [*vide* Vegetation of W. Aust., 1944, p. 1] and we were to follow it for the ensuing 500 miles, as far as Balladonia Station (W.A.), where the taller mallee re-appears. *Eucalyptus oleosa,* some *E. incrassata,* patches of *Acacia Sowdenii* (local "Myall") and stunted *Melaleuca pubescens* (Moonah), many trees of *Myoporum platycarpum* (Sugarwood) *Exocarpus aphylla,* and occasional ones of *Santalum acuminatum* (Quandong) constitute the arboreal growth on sandy soils at Colona. Associated ground shrubs include *Kochia Georgei, Templetonia Battii* (peculiar to the Bight), *Geijera linearifolia, Eremophila scoparia* and *Olearia magniflora* (large and very handsome purple flower heads). A tall form of *Stipa variabilis,* flowering out of season, was conspicuous on sandy

rises, where the crucifer and composite families were well represented by small ephemeral herbs, e.g., *Alyssum linifolium, Stenopetalum lineare, Hymenolobus procumbens, Capsella pilosula, Brachycome lineariloba, B. ciliaris* and *Toxanthus Muelleri.*

Several alien weeds were frequent around the station homestead, notably Annual Cat's-tail (grass), London Rocket, Dwarf Mallow, Horehound and Wild Sage. An abrupt change was apparent on limestone depressions among the timbered sand-hills. Such areas were treeless, with cover of a halophytic type—*Frankenia foliosa, Plagianthus squamatus, Bassia obliquicuspis* and the curious prostrate *Kochia lobiflora* were collected *inter alia.*

Some attention was given to the cryptogamic flora on soil and bark, and specimens of a dozen different lichens were secured, including *Parmelia hypoxantha* from sand-hills—an intriguing species which readily detaches from the earth, curls up into balls and blows away until piled against some object by the wind; it is very rarely found in fruit, and Colona samples yielded a few well developed but sterile apothecia. Two lichens, *Lecanora sphærospora* and *Buellia subalbula,* from limestone pebbles, were, apparently, known before only by the type collections.

Nullarbor Region and Great Bight

About ten miles west of Colona *Melaleuca pubescens* vanished from the roadside, its common associate *Casuarina stricta* having dropped out of the flora between Ceduna and Colona. In their stead, along the road toward Eucla, the umbrageous *Acacia Sowdenii* ("Myall") becomes conspicuous and dominates the landscape in many places, bearing occasionally clumps of parasitic *Amyema quandang* (Grey Mistletoe); it was a disappointment not to have seen this useful, attractive, drought-resisting tree in blossom. *Acacia Oswaldii* (Umbrella Wattle) is rather similar in habit and often associated with it.

Approaching the head of the Bight, we pass over portion of the vast Nullarbor Plain—"one of the geographical wonders of the world," according to J. T. Jutson—devoid of all but low halophytic shrub growth and seasonal herbs. The Plain meets the sea eight miles south of White Wells in a succession of beetling 200-ft. limestone cliffs and a deviation was made to view this impressive escarpment. Of 15 plants collected in the vicinity of White Wells, eight were referable to the family *Chenopodiaceæ* (viz., *Atriplex nummularia, A. vesicaria, Kochia eriochlada, K. sedifolia, K. oppositifolia, Bassia uniflora, Arthrocnemum arbus-*

culum and *Hemichroa diandra*), pointing the aptness of the name "salt-bush steppe" for this particular community of plants.

From Nullarbor Homestead and Kunalda short trips north were taken to examine several of the shallow dry caves which abound on the plain. Under the favourable micro-climate obtaining in the shelter of these limestone sink-holes, welcome greenery is given by several perennial plants that would be too tender to survive the high winds and insolation above ground, notably: *Pleurosorus rutifolius, Parietaria debilis, Lavatera plebeja* and *Galium umbrosum*. Bushes of *Geijera linearifolia* occur both at Murrawijinie Cave (eight miles north of Nullarbor) and in "Bitumen" Cave, Kunalda, which was filled with a luxuriant growth of *Nicotiana Goodspeedii*—an indigenous tobacco having delicately scented flowers.

There is a change to mallee eucalypts and moonah again near the West Australian border, and at Eucla (ten miles beyond it) the highway descends rapidly to sea level over the Hampton Range. Really a limestone plateau escarpment, this "range" marks the westerly inland continuation of the Great Bight cliffs and apparently denotes a former shore-line, the saline flats and dunes at its base having been uplifted from the sea in comparatively recent geological time.

Euclonia

Eucla (with one inhabited building) is chiefly remarkable for its high moving sand dunes which threaten to overwhelm the deserted cable station, and immense clumps of *Nitraria Schoberi* (Nitre Bush) seem to be the only local shrubs that can keep pace with the smothering effect of blown sand. Inland from the encroaching dunes, a saline flat merges into the eucalypt scrubland (*E. gracilis* and *E. incrassata*, with *Melaleuca pubescens* toward the cliffs). West of Eucla the roadway follows the base of Hampton Range scarp—almost straight for more than 100 miles. Glasswort flats are succeeded by alternating myall woodland and eucalypt-moonah rises toward Madura (115 miles from Eucla).

Before ascending the escarpment again, the writer was enabled to examine its characteristic flora—in a steep moist cleft immediately behind Madura Homestead. *Eucalyptus oleosa* is dominant there and commonly associated with stunted *Melaleuca pubescens* (Moonah). *Pittosporum phillyreoides, Heterodendron oleifolium*, and *Eremophila alternifolia* (spotted pale magenta flowers on long pedicels) are tall shrubs, while *Rhagodia Preissii, Pomaderris Forrestiana, Olearia exiguifolia* and *O. Muelleri* were noted as frequent ground shrubs—all in bloom. Of particular interest

was a handsome spear-grass having thin cane-like stems (to 3 ft. high); it is either a distinct variety of the uncommon *Stipa breviglumis* or an undescribed species. *Bredemeyera volubilis* (Love-creeper) twined attractively among the lower shrubs, its blue flowers much larger than most examples to be met with in Victoria; a robust strain of the introduced blue pimpernel, *Anagallis arvensis* var. *cærulea*, also luxuriated as a weed around the small dam above the homestead.

Westward across Hampton upland, the country is very heavily rabbit-infested; in many places trees and shrubs are either dead or dying and no seedlings whatever are to be found of such valuable trees as the local Myall and Sugarwood. Belts of mallee scrub (*Eucalyptus oleosa* and *E. gracilis*), *Acacia Oswaldii* and *Melaleuca pubescens* are interspersed with grassy tracts and treeless flats carrying succulent herbage (*Arthrocnemum, Zygophyllum apiculatum* and *Z. glaucescens*).

At Moonera, near Cocklebiddy (80 miles beyond Madura), tall broom-like shrubs of *Casuarina humilis* and *Eremophila Dempsteri* (about 6 ft. high) were noted for the first time. Here also the rare *Frankenia densa* was collected, in limestone gravel on the roadway; this bluish-grey "sea heath" has rosy pink flowers, is completely prostrate and exceedingly brittle in both fresh and dried condition. Moonah disappeared at about 280 miles west of Eucla, where we entered a section of the road that runs perfectly straight for the next 96 miles.

The historical Balladonia Homestead, 306 miles beyond Eucla, is situated on a granite outcrop covering 20 or 30 acres and culminating in some large boulders—impressive enough against the surrounding monotonous limestone flats. These rocks gave support to some interesting plants, e.g., *Notholæna vellea* (the drought-resisting Woolly Cloak-fern), prickly *Solanum orbiculatum* and a silky form of *Glycine clandestina* with deep violet flowers. Seasonal composites were a feature in the damp sandy soil covering flat slabs of granite—*Brachycome ciliaris* var. *lanuginosa, Angianthus tomentosus* and an indeterminate *Gnephosis* which is probably new to science. *Trichinium obovatum* (Silver-tails) and *Disphyma australe* (Australian Noon-flower) were abundant on calcareous rises adjoining the granite, the latter making rosy-magenta carpets of colour around the station-yard walls.

From Balladonia the rainfall increases toward Norseman, as one comes gradually out of the vast eremean division of "Euclonia." Taller mallee soon appears, with *Melaleuca cymbifolia* replacing Moonah as an understorey, and we pass through

the eastern fringe of the great Salmon Gum belt (*Eucalyptus salmonophloia*)—a forest of these bronze-boled eucalypts excited admiration along the roadside a few miles beyond Balladonia. Other trees observed hereabouts for the first time were *Codonocarpus cotinifolius* (Bell-fruit), *Acacia acuminata* ("Raspberry-jam"), *Eucalyptus calycogona* and a puzzling eucalypt with most attractive, shining red, long-horned buds that lent a distant impression of massed crimson blossom.

Fraser Range—Dundas Hills

Where the road crosses Fraser Range near its low southern extremity, a brief sortie was made to examine local vegetation. The rocky crest of the range is almost devoid of trees, except for gnarled examples of *Casuarina Huegeliana,* much resembling the eastern *C. stricta* (Drooping She-oak) in habit and large cones, and for an occasional tree of *Pittosporum phillyreoides*; *Eremophila alternifolia* and the bright yellow *Pimelea thesioides* also occur among the rocks. Sandy approaches carry a stunted eucalypt forest (*E. oleosa* var. *glauca, E. Le Souefii, E. salubris,* etc.), but the whole area is rather disappointing botanically and we did not find the more spectacular *Eucalyptus cæsia* and *E. Stricklandii* which doubtless occur farther north along this range. Low shrubs of *Dodonæa microzyga* were rendered ornamental by trusses of bright red-winged fruits.

Dundas area lies at the south-east of Jutson's "Salinaland" or salt-lake division [*vide Physiogr. W. Aust.,* 94 (1934)] and affords many glimpses of salt-encrusted depressions—contrasting sharply with the surrounding timbered country; some were several miles in extent, but there was no opportunity to collect any samples of their halophytic vegetation during our 126-mile journey from Norseman to Esperance. As we moved south through Salmon Gums and Grass Patch, there was a crescendo of botanical excitement, attaining a climax in the heathy sand-plains toward the coast — richest floral region in the world, with the possible exception of Cape Peninsula in South Africa.

Southern Sand-plains

About six miles north of Salmon Gums, dense thickets of small slender eucalypts had sprung up following fire—*E. Flocktoniæ, E. dumosa, E. eremophila,* and the very localized *E. diptera* with sessile, hemispherical, two-winged fruits. The first two species extended nearly the whole way to Esperance, while a little south of Grass Patch we collected also *E. Forrestiana, E. goniantha,* and *E. spathulata* var. *grandiflora.* Beyond Salmon Gums, and

especially in the neighbourhood of Grass Patch, is a bewildering variety of small *Acacia* species: the remarkable leafless *A. glaucoptera,* with much flattened branches (like an *Epiphyllum* cactus), evoked expressions of astonishment. Other species of interest were *A. Graffiana, A. colletioides* var. *nysophylla, A. gonophylla, A. Pritzeliana, A. dermatophylla, A. pilosa, A. bidentata,* and three as yet undescribed species; one of these novelties grew in cushion formation, less than a foot high, and had bluish awl-shaped phyllodes of almost succulent appearance — a very charming dwarf.

In a half-mile strip of heathland along the main road between Grass Patch and Gibson railway sidings, we observed more flowering species than in all the preceding 1000 miles of our journey! Brilliant splashes of colour came from clumps of purple *Dampiera lavandulacea* and *D. Lindleyi* and scarlet *Leschenaultia formosa.* Among the numerous *Proteaceæ* were tall bushes of *Lambertia inermis, Grevillea plurijuga, Hakea cinerea, H. Brookeana* and *H. pandanicarpa,* the last with very large woody follicles deeply cracked into regular pyramidal warts. Of rare and localized plants one could mention: *Boronia beckeacea, Dodonæa amblyophylla* and *Olearia ramosissima,* while a *Spyridium, Hybanthus* and *Scævola* cannot be matched with any specimen or description available at the Melbourne Herbarium and may represent three other undescribed plants from this fruitful region. In view of the fact that the Grimwade party found so much unusual material, including several species undoubtedly new to science, merely by stopping for a short time at isolated intervals along main roads, what wealth of new records must surely await a thorough botanical survey of these fascinating southern heathlands?

Granite cliffs at Dempster's Hill, Esperance, afford wonderful sea-scapes, especially toward the islands of Recherche Archipelago, and the local flora is most varied and full of interest. The district has a long botanical history, beginning with the visit of the French botanists Riche and Labillardière in December, 1792 (during Commander Bruny D'Entrecasteaux's expedition to search for La Perouse). Labillardière made extensive collections which became the types of many new species described in his *Novæ Hollandiæ Plantarum Specimen* (two volumes, 1803/6), and we were gratified to see that a number of these plants still survives here in their type area, e.g., *Adenanthos cuneata, Olax phyllanthi, Nuytsia floribunda, Boronia tetrandra, Phyllanthus calycinus, Adriana quadripartita, Spyridium globulosum, Thomasia triphylla, Pimelea ferruginea, Agonis marginata,*

Platysace compressa, Anthocercis littorea and *Velleia trinervis.* The *Olax* and *Platysace* are remarkable for their strange appearance — the former with naturally drooping and dead-looking leaves of ashen grey-green, the latter leafless with flattened tape-worm-like stems that zigzag at each branching.

Nine years later, in January, 1802, Robert Brown (with Captain Matthew Flinders) collected at "Lucky Bay," some 25 miles S.E. of Esperance, during four days that the *Investigator* anchored there. It was rather unfortunate that both Labillardière and Brown should have visited this rich botanical area in the height of summer when the flowering season of most plants would be long past. Several of their records have not been seen since.

We found flamboyant red blooms of *Templetonia retusa* ("Cocky's-tongues") conspicuous among the shrubberies on Dempster's Hill; so were the dense, almost fleshy, white flower spikes of Fitzgerald's *Goodenia decursiva* (this being the type locality). *Hakea prostrata* was true to name, being utterly prostrate—farther inland it grows erect and becomes a small tree.

The 120-mile drive to Ravensthorpe was wholly through undulating sand-heath country and revealed an endless succession of beautiful flowers—hakeas, banksias, melaleucas, leucopogons, dampieras orchids, etc., and such exclusively western genera as *Conostylis, Dryandra, Synaphœa, Franklandia, Calothamnus, Chamelaucium, Verticordia, Andersonia* and *Needhamia.* Silver-blue *Eucalyptus tetragona* has large broad leaves and quadrangular branchlets (recalling the juvenile condition of Tasmanian Blue Gum and Shining Gum); it is dominant throughout this region, the whole plant being strongly pruinose. *E. tetraptera,* with invariably slender stems, long stiff shiny exceedingly thick leaves (probably the thickest in the genus) and very large square "cattle-bell" shaped fruits, is a top-heavy plant; the numerous examples witnessed were always procumbent and of untidy appearance. A large frequent shrub in many places was *Banksia speciosa,* with long deflexed *Dryandra*-like leaves.

These sand-plains have been extensively burnt again and again, and fire-scarred trees of *Nuytsia floribunda* (W.A. Christmas-tree) dot the landscape everywhere — bizarre, twisted growths with archaic mien. *Nuytsia* is apparently tenacious of life, for every fire-damaged specimen was encircled at the base by vigorous sucker shoots. Several salt lakes on the plains carried marginal groves of picturesque white-boled paperbarks (*Melaleuca cuticularis*)—a widely distributed tree in W.A. "Salina-land". Grass-trees (*Xanthorrhœa Preissii*) were abundant, flowering over recent burns.

Probably the most brilliant floral displays were attributable to flame-red *Leschenaultia formosa* [Brown's type came from near Esperance in 1802], vivid purple *Calytrix brachyphylla* and mauve *Burtonia scabra* (an ericoid pea shrub). Smaller very decorative legumes were the dark blue Wedge-peas, *Gompholobium venustum* and *G. Knightianum* (both with elegant pinnate leaves), and the little herbaceous *Isotropis cuneifolia* of damp ground — its few rather large flowers are apricot-hued and exquisitely veined on the back with deep red.

Ravensthorpe, the site of former copper mines, is stony and dry (14 in. rainfall), but its flora proved interesting. Here we touched again the southern fringe of Salmon Gum—Mallet forest with several smaller eucalypts in association, including *E. platypus* var. *heterophylla* and typical *E. annulata*. Some of the Mallet trees (*E. occidentalis*) in the township are large specimens. A dry creek, at an old copper mine about one mile north of the town, disclosed five species each of *Acacia* and *Melaleuca*—all in bloom. One Acacia had broadish, glaucous, multi-veined phyllodes about 1½ inches long and is apparently undescribed. Several plants of an elegant *Grevillea* (*G. patentiloba*) were also seen, the red flowers in loose clusters along bare attenuated and trailing shoots. The dry character of this climate was reflected in such plants as *Teucrium sessiliflorum, Sida, Halgania, Aristida* and *Kochia tomentosa*. *Melaleuca pubescens* appeared again here — the farthest west that we observed, although it has since been certified as a remarkably isolated occurrence on Rottnest Island. Time did not permit an excursion south of the town to see *Actinotus superbus* (Flannel-flower) or *Pimelea physodes* (Qualup Bell) for which the district is famous. These splendid flowers grow some 10-20 miles away toward the Mts. Barren Range.

Ten miles west of Ravensthorpe one meets the sand-plain country again, and for the next 70 miles our road passed through heathland ablaze with colour. South and south-east, the jagged peaks of the Barren mountains rose boldly out of the plain, a panorama of great beauty not unlike the Victorian Grampians, and certain flowers appeared peculiar to this region. In the great abundance of leguminous plants, the genera *Acacia, Chorizema* and *Daviesia* (with several extraordinary species) were noteworthy. *Acacia acuminata* ("Raspberry-jam") and *A. ericifolia* had been admired on the outskirts of Ravensthorpe where we passed also some broomy shrubs of *Eremophila pachyphylla* and *E. dichroantha*. Soon *Acacia sessilispica, A. latipes, A. pulchella* (very stunted) and a probable form of *A. lineolata* were added to the growing list. *Daviesia pachyphylla* discouraged interference

by virtue of its concentrated armament of spiny awl-shaped leaves —glaucous and curiously inflated; *D. reversifolia* offered a similar problem to the collector, but here the foliage was rather sparse, each rigid narrow spine-tipped leaf alternatively deflexed at a sharp angle so that the trailing branches presented a regular zig-zag effect—reminiscent of an agricultural harrow.

By the road crossing on the upper reaches of Fitzgerald River (saline, as are most watercourses between Esperance and Albany) we found welcome groves of *Casuarina Huegeliana* and the pine *Callitris Drummondii,* the ground under them soft from fallen needles. This stopping place also yielded a rare epacrid, *Acrotriche ramiflora* (heavy with bloom) and was remarkable for the variety of its *Myrtaceæ—Eucalyptus uncinata, Leptospermum erubescens, Kunzea recurva, Melaleuca spathulata* (form), *M. pentagona* and *Bæckea crispiflora,* to mention but a few of the interesting species. *Hakea laurina* grew here too, but in such a spindly form and with so few leaves that one would hardly recognize it as conspecific with the bushy Pincushion Hakea of Victorian gardens.

Near Ongerup, specimens were obtained of several mallee eucalypts, viz., *E. platypus* (the typical form, of poplar-like aspect and with very broad, thick, lustrous leaves), *E. annulata, E. conglobata, E. calycogona* and *E. spathulata*—the last a neat ornamental tree, having an umbrageous crown of slender greyish leaves. Approaching Pallinup River from Borden, the road suddenly affords a magnificent view of the Stirling Range some 20 miles to the south—sharply serrated peaks exceeding 3000 ft. and, like the Barrens, strongly reminiscent of Victoria's Grampians.

Stirling Range Area

Pallinup River is believed to have "captured" the heads of several ancient watercourses after the gigantic east-west Stirling uplift barred their flow to the south. It is now a sluggish salty stream, but has excellent camping sites among the she-oaks, jam-woods, gnarled banksias and paperbarks that shade its low banks. A representative collection of lichens and bryophytes was made on earth and woody debris near the road bridge, while damp sandy slopes in the vicinity yielded several interesting sedges (a *Lepidobolus, Loxocarya* and *Lyginia* and three species of *Schœnus*). What would seem to be an undescribed species of *Calytrix* had small white flowers with exceedingly minute calyces.

Four hours botanizing at Chester Pass in the Stirling Range National Park provided the floristic highlight of the whole expedition. Two of us essayed to climb the nearby slopes of

Mt. Hassell (its pinnacle touches 3000 ft.) where, despite the spoliation caused by successive bushfires, the flowers are still a sheer delight. No less than 26 different proteads were collected—half the total species in Victoria! Scarlet *Banksia coccinea,* stiff and regal as a waratah, was one of the loveliest, and fertile seeds taken from Chester Pass have since been grown successfully at Frankston. Another very showy red flower was identified as *Beaufortia decussata.* Splashes of vivid blue came from occasional patches of the ericoid *Conospermum amœnum*; *Dryandra formosa* and *Banksia Brownii* shone with golden heads, those of the latter species borne among most decorative, delicately cut leaves of ferny aspect. Stunted Jarrah (*Eucalyptus marginata*) and Marri (*E. calophylla*) forest clothed the foothills of the range, but undoubtedly the most pleasing eucalypt was *E. doratoxylon* (Bell Gum)—wholly rubescent, with slender leaves and gracefully drooping trusses of small pilular fruits. The remarkable "drumstick" grass-tree, *Kingia australis,* confronted us for the first time here—it has been reliably estimated to grow at the rate of a foot a century, and many examples exceeded eight feet in height.

On the swampy plain tract some five miles south of Stirling Range we saw magenta patches in the roadside scrub and found the climbing trigger-flower, *Stylidium scandens,* its whorled leaves each coiled into an elegant spiral at the tip for support in dense undergrowth. Nearby grew *Eucalyptus decipiens,* also *E. buprestium,* fruits of which appear like large globular galls amongst the foliage. The granitic Porongorups, shrouded in mist, were too far from our main road to permit visitation; but gully vegetation in full bloom along Napier Creek (15 miles north of Albany) called for a brief inspection. In striking contrast with the gold of several *Acacia* species were deep purple flowers of *Hovea elliptica, H. chorizemifolia* and *Hardenbergia Comptoniana,* and vivid scarlet umbels of *Kennedya coccinea.* Several orchids grew luxuriantly on the moist sandy slopes above the creek, notably *Diuris longifolia, Pterostylis recurva* and *P. vittata,* but in general the season was not a good one for orchids along the southern coastal heaths.

King George's Sound to Nornalup Inlet

Albany is built partly around the western slopes of Mt. Clarence—a granite hill whose natural bushland has been wisely preserved. A scenic road skirts the steep seaward face of the hill and affords easy access to the flora in mossy soaks among large slabs of granite. In a few moments we found several proteads, including *Stirlingia*

tenuifolia (with extremely dissected foliage), the large-flowered scarlet bladderwort, *Utricularia Menziesii*, and *Borya nitida* (Pincushion Lily). Several large weeds are well established in the dampish environs of Albany, e.g., White Calla-lily, Watsonia, Blackberry and Pinnate Psoralea.

The West Australian Pitcher-plant (*Cephalotus follicularis*, in the monotypic endemic family *Cephalotaceæ*) grows plentifully enough in certain swampy tracts between Albany and Denmark, and it was a matter for great regret that lack of time prevented location of this unique, world-famous plant. Denmark is at the eastern fringe of the high-rainfall Karri forest belt. Between there and Parryville were seen our first examples of Karri trees (*Eucalyptus diversicolor*) with associate shrubs of tall *Acacia pentadenia* (a bipinnate species), the small endemic conifer *Podocarpus Drouyniana*, etc. An isolated patch of Karri timber is to be found as far east as the Porongorups (north of Albany). A special search at Parryville for Brown Boronia (*B. megastigma*) was rewarded by several spindly, shallow-rooted specimens of this very fragrant plant—concealed amongst rank swamp growth on permanently wet flats. Around the same swamp occurred also graceful pink-flowered *B. gracilipes, Crowea angustifolia, Tetratheca hispidissima, Scævola striata, S. microphylla* and an, as yet, indeterminate species of *Hemigenia*.

Massive trees of Red Tingle-tingle (*Eucalyptus Jacksonii*) with Karri, Marri and *Casuarina decussata* may be inspected conveniently by a short detour (between Parryville and Nornalup) to the "Valley of the Giants."* The undergrowth is dense, with much *Chorizema ilicifolium* trailing attractively through it; *Petrophila diversifolia* there has remarkably hemlock-like foliage, while the little greenhood orchid (*Pterostylis nana*) is frequent around the shaded mossy butts of the big trees and even on old decaying logs.

At about four miles east of Nornalup a forest track leads one south across marshy country with abundant tall sedge-like growths (*Dasypogon bromeliifolius, Lomandra Endlicheri, Evandra aristata, Anarthria scabra*, etc.) to gentle hill slopes where *Eucalyptus ficifolia* (Flame Gum) may be seen. Although so extensively planted in the eastern States, this tree is remarkably localized in its native haunts, inhabiting only a few thousand acres of sandy rises near the coast about Nornalup and at Brookes Inlet (the type area, some 25 miles to the west). Except when in flower, indigenous E. *ficifolia* is anything but ornamental — twisted, unhealthy-looking specimens of low stature. This poor forest,

*The "Valley of the Giants" was burnt out by a disastrous bush-fire early in 1950.

however, proved to be singularly rich in *Epacridaceæ* and *Rutaceæ*; *Crowea dentata* and four species of *Boronia* (*B. crenulata, B. spathulata, B. gracilipes* and another indeterminate one resembling *B. pulchella*) were there, while of *Leucopogon* species two cannot be matched with any forms represented in the Melbourne Herbarium.

Walpole settlement on Nornalup Inlet is noted for its Yellow Tingle-tingle (*Eucalyptus Guilfoylei*)—a tall tree of restricted distribution between Denmark and Cape Leeuwin. In neighbouring swamps we found the large handsome leek-orchid *Prasophyllum fimbria, Isopogon axillaris* and the uncommon little goodeniaceous plant *Diaspasis filifolia.*

Karri Forests

Near Weld River, along the road to Pemberton, *Eucalyptus megacarpa* (Bullich) and *E. patens* (Swan River Blackbutt) were both examined, among the prevailing Karri and Marri stands. Shannon River crossing was memorable for more and better samples of Brown Boronia, other interesting shrubs in the vicinity being pendant *Melaleuca microphylla,* tall *Ricinocarpus glaucus,* silver *Hemigenia podalyrina* and scrambling *Dampiera hederacea.* Miniature bog-gardens flourished in natural clearings that marked the outcropping of many granite slabs in the Karri forest; *Burchardia umbellata* (small stocky form), *Tribonanthes australis, Polypompholyx multifida* and several trigger-flowers were blooming profusely in one of these soakages near the main road.

Three days were spent amongst the big timber in Pemberton district, where lofty eucalypts and dense undergrowth (exhaling a delicious aroma) recall the mountain forests of the Otways and Upper Yarra watershed in Victoria, albeit at a much lower elevation. Rainfall is similar (50-60 inches), but one misses fern growth: bracken is the only frequent kind here, growing very tall, while occasional clumps of *Asplenium præmorsum* (Forked Spleenwort) occur as epiphytes on the mossy branches of *Casuarina decussata*; *Adiantum æthiopicum* (Maidenhair-fern) was also observed sparingly in several gullies. The Karri Sheoak (*C. decussata*) is a most attractive understorey tree, with deeply fluted corky bark of a curious yellow-brown colour and somewhat amorphous cones of the same hue, their valves being nearly immersed. *Banksia grandis* (with exceptionally large leaves and cones for its genus) and weeping *Agonis flexuosa* are two other frequent trees of the lower canopy; tall shrubs are well represented by various *Acacia* species, *Albizzia distachya, Bossiæa aquifolium* ("Water-bush" from its efficiency in holding rain-

drops), *Chorilaena hirsuta, Trymalium floribundum, Pimelea clavata* ("Banjine"), *Agonis linearifolia, Leucopogon verticillatus, Logania vaginalis, Persoonia longifolia* and *Leptomeria squarrulosa.*

Deep sheltered valleys two to four miles east of Pemberton approached nearer to a typical Gippsland fern gully than any other formation we saw in the West — Maidenhair-fern on the stream banks, Forked Spleenwort on the Karri Sheoaks, *Clematis pubescens* and *Hardenbergia Comptoniana* (conspicuous lianes) ascending high up the trunks of trees, and many bryophytes* and foliose lichens on fallen timber or around the bases of old trees. These cryptogams mostly belong to species that are common also in east Australian forests, e.g., the large lichens *Peltigera polydactyla* and *Sticta Mougeotiana* which Baron von Mueller had collected at the Porongorups in 1867.

The small diffuse conifer *Podocarpus Drouyniana* (with unusually large seeds) and cycad *Macrozamia Reidlei* ("Zamia Palm") occur almost throughout the Karri belt. In more open places with loamy soil, *Patersonia xanthina* expands its large golden blooms—a startling contradiction in this genus of otherwise purplish-flowered irids. *Hovea elliptica* colours the forest a rich purple in many places, its brilliance contrasting delightfully with the ubiquitous yellows of the Karri wattles (*Albizzia distachya, Acacia alata, A. diptera, A. myrtifolia* var. *angustifolia, A. urophylla, A. pulchella, A. pentadenia,* etc.) and the stark white boles of the noble Karri eucalypts themselves. In all this high-rainfall area, no floral subject was more appealing than graceful *Crowea dentata* with its long sprays of waxy-white bloom.

Tetrarrhena laevis was the only indigenous grass to be noted, and apparently there has always been a paucity of *Gramineæ* in wet Karri country. Early pioneers who put stock around the fringes of the big timber may be accounted responsible for the almost complete disappearance of such native pasture plants as existed originally. After forest fires, the first plants to shoot are cycads and hungry cattle will browse on these until rickets are manifest — the result of a cumulative poisoning; *Macrozamia* seeds also are violently poisonous, unless treated as the aborigines prepared them for food. In 1922, large tracts of virgin Karri were surveyed for closer settlement and by 1928 systematic ring-barking began. Group settlers, arrived from England, fought a losing battle against bracken and scrub on a hungry soil that would never provide pasture without constant heavy manuring.

*The mosses and hepatics of the Expedition, numbering about 30 species, are now determined and will form the subject of a special report.

For mile after mile in the Warren River district one is depressed by the sight of gaunt ringbarked trees, burnt-out country and abandoned selections. Fortunately the Karri seeds well and there is evidence of much natural regeneration.

Of outstanding interest in the Warren River National Park is an aged Karri that has achieved historical fame and is known as "Miss North's Tree." It is completely encircled at a height of about 30 feet on the trunk by a gigantic burl which in the 1870's attracted the attention of an English lady, Miss North; she was driven from Brockman's homestead every day for a fortnight in order to paint the knobbly giant. Her excellent paintings of S.W. Australian trees were finally donated to the Herbarium at the Royal Botanic Gardens, Kew, with enough money for their appropriate housing, and they may still be consulted there. It was singular that here, in this very wet region, we should experience three cloudless days of warm sunshine, whereas in the proverbially dry Nullarbor section of our journey the same period had been attended by grey skies and gentle showers.

No collecting was done over the 100 miles between Pemberton and Bunbury, but it was noted that *Podocarpus Drouyniana* extends as far north as Yornup, near Bridgetown. On high sand dunes at Bunbury—our first glimpse of the Indian Ocean—several unfamiliar psammophytic plants were collected, including: *Spinifex longifolius, Acanthocarpus Preissii, Acacia heteroclita, Alyxia buxifolia, Scaevola crassifolia* and two introductions from South Africa (*Pelargonium capitatum* and *Anthericum divaricatum*—a lily with long sprawling strap-like leaves). The brown alga, *Scaberia Agardhii* was taken from the tessellated basaltic wave platform nearby—a unique geological feature on the sandy coastline of Swanland.

Darling Scarp and Swan Coastal Plain

Yarloop was our first record for the strange proteaceous "Wooden-pear" tree (*Xylomelum occidentale*), which follows typical sand-heath country fringing the Darling Scarp for a hundred miles; north of Perth, it is succeeded by the more attractive *X. angustifolium.* Other noteworthy plants at Yarloop were *Sowerbæa laxiflora* (very similar to the east Victorian *S. juncea*), *Conostylis involucrata, Acacia sphacelata* var. *sessilis, Labichea punctata* (a legume with only *two* perfect stamens) and the heath *Conostephium pendulum,* having its creamy-white flower bells tipped heavily with purple-black and very sharply contracted.

Dwellingup, in the centre of an important Jarrah timber milling area, was compared with the wetter Karri forests farther south. Near the "Banksia" sawmill flowered *Leschenaultia biloba,* a famous blue subject that we had been anxious to see ever since leaving Norseman, also a possible giant form of *Hibbertia montana* which cannot be satisfactorily matched in Melbourne. *Banksia grandis* formed the principal, if rather sparse, undercanopy of this Jarrah forest.

The descent from the Darling escarpment toward North Darnalup is rather abrupt and takes one through a surprising wealth of flowering shrubs, especially proteads, of which eight species were recorded in a few minutes and included yellow *Lambertia multiflora* and the very showy crimson *Grevillea Wilsonii*; *Hypocalymma robustum, H. angustifolium, Eriostemon spicatus, Hibbertia Huegelii* and *H. acerosa* were also present and typical of the Darling Range flora. *Eucalyptus haematoxylon* was met with only here—a tree in vegetative character and fruit almost indistinguishable from *E. calophylla,* but differing in its dark red timber. It is indeed regrettable that the rich sand-heath flora between the Darling plateau region and the sea (the Swan Coastal Plain) should be in process of extermination through farming and the introduction of all-too-aggressive weeds.

Our arrival in Perth on Wednesday afternoon, September 10th, terminated the Expedition which had covered 1800 miles in sixteen days—an average daily mileage of 112. Despite such rapid movement and the necessarily limited time for intensive collecting anywhere, the writer made the most of every opportunity to botanize along the route; he remained in Perth for five days in order to see something of the local flora and to check up as many identities as possible at the State Herbarium. The Government Botanist, Mr. C. A. Gardner, kindly escorted him to the National Park at Jane Brook, the forest look-out tower and weir at Mundaring, Greystones Road and Cannington Swamps — a very interesting but fast vanishing flora in which the little conifer *Actinostrobus pyramidalis* is still to be found by the roadside. Other trips were made to Bull's Brook and City Beach, and the results of all these latter excursions in and around Perth have been added to those of the Expedition itself.

Conclusion

In the total of 870 separate collections of vascular plants, 685 species are concerned, including: *Proteaceæ* 85 spp.; *Leguminosæ* 98 spp. (37 in *Acacia*); *Myrtaceæ* 94 spp. (38 in *Eucalyptus* and 22 in *Melaleuca*); *Epacridaceæ* 36 spp.; *Goodeniaceæ* 25 spp.; and

Granite outcrops at Balladonia, Western Australia.

The Expedition's Transport in the Stirling Ranges, Western Australia.

Kingia australis at North Darnalup, Western Australia.

Compositæ 28 spp. In addition, 32 species of lichens were collected, but the *Bryophyta* were checked too late for insertion here. Flowering plants have been carefully mounted and incorporated in the National Herbarium of Victoria, augmenting the great collections already housed there by at least 38 species that were *not* previously represented and by 21 others of which the *Herbarium* possessed only *single specimens* (including 11 types); 127 (18·5%) of the species collected occur also in Victoria, but the majority of these were taken in Eyre's Peninsula, South Australia. Several species from the Expedition, including four in the genus *Acacia,* are new to science and will be published as opportunity offers.

A memorable experience was the location, in company with Mr. C. A. Gardner, of the extremely rare and apparently localized *Pilostyles Hamiltonii* at the Mundaring Pine Plantation. This minute-flowered member of *Rafflesiaceæ* is parasitic on *Daviesia* species and created a botanical stir in Western Australia when it was discovered by Mr. C. D. Hamilton as recently as March, 1946 —hitherto the family had been unknown from Australia and the genus *Pilostyles* recorded only for Persia, tropical Africa and the American region between California and Chile, always on some leguminous host. We were fortunate to find it in a fruiting condition on one small patch of *Daviesia incrassata.* [See C. A. Gardner in *Journ. Royal Soc. W. Aust.,* XXXII, 77 (1948).]

Mr. J. Swanson was untiring in his collection of seed throughout the itinerary and has achieved a large measure of success in germinating these and establishing seedling plants of unfamiliar species at the Frankston Golf Club nursery.

The writer wishes to register the personal debt of gratitude he owes to Sir Russell Grimwade, organizer and leader of this venture, without whose kindly munificence he would probably never have been able to visit the West or to explore such a variety of rich wildflower country—from rainfall regions of under 10 in. to those of 60 in. Botanical results from the Expedition are most gratifying and constitute the largest single addition of Australian exsiccatae to be received into the Victorian National Herbarium since the time of Baron von Mueller. A limited number of duplicate specimens is available for exchange purposes.

Grateful acknowledgement is also made to Mr. P. N. S. Bibby, of the National Herbarium staff (South Yarra), for much willing help in identifying the lichen material gathered on the Grimwade Expedition, and to Mr. C. A. Gardner, Government Botanist, Perth, who assisted by the determination of a number of doubtful specimens.

SYSTEMATIC ENUMERATION OF VASCULAR PLANTS COLLECTED (AND NOW ADDED TO THE NATIONAL HERBARIUM OF VICTORIA)

[* Denotes a naturalized alien, † a species not previously represented in Melbourne.]

PTERIDOPHYTA

POLYPODIACEÆ

Asplenium
præmorsum Sw.—Warren R. Nat. Park; 4 ml. E. of Pemberton (on *Casuarina*)
Pleurosorus
rutifolius (R.Br.) Fee — Murrawijinie and Kunalda Caves, S.A.
Notholæna
vellea R.Br.—Balladonia (granite crevices)
Adiantum
æthiopicum L.—Warren R. Nat. Park

GYMNOSPERMEÆ

CYCADACEÆ

Macrozamia
Reidlei (Gaud.) Gardner — "Pimelea," 9 ml. N.W. of Pemberton

TAXACEÆ

Podocarpus
Drouyniana F.v.M.—Parryville; Shannon R. (1 ml. N.)

CUPRESSACEÆ

Actinostrobus
pyramidalis Miq. in Lehm.—Cannington swamps
Callitris
Drummondii (Parl.) F.v.M. Fitzgerald R. (head)

ANGIOSPERMEÆ

SCHEUCHZERIACEÆ

Triglochin
calcitrapa Hook.—City Beach
trichophora Nees in Lehm.—City Beach

GRAMINEÆ (14 spp.)

Cymbopogon
obtectus S. T. Blake—Jane Brook (Nat. Park)
Neurachne
alopecuroides R.Br. — S. of Grass Patch; Ravensthorpe; Dwellingup ("Banksia" mill)
Paspalidium
gracile (R.Br) Hughes—Balladonia (granite)
Spinifex
longifolius R.Br.—Bunbury Beach
Tetrarrhena
lævis R.Br.—Warren R. Nat. Park; Mundaring fire tower
Aristida
arenaria Gaud.—Fraser Range; Ravensthorpe
Stipa
breviculmis J. M. Black, var.—Madura Stn.
elatior (Benth.) Hughes—City Beach
variabilis Hughes—Colona Stn., S.A.
Danthonia
?setacea R.Br.—S. of Grass Patch
sp.—Murrawijinie Cave, S.A.
Triodia
irritans R.Br.—Elliston cliffs, S.A.
Kœleria
**phleoides* Pers., var. *azorensis* Domin—Colona Stn., S.A.
Poa
Drummondiana Nees in Hook.—Kunalda Cave, S.A.
[+ 1 indet. sp.]

CYPERACEÆ (15 spp.)

Scirpus
antarcticus L.—City Beach
Schœnus
flavus (Nees) Bœckl.—Pallinup R.
?barbatus Bœckl.—Pallinup R.
curvifolius (R.Br.) Benth.—35 ml. W. of Esperance; Pallinup R.
unispiculatus (F.v.M.) Benth.—Greystones Rd. (Mundaring)
breviculmis Benth.—35 ml. W. of Esperance
grandiflorus (Nees) F.v.M.—Esperance; City Beach
Mesomelæna
tetragona (R.Br.) F.v.M. — 70 ml. W. of Esperance; Greystones Rd. (Mundaring)
Lepidosperma
effusum Benth.—Pemberton
tetraquetrum Nees in Lehm.—"Pimelea," 9 ml. N.W. of Pemberton
angustatum R.Br.—Walpole
leptostachyum Benth.—Warren R. Nat. Park
Tetrariopsis
octandra (Nees) C. B. Clarke—Porongorup foothills
Evandra
aristata R.Br.—4 ml. E. of Nornalup
[+ 1 indet. sp.]

RESTIONACEÆ (9 spp.)

Lyginia
tenax (Labill.) Gardner—Pallinup R.

RESTIONACEÆ (contd.)
Anarthria
scabra R.Br.—4 ml. E. of Nornalup
prolifera R.Br.—Chester Pass, Stirling Ra.
polyphylla Nees in Lehm.—30 ml. W. of Ravensthorpe
Lepyrodia
Muirii F.v.M.—Shannon R.
Restio
† ?*sp.*—4 ml. E. of Pemberton
Loxocarya
fasciculata (R.Br) Benth.—35 ml. W. of Esperance
cinerea R.Br.—50 ml. W. of Ravensthorpe; Pallinup R.
Lepidobolus
Preissianus Nees in Lehm.—70 ml. W. of Esperance; Pallinup R.

CENTROLEPIDACEÆ
Centrolepis
polygyna (R.Br.) Hieron.—Greystones Rd. (Mundaring)

PHILYDRACEÆ
Pritzelia
pygmæa (R.Br.) F.v.M.—Greystones Rd. (Mundaring)

LILIACEÆ (17 spp.)
Burchardia
umbellata R.Br.—Shannon R. (granite 1 ml. N.)
Thysanotus
Patersonii R.Br.—Fraser Range
**Anthericum*
†**divaricatum* Jacq.—Bunbury Beach
Tricoryne
elatior R.Br.—Jane Brook (Nat. Park)
Agrostocrinum
scabrum (R.Br.)—Baill.—Jane Brook (Nat. Park)
Stypandra
imbricata R.Br.—10 ml. W. of Ravensthorpe
Laxmannia
grandiflora Lindl.—Bull's Brook (1 ml. S.)
+var. *paleacea* Benth.—S. of Grass Patch
squarrosa Lindl.—S. of Grass Patch
brachyphylla F.v.M. ex Benth.—70 ml. W. of Esperance
Sowerbæa
laxiflora Lindl.—Yarloop
Borya
nitida Labill.—Mt. Clarence (Albany)
Dasypogon
bromeliifolius R.Br.—4 ml. E. of Nornalup
Acanthocarpus
Preissii Lehm.—Bunbury Beach; City Beach
Lomandra
Endlicheri (F.v.M.) Ewart—Parryville; 4 ml. E. of Nornalup
pauciflora (R.Br.) Ewart—Parryville; 4 ml. E. of Pemberton
Xanthorrhœa
Preissii Endl. in Lehm.—50 ml. W. of Ravensthorpe
Calectasia
cyanea R.Br.—35 ml. W. of Esperance; Chester Pass, Stirling Ra.; Cannington swamps

HÆMODORACEÆ
Phlebocarya
ciliata R.Br.—Darling Ra., North Darnalup

AMARYLLIDACEÆ
Tribonanthes
australis Endl.—Shannon R. (granite 1 ml. N.)
variabilis Lindl.—Cannington swamps
longipetala Lindl.—1 ml. S. of Bull's Brook
Conostylis
Bealiana F.v.M.—35 ml. W. of Esperance
serrulata R.Br.—35 ml. W. of Esperance
candicans Endl.—City Beach
involucrata Endl.—Yarloop
setosa Lindl.—Mundaring fire tower
setigera R.Br.—Porongorup foothills; Nth. Darnalup
Anigozanthos
humilis Lindl.—50 ml. W. of Ravensthorpe
bicolor Endl. in Lehm.—Yarloop; Greystones Rd. (Mundaring)

DIOSCOREACEÆ
Dioscorea
hastifola Endl. in Lehm.—Jane Brook (Nat. Park)

IRIDACEÆ
Patersonia
xanthina F.v.M.—Pemberton
rudis Endl.—Dwellingup
Orthrosanthus
multiflorus Sweet—Chester Pass, Stirling Ra.
laxus (Endl.) Benth.—Jane Brook (Nat. Park)

ORCHIDACEÆ (18 spp.)
Thelymitra
crinita Lindl.—Darling Ra., North Darnalup
Diuris
longifolia R.Br.—Esperance; Napier Ck.
carinata R.Br.—35 ml. W. of Esperance
Prasophyllum
elatum R.Br.
var. *Muelleri* (Andr.) Nicholls—1 ml. S. of Bull's Brook; City Beach
fimbria Reichb.f.—Walpole

ORCHIDACEÆ (contd.)
Pterostylis
nana R.Br.—Esperance; Valley-of-Giants (Nornalup)
recurva Benth.—Napier Ck.
vittata Lindl.—Napier Ck.
mutica R.Br.—Venus Bay, S.A.
Acianthus
reniformis (R.Br.) Schlecht.—Venus Bay, S.A.; Pemberton
Caladenia
filamentosa R.Br.,
var. *tentaculata* (Tate) Black—Venus Bay, S.A.; Jarramongup Stn.
Patersonii R.Br.,
var. *longicauda* (Lindl.) Rogers—Esperance; 35 mls. W. of Esperance
dilatata R.Br.—Venus Bay, S.A.
flava R.Br.—Pallinup R.
latifolia R.Br.—Venus Bay, S.A.; Porongorup foothills; Kirup; City Beach
sericea Lindl.—North Darnalup
gemmata Lindl.—50 ml. W. of Ravensthorpe
Glossodia
Brunonis Endl.—50 ml. W. of Ravensthorpe

CASUARINACEÆ
Casuarina
Huegeliana Miq. in Lehm.—Fraser Ra.; Fitzgerald R. (head)
decussata Benth. — Valley-of-Giants (Nornalup); 4 ml. E. of Pemberton
humilis Otto & Dietr.—70 ml. W. of Esperance; City Beach
thuyoides Miq. in Lehm.—70 ml. W. of Esperance

URTICACEÆ
Parietaria
debilis Forst.f.—Murrawijinie Cave, S.A.

PROTEACEÆ (85 spp.)
Persoonia
longifolia R.Br.—4 ml. E. of Nornalup; Dwellingup; "Pimelea," 9 ml. N.W. of Pemberton
? *sp.*—40 ml. W. of Ravensthorpe
Franklandia
fucifolia R.Br.—35 ml. W. of Esperance; Chester Pass, Stirling Ra.
Isopogon (8 spp.)
latifolius R.Br.—Chester Pass, Stirling Ra.
attenuatus R.Br.—Chester Pass, Stirling Ra.
sphærocephalus Lindl.—Darling Ra., Nth. Darnalup
axillaris R.Br.—15 ml. N.W. of Walpole
Baxteri R.Br.—Chester Pass, Stirling Ra.
roseus Lindl.—Chester Pass, Stirling Ra.
asper R.Br.—1 ml. S. of Bull's Brook
formosus R.Br.—40 ml. W. of Ravensthorpe
Petrophila (9 spp.)
teretifolia R.Br.—30 ml. E. of Ravensthorpe
longifolia R.Br.—Chester Pass, Stirling Ra.
media R.Br.—Cannington swamps
acicularis R.Br.—Mt. Clarence (Albany)
propinqua R.Br.,
var. *sericiflora* Benth.—35 ml. W. of Esperance
divaricata R.Br.—Chester Pass, Stirling Ra.
diversifolia R.Br.—Valley-of-Giants (Nornalup)
ericifolia R.Br.—Chester Pass, Stirling Ra.
seminuda Lindl.—Cannington swamps
Adenanthos
barbigera Lindl.—Mundaring fire tower
obovata Labill.—Chester Pass, Stirling Ra.; Walpole
cuneata Labill.—35 ml. W. of Esperance
Meissneri Lehm.—Nth. Darnalup
Stirlingia
simplex Lindl.—Greystones Rd. (Mundaring)
tenuifolia (R.Br.) Steud.—35 ml. W. of Esperance; Mt. Clarence (Albany)
latifolia (R.Br.) Steud.—Chester Pass, Stirling Ra.
Synaphæa
polymorpha R.Br. — 35 ml. W. of Esperance; Chester Pass, Stirling Ra.
petiolaris R.Br.—30 ml. W. of Ravensthorpe
†*pinnata* Lindl.—Jane Brook (Nat. Park)
Conospermum
flexuosum R.Br.—4 ml. E. of Nornalup
amœnum Meissn. in Lehm.—Chester Pass, Stirling Ra.
cæruleum R.Br.—5-10 ml. S. of Chester Pass, Stirling Ra.
stœchadis Endl.—Yarloop
Grevillea (15 spp.)
patentiloba F.v.M.—Ravensthorpe
plurijuga F.v.M.—S. of Grass Patch
nudiflora Meissn. in Hook. — S. of Grass Patch; 35 ml. W. of Esperance

PROTEACEÆ (contd.)
Grevillea (contd.)
Thelemanniana Hueg. in Endl.—City Beach
Hookeriana Meissn. in Lehm.—40 ml. and 60 ml. W. of Ravensthorpe
bipinnatifida R.Br.—Jane Brook (Nat. Park)
Wilsonii A. Cunn. in Wils.—Darling Ra., Nth. Darnalup
fasciculata R.Br. (inc. *G. Brownii* Meissn. in Lehm.)—Chester Pass, Stirling Ra.
pilulifera (Lindl.) Gardner—North Darnalup; Greystones Rd. (Mundaring); 1 ml. S. of Bull's Brook
Endlicheriana Meissn. in Lehm.—Jane Brook (Nat. Park)
crithmifolia R.Br.—City Beach
synapheæ R.Br.—Mundaring fire tower
brevicuspis Meissn. in Lehm.—Parryville
pulchella (R.Br.) Meissn. in Lehm.—Chester Pass, Stirling Ra.
glabrata (Lindl.)—Meissn. in Lehm.—Jane Brook (Nat. Park)
Hakea (17 spp.)
cyclocarpa Lindl.—Darling Ra., Nth. Darnalup
crassifolia Meissn. in Lehm.—Chester Pass, Stirling Ra.
Brookeana F.v.M. — S. of Grass Patch. (*Holotype only in Melbourne.*)
pandanicarpa R.Br.—S. of Grass Patch
Baxteri R.Br.—Chester Pass, Stirling Range
trifurcata (Sm.) R.Br. — Cannington swamps
+ *forma* (?)—40 ml. W. of Ravensthorpe
amplexicaulis R.Br.—4 ml. E. of Pemberton; Greystones Rd. (Mundaring)
prostrata R.Br.—Esperance
laurina R.Br.—Fitzgerald R. (head)
cinerea R.Br.—S. of Grass Patch (*1 specimen only in Melbourne*)
corymbosa R.Br.—Pallinup R.
undulata R.Br.—Chester Pass, Stirling Ra.; Greystones Rd. (Mundaring)
elliptica (Sm.) R.Br.—Greystones Rd. (Mundaring)
ambigua Meissn. in Lehm.—Chester Pass, Stirling Ra.
varia R.Br.—40 ml. W. of Ravensthorpe
lissocarpha R.Br.—Fitzgerald R. (head)
bipinnatifida R.Br.—Greystones Rd. (Mundaring)
Xylomelum
occidentale R.Br.—Yarloop
Lambertia
inermis R.Br.—S. of Grass Patch; 35 ml. W. of Esperance
ericifolia R.Br.—Chester Pass, Stirling Ra.
multiflora Lindl.—Darling Ra., Nth. Darnalup
Banksia (10 spp.)
pulchella R.Br.—35 ml. W. of Esperance
nutans R.Br.—Chester Pass, Stirling Ra.
sphærocarpa R.Br.—Cannington swamps
Brownii Baxt. ex R.Br.—Chester Pass, Stirling Ra.
attenuata R.Br.—Pallinup R.
repens Labill.—S. of Grass Patch; 70 ml. W. of Esperance
prostrata R.Br.—40 ml. W. of Ravensthorpe
quercifolia R.Br.—Chester Pass, Stirling Ra.; 4 ml. E. of Nornalup
coccinea R.Br.—Chester Pass, Stirling Ra.
ilicifolia R.Br.—4 ml. E. of Nornalup
Dryandra
floribunda R.Br.—35 ml. W. of Esperance; Chester Pass, Stirling Ra.; City Beach
mucronulata R.Br.—Chester Pass, Stirling Ra.
formosa R.Br.—Chester Pass, Stirling Ra.
nivea (Labill.) R.Br.—70 ml. W. of Esperance; Nth. Darnalup; Serpentine Falls
? bipinnatifida R.Br.—40 ml. W. of Ravensthorpe

SANTALACEÆ
Exocarpus
spartea R.Br.—Esperance
? sp.—S. of Grass Patch
Leptomeria
pauciflora R.Br.—4 ml. E. of Nornalup
scrobiculata R.Br.—Chester Pass, Stirling Ra.; Shannon R.
squarrulosa R.Br.—Pemberton
Santalum
acuminatum (R.Br.) DC.—City Beach

OLACACEÆ
Olax
phyllanthi (Labill.) R.Br.—Esperance; 17 ml. S. of Ravensthorpe

RAFFLESIACEÆ
Pilostyles
†*Hamiltonii* Gardner—Mundaring pine plantation (parasitic on *Daviesia incrassata*)

LORANTHACEÆ
Nuytsia
floribunda (Labill.) R.Br. — Esperance
Amyema
quandang (Lindl.) van Tieghem—20 ml. W. of Colona Stn., S.A.

CHENOPODIACEÆ
Rhagodia
Preissii Moq. in DC.—Madura Stn., Fraser Ra.
Atriplex
nummularia Lindl. in Mitch.—Head of Bight, S.A.
paludosa R.Br.—Ceduna, S.A.
vesicaria Heward ex Benth.—Head of Bight, S.A.
Bassia
sclerolænoides F.v.M.—Colona Stn., S.A.
uniflora (R.Br.) F.v.M. — Head of Bight, S.A.
obliquicuspis R. H. Anderson—Colona Stn., S.A.
Kochia
lobiflora (F.v.M.) Benth.—Colona Stn., S.A.
crioclada (Benth.) Gauba—Ceduna, S.A.; Head of Bight, S.A.
tomentosa (Moq.) F.v.M.—Ravensthorpe
+ var. *tenuifolia* F.v.M.—Ravensthorpe
scdifolia F.v.M.—Head of Bight, S.A.
oppositifolia F.v.M.—Head of Bight, S.A.
Arthrocnemum
arbusculum (R.Br.) Moq.—Head of Bight, S.A.

AMARANTHACEÆ
Hemichroa
diandra R.Br.—Head of Bight, S.A. [The genus is intermediate between *Chenopodiaceæ* and *Amaranthaceæ* and placed in one or other family by various botanists.]
Trichinium
obovatum Gaud.—Ceduna, S.A.
alopecuroideum Lindl. in Mitch.—King's Park, Perth
spathulatum R.Br.—Fraser Ra.

PHYTOLACCACEÆ
Gyrostemon
Sheathii W. V. Fitzg.—Esperance
Codonocarpus
cotinifolius (Desf.) F.v.M.—Between Balladonia Stn. and Fraser Ra.
Tersonia
brevipes Moq. in DC.—City Beach

AIZOACEÆ
Tetragonia
*† ?*Zeyheri* Fenzl ex Harv. and Sond.—City Beach
Disphyma
australe (Soland ex Forst.) J. M. Black—Head of Bight, S.A.

PORTULACACEÆ
Calandrinia
brevipedata F.v.M.—City Beach

RANUNCULACEÆ
Clematis
pubescens Hueg.—"Pimelea," 9 ml. N.W. of Pemberton

CRUCIFERÆ
**Heliophila*
**pusilla* L.—City Beach
Stenopetalum
lineare R.Br.—Colona Stn., S.A.
robustum Endl. in Hueg.—City Beach
Alyssum
linifolium Steph.—Colona Stn., S.A.
Hymenolobus
procumbens (L.) Nuttall—Colona Stn., S.A.
Capsella
pilosula F.v.M.—Colona Stn., S.A.

DROSERACEÆ
Drosera
scorpioides Planch.—70 ml. W. of Esperance
gigantea Lindl.—Greystones Rd. (Mundaring)
Menziesii R.Br. in DC.—Darling Ra., Nth. Darnalup
stolonifera Endl.—"Banksia" mill near Dwellingup

PITTOSPORACEÆ
Pittosporum
phillyreoides DC.—Madura Stn.
Cheiranthera
Preissiana Putterl. in Lehm.—1 ml. S. of Bull's Brook. (*1 specimen only in Melbourne.*)

LEGUMINOSÆ (98 spp.)
Acacia (37 spp.)
glaucoptera Benth.—S. of Grass Patch; Ravensthorpe
alata R.Br.—"Pimelea," 9 ml. N.W. of Pemberton
diptera Lindl.—Chester Pass, Stirling Ra.; Porongorup foothills; 4 ml. E. of Pemberton
spinescens Benth.—Venus Bay, S.A.
latipes Benth.—40 ml. W. of Ravensthorpe
colletioides (A. Cunn.) Benth., var. *nysophylla* Benth.—Salmon Gums
sphacelata Benth. in Hook., var. *sessilis* Benth.—Yarloop
Sowdenii Maiden—20 ml. W. of Colona Stn., S.A.
gonophylla Benth.—S. of Grass Patch

LEGUMINOSÆ (contd.)
Acacia (contd.)
ericifolia Benth. in Hook.—4 ml. W. of Ravensthorpe
†*sp. nov.* (dwarf, turgid glaucous leaves ½")—S. of Grass Patch; 50 ml. W. of Ravensthorpe
cometes Andrews—S. of Grass Patch (fragment only in Melbourne)
ferocior Maiden—4 ml. S. of Borden (*1 specimen only in Melbourne*)
†*Pritzeliana* Gardner—S. of Grass Patch
sp. nov. (thick, marginate, rotund leaves, ½")—S. of Grass Patch
†*sp.*—City Beach (2 forms)
erinacea Benth. in Hook.—Ravensthorpe
†*dermatophylla* Benth.—S. of Grass Patch
pilosa Benth.—S. of Grass Patch
hastulata Sm.—Denmark (river banks)
bidentata Benth. in Hook.—S. of Grass Patch
acanthoclada F.v.M.—"Jarramongup" Stn.
Graffiana F.v.M.—Salmon Gums
myrtifolia Willd., var. *angustifolia* Benth.—Porongorup foothills; Walpole; 4 ml. E. of Pemberton
urophylla Benth.—Denmark (river banks); 4 ml. E. of Pemberton
nitidula Benth.—Ravensthorpe
heteroclita Meissn. in Lehm.—Esperance; Bunbury Beach
? *lineolata* Benth. in Schlecht.—40 ml. W. of Ravensthorpe
†*sp. nov.* (broad, glaucous, obtuse, plurinerved leaves, 1-2")—1 ml. N. of Ravensthorpe
ixiophylla Benth.—Ravensthorpe
sessilispica Maid. and Blakely—60 ml. W. of Ravensthorpe (*fragment only in Melbourne*)
acuminata Benth.—Between Balladonia and Fraser Ra.; 4 ml. W. of Ravensthorpe
pulchella R.Br. in Ait.—Chester Pass, Stirling Ra.; Napier Ck.; City Beach
+ *forma* (?)—40 ml. W. of Ravensthorpe
pentadenia Lindl.—Parryville
nigricans R.Br.—Napier Ck.
strigosa Link—Chester Pass, Stirling Ra.; Mt. Clarence (Albany); Parryville; Dwellingup
+ *forma* (?)—Esperance
Drummondii Lindl.—Mundaring fire tower
Labichea
lanceolata Benth. in Hueg.—Jane Brook (Nat. Park)
punctata Benth. in Lindl.—Yarloop
Cassia
cremophila A. Cunn. in T. Vog.—Venus Bay, S.A.; 4 ml. W. of Ravensthorpe
Brachysema
latifolium R.Br. in Ait.—35 ml. W. of Esperance
Oxylobium [*sensu lato*]
atropurpureum Turcz.—Chester Pass, Stirling Ra.
capitatum Benth. in Hueg.—Nth. Darnalup; Cannington swamps
cuneatum Benth. in Lindl., var. *emarginatum* Benth.—Chester Pass, Stirling Ra.
heterophyllum (Turcz.) Benth., ? *forma*—4 ml. W. of Ravensthorpe
Chorizema
nervosum T. Moore—40 ml. W. of Ravensthorpe
ilicifolium Labill.—Valley-of-Giants (Nornalup)
glycinifolium (Sm.) Druce—Chester Pass, Stirling Ra.
aciculare (DC.) Gardner—S. of Gr. Patch; 35 ml. W. of Esperance; Napier Ck.
Mirbelia
spinosa Benth.—Jane Brook (Nat. Park)
Isotropis
cuneifolia (Sm.) Domin—S. of Gr. Patch; Napier Ck.
Gompholobium
ovatum Meissn. in Lehm.—4 ml. E. of Pemberton
polymorphum R.Br.—Jane Brook (Nat. Park)
marginatum R.Br.—Porongorup foothills
burtonioides Meiss. in Lehm.—Chester Pass, Stirling Ra.
tomentosum Labill.—1 ml. S. of Bull's Brook; City Beach
venustum R.Br.—70 ml. W. of Esperance; Mundaring fire tower
Knightianum Lindl.—35 ml. W. of Esperance; 30 ml. W. of Ravensthorpe; Chester Pass, Stirling Ra.
Burtonia
villosa Meissn. in Lehm.—Chester Pass, Stirling Ra.
scabra R.Br.—35 ml. W. of Esperance
Jacksonia
furcellata (Bonpl.) DC.—State Herbarium, Perth (grounds)
Sternbergiana Hueg.—1 ml. S. of Bull's Brook

LEGUMINOSÆ (contd.)
Sphærolobium
alatum Benth.—Chester Pass, Stirling Ra.
Daviesia
cordata Sm.—4 ml. E. of Pemberton; Mundaring Weir
pachyphylla F.v.M.—10 ml. W. of Ravensthorpe
teretifolia (R.Br.) Benth.—35 ml. W. of Esperance
colletioides Meissn.—Chester Pass, Stirling Ra.
reversifolia F.v.M.—35 ml. W. of Esperance; 40 ml. W. of Ravensthorpe (*1 collection only in Melbourne*)
incrassata Sm. — Mundaring pine plantation (the host of *Pilostyles Hamiltonii*)
divaricata Benth. — State Herbarium, Perth (grounds)
juncea Sm.—Chester Pass, Stirling Ra.; Napier Ck.
Aotus
? *sp.*—10 ml. W. of Ravensthorpe
Pultenæa
reticulata (Sm.) Benth.—4 ml. E. of Nornalup; 15 ml. N.W. of Walpole
obcordata (R.Br.) Benth.—Esperance
Gastrolobium
spathulatum Benth. in Lindl.—Jane Brook (Nat. Park)
spinosum Benth. in Lindl.—1 ml. S. of Bull's Brook
calycinum Benth. in Lindl.—Greystones Rd. (Mundaring)
Eutaxia
microphylla (R.Br.) Gardner—Ravensthorpe
Latrobea
diosmifolia Benth.—10 ml. W. of Ravensthorpe
Dillwynia
cinerascens R.Br.—Mundaring fire tower; 1 ml. S. of Bull's Brook
sp. (glabrous calyx)—35 ml. W. of Esperance; 30 ml. E. of Ravensthorpe
? *sp.*—S. of Grass Patch
Bossiæa
aquifolium Benth.—"Pimelea," 9 ml. N.W. of Pemberton
linophylla R.Br. in Ait.—Porongorup foothills
pulchella Meissn. in Lehm.—Mundaring fire tower
ornata (Lindl.) Benth.—"Pimelea," 9 ml. N.W. of Pemberton; Mundaring fire tower
eriocarpa Benth. in Hueg., var. *angustifolia* (Meissn. in Lehm.) comb.?—Jane Brook (Nat. Park)
Templetonia
retusa (Vent.) R.Br.—Esperance
Battii F.v.M.—Colona Stn., S.A. (*Holotype only in Melbourne*)
sulcata (Meissn.) Benth.—S. of Grass Patch
Hovea
chorizemifolia (Sweet) DC.—Napier Ck.; 4 ml. E. of Nornalup
elliptica (Sm.) DC.—Napier Ck.; 4 ml. E. of Pemberton
trisperma Benth. in Hueg.—Chester Pass, Stirling Ra.; Shannon R.; Yarloop
pungens Benth. in Hueg.—City Beach
**Lupinus*
**angustifolius* L.—State Herbarium, Perth (grounds)
Glycine
clandestina Wendl., var. *sericea* Benth.—Balladonia (granite)
Kennedya
coccinea Vent.—Napier Ck.
Hardenbergia
Comptoniana (Andr.) Benth. in Hueg.—Napier Ck.; Warren R. Nat. Park; City Beach

GERANIACEÆ
Erodium
**Botrys* (Cav.) Bertol.—1 ml. S. of Bull's Brook
Pelargonium
**capitatum* (L.) Ait.—Bunbury Beach; City Beach

RUTACEÆ (16 spp.)
Geijera
linearifolia (DC.) Black—Ceduna, S.A.
Boronia (8 spp.)
megastigma Nees in Lehm.—Parryville; Shannon R.
tetrandra Labill.—Esperance
†*sp.* (aff. *B. pulchella*)—4 ml. E. of Nornalup
gracilipes F.v.M.—Parryville; 4 ml. E. of Nornalup
bæckeacea F.v.M.—S. of Gr. Patch (*Holotype only in Melbourne*)
crenulata Sm.—Chester Pass, Stirling Ra.; Napier Ck.; 4 ml. E. of Nornalup
inornata Turcz.—S. of Grass Patch
spathulata Lindl. — Chester Pass, Stirling Ra.; 4 ml. E. of Nornalup; Mundaring fire tower
Eriostemon
spicatus A. Rich.—Darling Ra., Nth. Darnalup
Crowea
angustifolia Turcz.—Parryville

LEGUMINOSÆ (contd.)
dentata (R.Br.) Benth.—4 ml. E. of Nornalup
Microcybe
pauciflora Turcz.—S. of Gr. Patch
multiflora Turcz.—6 ml. N. of Salmon Gums
+ var. "*baccharioides*" F.v.M. ms.—S. of Grass Patch
Correa
pulchella Sweet—Venus Bay, S.A.
Chorilæna
hirsuta Benth.—Shannon R.

TREMANDRACEÆ
Tremandra
stelligera R.Br. in DC., var. *hispida* Benth.—6 ml. N.W. of Walpole
diffusa R.Br. in DC.—Walpole
Platytheca
verticillata (Hueg.) Baill.—Chester Pass, Stirling Ra.
Tetratheca
affinis Endl. in Hueg.—Chester Pass, Stirling Ra.
setigera Endl. in Hueg.—Kirup
hispidissima Steetz in Lehm.—Parryville
hirsuta Lindl.—Mundaring fire tower
viminea Lindl.—Chester Pass, Stirling Ra.; Dwellingup

POLYGALACEÆ
Bredemeyera
volubilis (Labill.) Chod. — Madura Stn.; 1 ml. S. of Bull's Brook
virgata (Labill.) comb.?—Parryville

EUPHORBIACEÆ
Phyllanthus
calycinus Labill.—Esperance
scaber Klotzsch in Lehm.—Esperance
Adriana
quadripartita (Labill.) Gaud.—Esperance
Poranthera
microphylla Brongn.—Mundaring fire tower
Huegelii Klotzsch in Lehm.—Mundaring fire tower
Ricinocarpus
glaucus Endl. in Hueg.—Shannon R.
Beyeria
Leschenaultii (DC.) Baill., var. *Drummondii* Grüning—Venus Bay, S.A.
Monotaxis
gracilis (Muell. Arg.) Baill.—S. of Grass Patch
Amperea
ericoides Adr. Juss.—Mt. Clarence (Albany)
protensa Nees in Lehm.—4 ml. E. of Pemberton (*Type only in Melbourne*)

STACKHOUSIACEÆ
Stackhousia
pubescens A. Rich.—Esperance; Jane Brook (Nat. Park)
Huegelii Endl. in Hueg.—10 ml. W. of Ravensthorpe
Brunonis Benth.—Jane Brook (Nat. Park)

SAPINDACEÆ
Diplopeltis
Huegelii Endl. in Hueg.—Jane Brook (Nat. Park); City Beach
Dodonæa
ptarmicifolia Turcz.—Ravensthorpe
ceratocarpa Endl. in Hueg.—Esperance
†*amblyophylla* Diels—S. of Grass Patch
hexandra F.v.M.—Venus Bay, S.A.
Baueri Endl.—Venus Bay, S.A.
microzyga F.v.M.—Fraser Ra.

RHAMNACEÆ
Pomaderris
myrtilloides Fenzl in Hueg.—Esperance
Forrestiana F.v.M. — Madura Stn., Moonera, near Cocklebiddy (197 ml. W. of Eucla)
Trymalium
floribundum Steud.—Napier Ck.
ledifolium Fenzl in Hueg.—Porongorup foothills; "Banksia" mill near Dwellingup; Jane Brook (Nat. Park)
Spyridium
globulosum (Labill.) Benth.—Esperance; Bunbury Beach
†*sp.* (aff. *S. rotundifolium*)—S. of Grass Patch
Cryptandra
pungens Steud. in Lehm.—10 ml. W. of Ravensthorpe

MALVACEÆ
Lavatera
plebeia Sims—Kunalda Cave, S.A.
Plagianthus
squamatus (Nees) Benth.—Colona Stn., S.A.; Head of Bight, S.A.
Sida
?*virgata* Hook in Mitch.—1 ml. N. of Ravensthorpe
Hibiscus
Huegelii Endl. in Hueg.—4 ml. W. of Ravensthorpe

STERCULIACEÆ
Rulingia
cygnorum (Steud.) Gardner — Esperance; Jane Brook (Nat. Park)
parviflora Endl. in Hueg.—Esperance

STERCULIACEÆ (contd.)
Thomasia
quercifolia (Andr.) J. Gay—Parryville
foliosa J. Gay—Darling Ra., Nth. Darnalup
triphylla (Labill.) J. Gay—Esperance
†*sp.*—Shannon R.
Guichenotia
ledifolia J. Gay—Esperance
Lysiosepalum
involucratum (Turcz.) Gardner—Fitzgerald R. (head)
Lasiopetalum
discolor Hook.—Venus Bay, S.A.
rosmarinifolium (Turcz.) Benth.—S. of Grass Patch
Behrii F.v.M.—Venus Bay, S.A.

DILLENIACEÆ
Hibbertia
montana Steud. in Lehm.—"Banksia" mill near Dwellingup
+ var. *confertifolia* (Steud.) Benth.—Chester Pass, Stirling Ra.
+ var. *major* Benth.—Shannon R.
?+ *var.* (giant form)—"Banksia" mill near Dwellingup
amplexicaulis Steud. in Lehm.—Pemberton
Cunninghamii (Benth.) Steud.—Chester Pass, Stirling Ra.; Napier Ck.
cuneiformis (Labill.) Gilg. in Engl. and Prantl — "Pimelea," 9 ml. N.W. of Pemberton
Huegelii (Endl.) F.v.M. — Darling Ra., Nth. Darnalup
glaberrima (Steud.) Gilg. in Engl. and Prantl — Jane Brook (Nat. Park)
acerosa (R.Br.) Benth. — Darling Ra., Nth. Darnalup
stricta R.Br.,
var. *leiocarpa* Benth.—20 ml. N. of Esperance

FRANKENIACEÆ
Frankenia
scssilis Summerhayes—Head of Bight, S.A.
†*densa* Summerhayes—Moonera, near Cocklebiddy, 197 ml. W. of Eucla
foliosa J. M. Black—Colona Stn., S.A.

VIOLACEÆ
Hybanthus
floribundus (Walp.) F.v.M.—1 ml. N. of Ravensthorpe
calycinus (Steud.) F.v.M.—1 ml. S. of Bull's Brook
†*sp. nov.* (?)—S. of Grass Patch

THYMELÆACEÆ
Pimelea (13 spp.)
spectabilis (Fisch. and Mey.) Lindl.—Mundaring fire tower
rosea R.Br.—Napier Ck.
ferruginea Labill.—Esperance
brachyphylla Benth.—S. of Grass Patch
Maxwellii (F.v.M.) Benth.—Chester Pass, Stirling Ra.
suaveolens (Endl.) Meissn. in Lehm.—Shannon R.; Yarloop; North Darnalup
physodes Hook.—17 ml. S. of Ravensthorpe
imbricata R.Br.—1 ml. S. of Bull's Brook
argentea R.Br.—1 ml. S. of Bull's Brook
clavata Labill.—Warren R. Nat. Park
thesioides S. Moore—Fraser Ra.
longiflora R.Br.—Walpole
glauca R.Br.—Venus Bay, S.A.

MYRTACEÆ (94 spp.)
Eucalyptus (38 spp.)
annulata Benth. — Between Balladonia and Fraser Ra. (*forma*?); Ravensthorpe; Ongerup; 4 ml. S. of Borden
platypus Hook.—Ongerup
+ var. *heterophylla* Blakely—Ravensthorpe; 40 ml. W. of Ravensthorpe
occidentalis Endl. in Hueg.—Ravensthorpe
astringens Maiden—4 ml. S. of Borden
eremophila (Diels) Maiden— 6 ml. N. of Salmon Gums
spathulata Hook.—Ongerup
+ var. *grandiflora* Benth.—S. of Grass Patch; 60 ml. W. of Ravensthorpe
goniantha Turcz.—S. of Grass Patch
†*Le Souefii* Maiden—Fraser Ra.
dumosa A. Cunn. ex Schauer in Walp.—6 ml. N. of Salmon Gums; S. of Grass Patch; 30 ml. E. of Ravensthorpe
incrassata Labill.—Eucla; Esperance
+ var. *costata* (Behr and F.v.M.) N. T. Burbridge—20 ml. W. of Colona Stn., S.A.; 30 ml. E. of Ravensthorpe
+ var. *angulosa* (Schauer) Benth.—Port Lincoln, S.A.
conglobata (R.Br.) Maiden—4 ml. W. of Ravensthorpe; Borden
tetraptera Turcz.—30 ml. E. of Ravensthorpe
Forrestiana Diels—S. of Grass Patch (*one collection only in Melbourne*)
doratoxylon F.v.M. — Chester Pass, Stirling Ra.

MYRTACEÆ (contd.)
†*diptera* Andrews—6 ml. N. of Salmon Gums
megacarpa F.v.M.—Weld R.
gomphocephala DC.—City Beach
diversicolor F.v.M.—4 ml. E. of Pemberton
reduncа Schauer in Lehm.—30 ml. E. of Ravensthorpe; 40 ml. W. of Ravensthorpe
†*cylindriflora* Maiden and Blakely—S. of Grass Patch
diversifolia Bonpl.—Port Lincoln, S.A.; Venus Bay, S.A.
salubris F.v.M.—Fraser Ra.
rudis Endl. in Hueg.—Keysbrook; Mundaring weir
calophylla R.Br.—Chester Pass, Stirling Ra.; Pemberton
ficifolia F.v.M.—4 ml. E. of Nornalup
hæmatoxylon Maiden—Darling Ra., Nth. Darnalup (*one collection only in Melbourne*)
calycogona Turcz.—Between Balladonia and Fraser Ra.; 40 ml. W. of Ravensthorpe; Ongerup
gracilis F.v.M.—Eucla
†*sp.* (aff. *E. gracilis*)—Ravensthorpe
salmonophloia F.v.M.—Ravensthorpe
oleosa F.v.M.—Between Balladonia and Fraser Ra.; Ravensthorpe
+ var. *glauca* Maiden (syn. *E. transcontinentalis*) — Fraser Ra.
Flocktoniæ Maiden—6 ml. N. of Salmon Gums; S. of Grass Patch
falcata Turcz.,
var. *ecostata* Maiden—30 ml. E. of Ravensthorpe
decipiens Endl. in Hueg.—5-10 ml. S. of Chester Pass, Stirling Ra.
uncinata Turcz.—Fitzgerald R. (head)
buprestium F.v.M.—5-10 ml. S. of Chester Pass, Stirling Ra.
marginata Sm.—Chester Pass, Stirling Ra.; 4 ml. E. of Pemberton
†*Jacksonii* Maiden—Valley-of-Giants (Nornalup)

Leptospermum
spinescens Endl. in Hueg.—70 ml. W. of Esperance (*one collection only in Melbourne*)
erubescens Shauer in Lehm.—Fitzgerald R. (head)

Agonis
flexuosa (Spreng.) Shauer in Lehm.—"Pimelea," 9 ml. N.W. of Pemberton
hypericifolia Schauer in Lehm.—Chester Pass, Stirling Ra.
marginata (Labill.) Schauer in Lehm.—Esperance
linearifolia (DC.) Schauer in Lehm.—35 ml. W. of Esperance; "Pimelea," 9 ml. N.W. of Pemberton
parviceps Schauer in Lehm.—Chester Pass, Stirling Ra.; Porongorup foothills

Kunzea
recurva Schauer in Lehm.—Fitzgerald R. (head); Chester Pass, Stirling Ra.; 15 ml. N.W. of Walpole; Nth. Darnalup
affinis S. Moore—10 ml. W. of Ravensthorpe

Melaleuca (22 spp.)
elliptica Labill.—Ravensthorpe (1 ml. N.)
acuminata F.v.M.—Ravensthorpe (1 ml. N.)
violacea Lindl.—5-10 ml. S. of Chester Pass, Stirling Ra.
cardiophylla F.v.M.—Ravensthorpe (1 ml. N.)
suberosa (Schauer) Gardner—35 ml. W. of Esperance
pubescens Schauer in Walp.—Eucla; Ravensthorpe
hamulosa Turcz.—Cannington swamps
rhaphiophylla Schauer in Lehm.—Cannington swamps
cymbifolia Benth.—Between Balladonia and Fraser Ra.
cuticularis Labill.—Ravensthorpe (1 ml. N.)
calycina R.Br. in Ait.—S. of Grass Patch; 35 ml. W. of Esperance
pentagona Labill.,
var. *subulifolia* Schauer—Fitzgerald R. (head)
†*sp.*—4 ml. W. of Ravensthorpe
?*spathulata* Schauer in Lehm.—S. of Grass Patch; Fitzgerald R. (head)
+ *var.* (?)—35 ml. W. of Esperance
subtrigona Schauer in Lehm.—S. of Grass Patch
scabra R.Br. in Ait.—35 ml. W. of Esperance
thymoides Labill.—Chester Pass, Stirling Ra.
microphylla Sm.—Shannon R.
acerosa Schauer in Lehm.—S. of Grass Patch; City Beach
pauperiflora F.v.M.—6 ml. N. of Salmon Gums
†*sp.* (cypress-like branchlets)—40 ml. W. of Ravensthorpe

Conothamnus
aureus (Turcz.) Domin—Chester Pass, Stirling Ra. (*one collection only in Melbourne*)

Calothamnus
gracilis R.Br.—35 ml. W. of Esperance; 30 ml. E. of Ravensthorpe

MYRTACEÆ (contd.)
quadrifidus R.Br.—Esperance; City Beach
Beaufortia
decussata R.Br.—Chester Pass, Stirling Ra.
heterophylla (Turcz.) Domin—Chester Pass, Stirling Ra.
Bæckea
crassifolia Lindl. in Mitch. — S. of Grass Patch
?*tetragona* (F.v.M.) Benth.—30 ml. W. of Ravensthorpe
sp. (aff. *B. ramosissima*)—40 ml. W. of Ravensthorpe
crispiflora F.v.M.—Fitzgerald R. (head)
Astartea
?*ambigua* F.v.M.—S. of Grass Patch
Hypocalymma
robustum Endl. in Hueg.—Darling Ra., Nth. Darnalup
speciosum Turcz.—Chester Pass, Stirling Ra.
Phillipsii Harv.—Chester Pass, Stirling Ra.
angustifolium Endl. in Hueg.—Darling Ra., Nth. Darnalup
Calytrix
brachyphylla Turcz. — S. of Grass Patch; 35 ml. W. of Esperance; Pallinup R.
tetragona Labill.—30 ml. W. of Ravensthorpe
†*sp.* (minute calyx)—Pallinup R.
Chamelaucium
megalopetalum (F.v.M.) Benth.—35 ml. W. of Esperance
Thryptomene
australis Endl.—30 ml. W. of Ravensthorpe (*one collection only in Melbourne*)
saxicola (A. Cunn.) Schauer in Lehm.—Esperance
Darwinia
vestita (Endl.) Benth.—35 ml. W. of Esperance; Chester Pass, Stirling Ra.
diosmoides (DC.) Benth.—Esperance
citriodora (Endl.) Benth.—Jane Brook (Nat. Park)
pimeleoides Kayser and Wakef.—Jane Brook (Nat. Park) (*Co-Type only in Melbourne*)
Verticordia
plumosa (Desf.) Domin—S. of Grass Patch
Preissii Schauer in Lehm.—35 ml. W. of Esperance; 70 ml. W. of Esperance; 30 ml. W. of Ravensthorpe
multiflora Turcz.—30 ml. E. of Ravensthorpe
habrantha Schauer in Lehm.—Chester Pass, Stirling Ra.

HALORAGIDACEÆ
Loudonia
aurea Lindl.—Mundaring fire tower

UMBELLIFERÆ
Hydrocotyle
pilifera Turcz.—City Beach
Centella
?*sp.*—Shannon R.
Trachymene
anisocarpa (Turcz.) Burtt—Parryville. (Blue-flowered.)
pilosa Sm.—City Beach
Platysace
compressa (Labill.) Norman—Esperance
tenuissima (Benth.) Norman—4 ml. E. of Pemberton
Xanthosia
rotundifolia DC.—4 ml. E. of Nornalup
Actinotus
superbus O. H. Sargent—17 ml. S. of Ravensthorpe (*Co-Type only in Melbourne*)

EPACRIDACEÆ (36 spp.)
Andersonia
echinocephala (Stschegl.) Druce—Chester Pass, Stirling Ra.
simplex (Stschegl.) Druce—Chester Pass, Stirling Ra.
sprengelioides R.Br.—Porongorup foothills
parvifolia R.Br.—35 ml. W. of Esperance
depressa R.Br.—4 ml. E. of Nornalup
cærulea R.Br.—Shannon R.
subulata Benth.—Parryville (*Co-Type only in Melbourne*)
Sphenotoma
dracophylloides Sond. in Lehm.—Chester Pass, Stirling Ra.
gracile (R.Br.) Sweet—15 ml. N.W. of Walpole
Lysinema
ciliatum R.Br.—S. of Grass Patch; 35 ml. W. of Esperance
Astroloma
pallidum R.Br.—Napier Ck.
Leucopogon (18 spp.)
verticillatus R.Br.—Napier Ck.
australis R.Br.—15 ml. N.W. of Walpole
+ *var.* (?)—Chester Pass, Stirling Ra.
revolutus R.Br.—Chester Pass, Stirling Ra.; Napier Ck.; "Pimelea," 9 ml. N.W. of Pemberton
atherolepis Stschegl., var. *densiflorus* Benth.—Chester Pass, Stirling Ra.
gibbosus Stschegl.—Chester Pass, Stirling Ra.

EPACRIDACEÆ (contd.)
†*sp.*—Chester Pass, Stirling Ra.
†*sp.* (resembling *L. biflorus*)—4 ml. E. of Nornalup
†*sp.* (large pink corolla like an *Epacris*)—Greystones Rd. (Mundaring)
†*sp.* (resembling *L. virgatus*)—4 ml. E. of Nornalup
carinatus R.Br.—20 ml. N. of Esperance
polystachyus R.Br.—4 ml. E. of Nornalup
sprengelioides Sond. in Lehm.—Greystones Rd. (Mundaring)
obtusatus Sond. in Lehm.—S. of Grass Patch
fimbriatus Stschegl.—40 ml. W. of Ravensthorpe
propinquus R.Br.—Pemberton
pendulus R.Br.—1 ml. N. of Shannon R. bridge
crassifolius Sond. in Lehm.—70 ml. W. of Esperance
sp.—1 ml. S. of Bull's Brook
Monotoca
oligarrhenoides F.v.M.—35 ml. W. Esperance (*Holo-type only in Melbourne*)
tamariscina F.v.M.—Chester Pass, Stirling Ra.; 4 ml. E. of Nornalup
Acrotriche
ramiflora R.Br.—Fitzgerald R. (head) (*one collection only in Melbourne*)
patula R.Br. Venus Bay, S.A.
Conostephium
pendulum Benth. in Hueg.—Yarloop
Needhamia
pumilio R.Br.—35 ml. W. of Esperance
Oligarrhena
micrantha R.Br.—Chester Pass, Stirling Ra.

LOGANIACEÆ
Logania
vaginalis (Labill.) F.v.M.—"Pimelea," 9 ml. N.W. of Pemberton
buxifolia F.v.M.—35 ml. W. of Esperance
stenophylla F.v.M.—S. of Grass Patch
fasciculata R.Br.—Esperance
serpyllifolia R.Br.—Napier Ck.; 4 ml. E. of Pemberton

APOCYNACEÆ
Alyxia
buxifolia R.Br.—Bunbury Beach

CONVOLVULACEÆ
Wilsonia
humilis R.Br.—4 ml. W. of Ravensthorpe

BORAGINACEÆ
Halgania
lavandulacea Endl.—S. of Grass Patch; Ravensthorpe

LABIATÆ
Teucrium
sessiliflorum Benth. in DC.—Ravensthorpe
Westringia
rigida R.Br.—6 ml. N. of Salmon Gums
Dampieri R.Br.—Elliston cliffs, S.A.
Hemigenia
†*sp.*—Parryville
podalyrina F.v.M.—1 ml. N. of Shannon R. bridge
incana (Lindl.) Benth.—Jane Brook (Nat. Park)
Hemiandra
pungens R.Br.—Napier Ck.
Prostanthera
calycina F.v.M.—Venus Bay, S.A.

SOLANACEÆ
Lycium
australe F.v.M.—Head of Bight, S.A.
Solanum
orbiculatum Dunal in Poir.—Balladonia (granite)
Nicotiana
Goodspeedii Wheeler—Head of Bight, S.A.; Kunalda, S.A.
Anthocercis
littorea Labill.—Esperance; City Beach

SCROPHULARIACEÆ
**Dischisma*
**arenarium* E. Mey.—City Beach

OROBANCHACEÆ
Orobanche
?*australiana* F.v.M.—City Beach

LENTIBULARIACEÆ
Polypompholyx
multifida (R.Br.) F.v.M.—1 ml. N. of Shannon R. bridge
Utricularia
Menziesii R.Br.—Mt. Clarence (Albany)

MYOPORACEÆ
Myoporum
serratum R.Br.—Chester Pass, Stirling Ra.
Eremophila
Dempsteri F.v.M.—Moonera, near Cocklebiddy, 197 ml. W. of Eucla
pachyphylla Diels—4 ml. W. of Ravensthorpe (*one collection only in Melbourne*)
†*dichroantha* Diels—4 ml. W. of Ravensthorpe

MYOPORACEÆ (contd.)
†*sp.* (aff. *E. dichroantha*)—Salmon Gums
scoparia (R.Br.) F.v.M.—Colona Stn., S.A.
Weldii F.v.M.—Ceduna, S.A.
maculata F.v.M.—Fraser Ra.
alternifolia R.Br.—Madura Stn; Fraser Ra.

PLANTAGINACEÆ
Plantago
varia R.Br.—Balladonia (granite)

RUBIACEÆ
Opercularia
vaginata Labill. — 50 ml. W. of Ravensthorpe; Jane Brook (Nat. Park)
scabrida Schlecht.—30 ml. E. of Ravensthorpe
volubilis (R.Br.) Benth.—Parryville
hispidula Endl. in Hueg.—Esperance
+ var. *pauciflora* (Endl.) Benth. —4 ml. E. of Pemberton
†*sp.*—"Banksia" mill, near Dwellingup
Galium
umbrosum Sol.,
var. *muriculatum* (Benth.) Ewart —Murrawijinie Cave, S.A.

LOBELIACEÆ
Lobelia
tenuior R.Br.—City Beach
rhombifolia De Vr. in Lehm.—1 ml. S. of Bull's Brook

GOODENIACEÆ (25 spp.)
Velleia
trinervis Labill.—S. of Grass Patch; Esperance
Goodenia
†*decursiva* W. V. Fitzg.—Esperance (TYPE loc.)
affinis De Vr.—Ravensthorpe
strophiolata F.v.M.—S. of Grass Patch
pterygosperma R.Br.—35 ml. W. of Esperance
Leschenaultia
biloba Lindl. — Dwellingup; North Darnalup; Mundaring fire tower
linarioides DC.—City Beach
formosa R.Br.—S. of Grass Patch; 35 ml. W. of Esperance
Diaspasis
filifolia R.Br.—15 ml. N.W. of Walpole
Scævola (9 spp).
spinescens R.Br.—Salmon Gums
striata R.Br.—Parryville
thesioides Benth.—30 ml. W. of Ravensthorpe
crassifolia Labill.—Bunbury Beach
holosericea De Vr.—City Beach
platyphylla Lindl.—Mundaring fire tower
microphylla (De Vr.) Benth.—Parryville
fasciculata Benth. in Hueg.—Jane Brook (Nat. Park)
sp. (resembling *Halgania lavandulacea*)—S. of Grass Patch (*one collection only in Melbourne*)
Dampiera (8 spp.)
alata Lindl.—4 ml. E. of Pemberton; 1 ml. S. of Bull's Brook
Lindleyi De Vr.—S. of Grass Patch
hederacea R.Br.—Shannon R.
lavandulacea Lindl.—S. of Grass Patch
linearis R.Br. — 4 ml. E. of Nornalup; Yarloop; 1 ml. S. of Bull's Brook
leptoclada Benth.—4 ml. E. of Nornalup
fasciculata R.Br.—Esperance
sacculata F.v.M. ex Benth.—35 ml. W. of Esperance.

STYLIDIACEÆ
Stylidium (12 spp.)
calcaratum R.Br. — "Banksia" mill near Dwellingup; Greystones Rd. (Mundaring)
imbricatum Benth. in Hueg.—Chester Pass, Stirling Ra.
petiolare Sond. in Lehm. — Greystones Rd (Mundaring); 1 ml. S. of Bull's Brook
junceum R.Br.—1 ml. S. of Bull's Brook
scandens R.Br.—5-10 ml. S. of Chester Pass, Stirling Ra.
amœnum R.Br.—Pemberton
Brunonianum Benth.—1 ml. S. of Bull's Brook
hispidum Lindl.—Greystones Rd. (Mundaring)
piliferum R.Br.,
var. *minor* Mildbr.—10 ml. W. of Ravensthorpe
schœnoides DC.—Mundaring fire tower
pubigerum Sond. in Lehm.—1 ml. S. of Bull's Brook
adnatum R.Br.—Warren R. Nat. Park

COMPOSITÆ (28 spp.)
Brachycome
lineariloba (DC.) Druce—Colona Stn., S.A.
pusilla Steetz—Pallinup R.; Greystones Rd. (Mundaring)
ciliaris (Labill.) Less.—Colona Stn., S.A.
+ var. *lanuginosa* (Steetz) Benth. —Balladonia (granite)

COMPOSITÆ (contd.)
Minuria
Cunninghamii (DC.) Benth.—Nullarbor Stn., S.A.
Olearia (10 spp.)
axillaris (DC.) F.v.M., var. *obovata* Benth.—City Beach
exiguifolia F.v.M.—Madura Stn.
ramosissima Benth.—S. of Grass Patch
pimeleoides (DC.) Benth., var. *minor* Benth.—Ceduna, S.A.
Muelleri (Sond.) Benth.—Madura Stn.
magniflora F.v.M.—Colona Stn., S.A.
paucidentata (Steetz) F.v.M.—Warren River Nat. Park; Mundaring Weir
rudis (Benth.) F.v.M.—City Beach
ciliata (Benth.) F.v.M.—S. of Grass Patch
homolepis F.v.M., var. *pilosa* A. J. Ewart—S. of Grass Patch
Cratystylis
conocephala (F.v.M.) S. Moore—20 ml. W. of Colona Stn., S.A.
Helipterum
Cotula (Benth.) DC.—City Beach
Helichrysum
ramosum DC.—Warren River Nat. Park
cordatum DC.—City Beach
Angianthus
tomentosus Wendl.—Balladonia (granite)
Gnephosis
†*sp. nov.*—Balladonia (granite)
Podolepis
nutans Steetz in Lehm.—Jane Brook (Nat. Park)
Athrixia
asteroides (Turcz.) Gardner—50 ml. W. of Ravensthorpe
nivea (Steetz) Druce—30 ml. E. of Ravensthorpe
athrixioides (Sond. and F.v.M.) Druce—Ravensthorpe
**Chrysanthemum*
**frutescens* L.—Elliston cliffs, S.A.
Senecio
lautus Soland. in G. Forst.—Head of Bight, S.A.; Esperance
**Tripteris*
**clandestina* Less.—Parliament House grounds (Perth)
**Ursinia*
**anthemoides* (R.Br.) Gaertn.—Parliament House grounds (Perth); Nth. Darnalup
**Arctotis*
**nivea* (L.) Hoffm.—City Beach (*one collection only in Melbourne*)

ENUMERATION OF LICHENS

THELOTREMACEÆ
Thelotrema
lepadinum Ach.—2½ ml. E. of Pemberton (on bark of shrubs and trees)

DIPLOSCHISTACEÆ
Urceolaria
scruposa (Schreb.) Ach. — Murrawijinie Cave, S.A. (on limestone soil)

STICTACEÆ
Sticta
?Mougeotiana Del.—2½ ml. E. of Pemberton (on logs and earth)

PELTIGERACEÆ
Peltigera
polydactyla (Neck.) Hoffm.—Shannon R. (logs and earth)

LECIDEACEÆ
Lecidea
decipiens (Ehrh.) Ach. — Colona Stn., S.A. (on sandy soil)

CLADONIACEÆ
Cladonia
retipora (Labill.) Flk.—Greystones Rd. (soil amongst granite)
aggregata (Sw.) Eschw.—2½ ml. E. of Pemberton; Shannon R. (on ground)
?lepidula Krempel — 2½ ml. E. of Pemberton (on logs and earth)
verticillata Hoffm. — 2½ ml. E. of Pemberton (on logs and earth)
Thysanothecium
hyalinum (Tayl.) Nyl.—2½ ml. E. of Pemberton (on dead wood)

PERTUSARIACEÆ
Pertusaria sp.—Pallinup R. (on *Casuarina* bark)

LECANORACEÆ
Lecanora
sphærospora Muell. Arg. — Colona Stn. S.A. (on limestone pebbles—*apparently this was known from Type only*)
sp. (indet.)—Colona Stn., S.A. (on stones and earth)
sp. (indet.)—Colona Stn., S.A. (on stones and earth)
sp. (indet.)—Colona Stn., S.A. (on stones and earth)

PARMELIACEÆ
Parmelia
physodes (L.) Ach.—2½ ml. E. of Pemberton (on wood)
quercina (Willd.) Vainio [syn. *P. tiliacea* (Hoffm.) Ach.]—Pallinup R. (on trees and wood)
?*caperata* (L.) Ach.—Pallinup R. (on dead wood)
conspersa (Ehrh.) Ach.—Greystones Rd. (on granite rocks)
congruens Ach.—Murrawijinie Cve., S.A. (on limestone soil)
hypoxantha Muell. Arg. — Colona Stn., S.A.; Murrawijinie Cave, S.A. (on sandy soil)
australiensis Cromb. — Colona Stn., S.A.; Murrawijinie Cave, S.A. (on sandy soil)
Heterodea
Muelleri (Hampe) Nyl. — Pallinup R. (moist sandy soil under *Casuarina*)

USNEACEÆ
Ramalina
calicaris (L.) Röhling—Colona Stn., S.A.; Pallinup River (on dead branches)
Usnea
florida (L.) Web. in Wigg., var. *strigosa* Ach. — Pallinup R. (on dead wood)
Siphula
coriacea Nyl. — Pallinup R.; Greystones Rd. (on sandy soil)

CALOPLACACEÆ
Blastenia
ferruginea Massal — Colona Stn., S.A. (red discs on bark of *Melaleuca pubescens*)
Caloplaca
fulgens (Sw.) Koerb., var. *bracteatum* Muell. Arg.—Colona Stn., S.A. (yellow rosettes on limestone ground)

TELOSCHISTACEÆ
Teloschistes
parietinus (L.) Norm.—Colona Stn., S.A. (on bark)
chrysophthalmus (L.) Beltr., var. *Sieberianus* Muell. Arg.—Colona Stn., S.A.; Pallinup R. (on bark)

BUELLIACEÆ
Buellia
subalbula (Nyl.) Muell. Arg.—Colona Stn., S.A. (on limestone pebbles — *apparently this was from Type only*)

PHYSCIACEÆ
Physcia
?*pulverulenta* (Schreb.) Nyl.—Colona Stn., S.A. (on bark of *Melaleuca pubescens*)

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A CRITICAL REVISION OF SPECIES IN THE GENUS *ASAROPODA* BY NEW CHARACTERS

By Tarlton Rayment, F.R.Z.S.

Introduction

The several species in this genus are robust, red-haired bees up to 17 mm. in length, with largely yellow "faces", and clearly close to *Anthophora* by the mouth-parts, pygidial plates of males and females, genitalia, and the neuration of the wings. The genus is endemic to Australia and New Guinea.

The bees have not been recorded from either Tasmania or New Zealand, and *Anthophora,* too, is absent from those countries. The author (1942) has already discussed the peculiar distribution and polylectic habits of *Anthophora* as evidence of its recent arrival in Australia.

A critical study demonstrated that *Asaropoda* probably derives from *Anthophora,* and is not of primitive origin, but rather a comparatively recent branch, losing two segments of the labial palpus, leaving it with only two segments. The wings are more or less fuliginious, the legs strong and hairy; the base of the abdomen is broad, and closely adapted to the thorax, so that there is a superficial likeness to certain bumble bees.

None of the species exhibits any greenish or bluish colour, and have little relationship to the Zonata Group of *Anthophora,* but it is clear that *Asaropoda* approaches the red-haired species such as *Anthophora scymna* Grib., and *A. rhodoscymna* Ckll., and could be derived from this group. *A. dawsoni* Raym. appears to be entirely distinct. By the genitalia, *A. punctata* Raym. appears to link the *bombiformis* group with the *albiceps* group. Certain *Anthophorae* have been included in this revision because they are not close to any other Anthophorid bees.

The species are all critical, and difficult to determine without dissection. It was found that the characters employed by the author in his critical revision of the Zonata Group held good for *Asaropoda,* consequently he prepared a number of mounts of the seventh abdominal tergum, the seventh, eighth and ninth sterna, and the genitalia. It was not possible to examine the mouth-parts of every specimen surveyed in this revision.

The bees were considered by Smith to be allied to the European genus *Saropoda,* and *bombiformis* was so described, but later

Professor T. D. A. Cockerell included the species in *Anthophora*. However, microscopical examination showed them to be distinct, and he proposed the genus *Asaropoda*. It will be observed that *Asaropoda* has the "copulatory gauges" of *Anthophora* (Rayment 1942) consisting of the striated pygidial plate of the female and the bidentate plate of the male. The study of the genitalia revealed that the northern and the southern species are in two distinct groups, one possessing the genitalia of the typical Anthophorid and the other the genitalia of the Zonata Cluster.

Professor T. D. A. Cockerell (1929) had already remarked that several species have passed as *A. bombiformis* because of the strong superficial likeness, and the several collections which passed under the author's hands demonstrated the necessity for a critical revision of the species, since the insects had been labelled "*Asaropoda bombiformis*" by various workers both here and abroad. In this paper the abdominal segments are numbered morphologically.

The author is indebted to the courtesies of the authorities of the several Australian Museums for permission to study the material in their collections, and to the many correspondents who have taken specimens over a wide area of the Commonwealth, and their names are recorded under each species. The notes on the architecture of *A. rufa* were supplied by the original discoverer of the only cells known to the science.

The research was assisted by a small grant from the Trustees of the Science and Industry Endowment Fund, and the author desires to acknowledge the support accorded by the Chairman, Sir David Rivett, to his researches in the Australian APOIDEA.

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Rayment, Tarlton. A Cluster of Bees, p. 389, 1935.
——, Ibid, p. 15, 393.
——, A Critical Revision of the Zonata Group in the Genus Anthophora, Treubia, Japanese Edition, p. 16, 1942.
——, Ibid, p. 15.
——, Victorian Naturalist, Vol. 65, p. 250, 1949.

Taxonomic Position

Saropoda Latreille

Gen. Crust. and Insect., IV, p. 177, 1809.

Sarapoda bombiformis Smith, Cat. Hym. B.M., II, p. 318, 1854.

Anthophora Latreille

Hist. Nat. Cr. et Ins., XIV, p. 45, 1808.

Anthophora bombiformis Dours, Monogr. Icon. Anthophora, p. 202, 1869.

Saropoda Latreille

Saropoda bombiformis Cockerell, Ann. Mag. Nat. Hist. (7), XVI, p. 296, 1905.
Saropoda alpha Cockerell, Ann. Mag. Nat. Hist. (7), Vol. XIV, p. 204, 1904.

Asaropoda Cockerell

Ann. Mag. Nat. Hist. (9), Vol. XVIII, p. 216, 1926.

Asaropoda Cockerell

Aust. Zool., Vol. VII, Pt. I, p. 34, August, 1931.

Asaropoda Rayment

A Cluster of Bees, p. 384, 1935.

Although Cockerell (Aust. Zool.) gives six segments for the maxillary palpus and two for the labial palpus, examination by the author of these organs in *A. anomala* Ckll. reveals only five segments in the maxillary palpus. *Anthophora* has, of course, four segments, in the labial palpus, and six in the maxillary.

The specimen examined by Cockerell was taken at Studley Park, Melbourne, Victoria, and was very probably *A. albiceps* Raym.; *Saropoda* has four segments in the maxillary, and only two in the labial palpus.

Gross Morphology

Head is small in comparison with the bulk of the body, the "face" with much yellow hair; compound eyes large and bulging in both sexes; ocelli in a low curve; scape short, somewhat dilated, and often yellow, flagellum long and sub-moniliform; glossa attenuated, and bearing a number of spatulate setae as in *Anthophora*. The generic character is found in the labial palpus, which has but two segments, the basal one excessively long and slender; maxillary palpus of five or six segments, the basal one excessively short, the second long and slender, the others short; labrum large, pale-yellow and quadrangular; mandibles bidentate, mostly yellow in colour; the maxillary combs are well developed, as in *Anthophora*.

Thorax large and strong, with a punctate sculpture but, like the scutella, hidden under the dense foxy-red fleece, so that characters of any value cannot be investigated without removing the hair; the metathorax is similarly masked, but even after the hair is removed, there is no sculpture or other characters of specific value; tegulae large, but typical of the Family.

Abdomen strong, ovate, and broadly adapted to the thorax; tegument reddish or blackish, with the hind margins of the abdominal segments somewhat paler, the whole body covered with dense reddish hair (on the southern species the hair of the head is usually white); there is a blackish band on tergum three; critical specific characters lie in the apical segments of the abdomen, but these can be studied only after dissection.

Legs stout and strong, the hind pair carrying dense scopae of harvesting-hair, which is usually black on the inner surface; basitarsi broad and powerful and, like those of *Anthophora* have no "pad" or empodium between the claws. The antennal cleaner, the strigilis, of the anterior legs has a large convex velum; there is a broad patella, or knee-plate, on the median legs; the calcariae of the posterior legs are finely serrated, and very strong, but without the coarse teeth of other earth-digging bees.

Wings are large and strong, subhyaline, or infuscated, with large areas naked, but apically there are many short papillae, and along the costal region a few long black hairs; pterostigma inconspicuous; radial cell somewhat truncated at the end; the three cubitals sub-equal, the second receiving the first recurrent nervure at about the middle, the third intercubitus nervure usually meeting the second recurrent; the twenty or more hamuli are strongly developed, and indicate a long range of flight.

Architecture

The only cells hitherto described are in the collection of the author, and were found in February, 1932, in heavy black soil at Earlwood; in hard yellowish clay at Clovelly; in fine sand among grass-roots at Thompson's Bay. Some of these at least were built by *Asaropoda rufa* Raym. All the localities are in New South Wales.

The entrance ranges about 9 mm. in diameter, and leads to a shaft about 10 cm. in length and which gives access to some ten or twelve oval "mud" cells, none of which is connected. The material is not actually mud, for the "dross" has all been removed, and the refined residue of minute pebbles is incorporated with a secretion of the salivary glands. The cells measure 23 mm. at the long axis, and 16 mm. at the short axis, and are considerably lighter in weight than a similar volume of earth. (Rayment, 1935.)

Each cell has four walls, the outer rough one, the third of a smooth brown material of unknown composition, a thinner brown one like paper, and the interior one of a pale creamy nature, but the author could not determine conclusively whether or not a primitive wax had been used for the innermost lining. He has proved that such a material is used by *Anthophora,* and suspects that *Asaropoda* has a similar habit. The total thickness of the wall is about 4 mm.

The bees seem to prefer to "nest" in the shade afforded by a ledge of rock, or even the root of a tree, and often in the vicinity of shafts of *Anthophorae,* although the "blue-bands" choose a sunny position nearby. Tests of the cell-material made with diluted nitric acid produced no ebulition, and there does not appear to be any lime or mortar in its composition. The cells of *Anthophora,* when subjected to a similar test, produced a strong ebulition, for they contain considerable lime in their composition.

Early in March, 1949, Rica Erickson, of Bolgart, Western Australia, a valued correspondent who has contributed much to our knowledge of the bees of the West, discovered a fine large female searching for her "nest" in loose sand. After a survey of the locality, the bee dived down into a shaft in a small tussock of dry reeds.

This observer investigated the shaft and found that the entrance was a short turret built of the tougher bright-red subsoil, the diameter of the shaft being about 10 mm.; the particles appeared to be cemented together with a biological secretion, probably from the salivary glands, but whether from the thoracic or the cephalic systems could not be determined. Such a firm structure appeared to be essential, for the strengthening of the shaft, owing to the friable nature of the soil. The bee had not commenced to build the cells at that date, and the rather large shaft went down in a slightly winding curve for 12½ cm. and terminated on a concave base. This is the first observation on these bees recorded for the far western State.

Behaviour of the Individual

These large robust bees are capable of excavating tough clayey ground, but they dig successfully in several other types of soil. Rica Erickson sends the following note on the behaviour of the female:

"She flew low over the ground in a swift but peculiar flight, now hovering, now darting, obviously searching for her nesting hole; after some hesitation she discovered it about a foot farther on, amid a similar tussock of reeds. All the time she maintained an exceedingly high buzzing obligato."

The egg of *Asaropoda* is large, measuring about 4·5 mm. at the long axis, with a diameter of 2 mm. approx. Like most eggs of bees they increase in size just before hatching, and the larvae of both host and a parasite feed on the store of a rather dry batter of honey and pollen, plus a little biological secretion.

Philip Whitely, another of the author's correspondents, has observed certain habits of the bees. The males assemble at night, often in the company of blue-banded *Anthophorae,* and arrange themselves along a dry stalk of grass, bending it with their weight. The bees grasp the stem with their mandibles, and rest throughout the night with the body held out almost at right angles to the support. This remarkable attitude is characteristic of other Anthophorid bees in America.

Whitely said that one night a violent hailstorm swept the district of Marrickville, N.S.W., and next morning he found that the hailstones had decapitated many Anthophorid bees assembled, the heads being still attached to the stalk; the headless bodies scattered over the ground. Some of these were *A. rufa* Raym., and others were probably *A. bombiformis* (Sm.).

F. E. Wilson, the well known Melbourne coleopterist, once observed a number of *Asaropodae* flying in company about the

flowers of mistletoe, *Loranthus* sp., at Melton, Victoria, but there is reason to believe that the bees visit a wide range of other plants, including the Antignon vine; Begonia sp., an introduction to Queensland; and Wandoo, *Eucalyptus redunca,* in West Australia. Pollens from many species have been recovered by the author from the fleece of the bees.

Commensals and Parasites

At Bolgart, Rica Erickson observed a large fly in close attendance on the bee digging its shaft. "In flight the fly certainly had a superficial resemblance to the bee, for it had a long dense fleece of similar golden hair." The fly proved to be a handsome specimen of *Bombylius*, and there is little doubt it is parasitic in the nests of the red-haired bees.

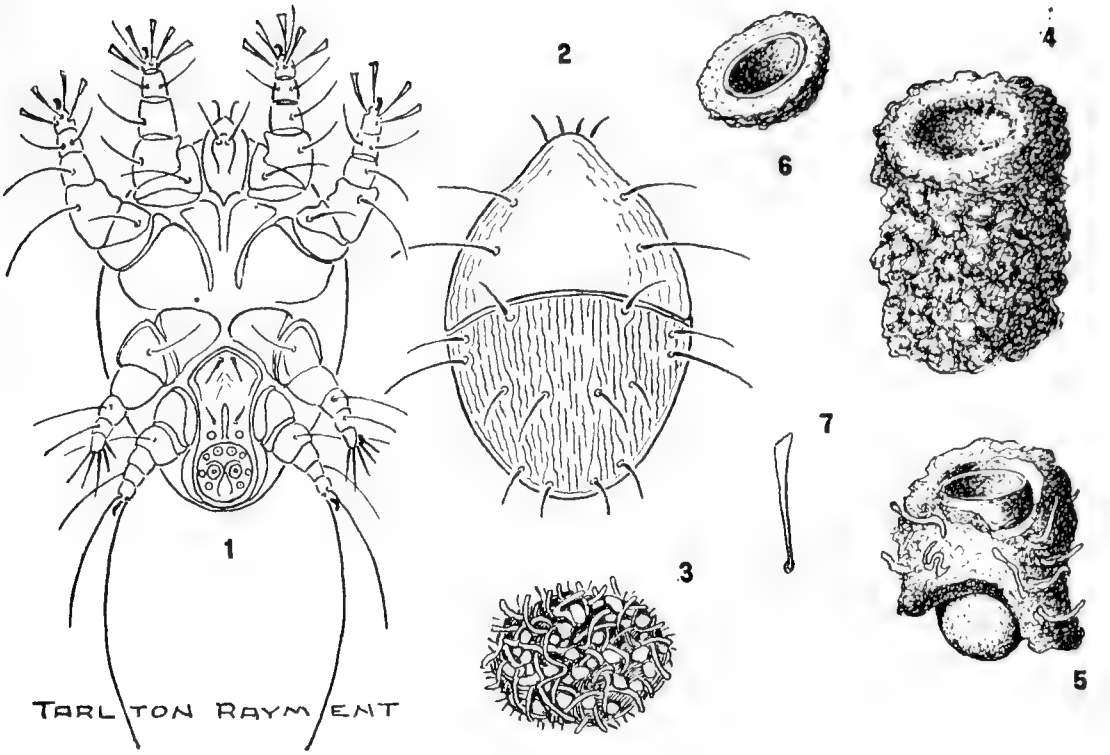
The complete literature on the genus is not available to the author, and he is unable to determine the species, but the following brief description will assist in the identification of the fly.

Length 10 mm. approx.; width of abdomen 5·5 mm., overall length of expanded wings 24 mm.; the insect is covered with dense long reddish-gold hair; arista black; with much long black hair; vertex with long hair about the ocelli; a long-oval depression on a dull-black almost naked area of the mesonotum; abdomen with black integument, but terga with a lateral broad reddish-amber band, and conspicuous long black hair among the golden fleece; on the ventral surface the hair is pale lemon; the very long slender legs are of a golden colour; tarsi black with black hair; wings sub-hyaline, the nervures typical of the genus; halteres clavate, golden-yellow; squamae golden-amber.

The author has reared Tachinid flies, *Miltogramma,* from cells of the blue-banded *Anthophorae*, and as many as five red pupal-cases have been present in one cell; there is no doubt that Anthophorid bees suffer from a heavy infestation of Dipterous parasites.

The most common parasite is probably the blue-spotted bee in the genus *Crocisa*, and specimens taken by Whiteley, at nests in Marrickville, near Sydney, proved to be *C. lugubris* Sm., and a new subspecies. The parasites loiter about the vicinity with a soft noiseless flight and, when the *Asaropoda* departs, descends to the cells to deposit the egg, which measures about 2·8 mm. at the long axis, with a diameter of 1·5 mm. at the short. The two eggs were present on one pudding. *Anthophora,* too, is pestered by these spotted parasites, and the young bees which emerge from such cells are mere dwarfs, owing to the depleted supply of food.

The author has taken only a few acarine mites from the fleece of certain *Asaropodae*, and of the many hundreds of Anthophorid bees studied by him, only about 1 per cent harbour these universal parasites. It would appear then that, in Australia at least, Anthophorid bees enjoy a remarkable freedom from these small pests,



1. Ventral view of a new Tyroglyphid mite.
2. Dorsal view showing the striations.
3. A parasite of *Asaropoda rufa* that had woven the hairs and indigestible portions of the chitinous plates of the bee into a strange cocoon.
4. Portion of the shaft built by *Asaropoda rickae* sp. nov.
5. The rough mud broken away from a cell of *Asaropoda rufa* to show the smooth inner cell.
6. The cap of the cell.
7. A long spatulate seta from the mite.

and the reason for this is not known. It is interesting to learn that the very different reed-dwelling simple social bee, *Exoneura,* enjoys a similar freedom from mites. (Rayment, 1949.)

I am indebted to Mr. H. Womersley, South Australian Museum, Adelaide, for his determination of the mite. It is a new species of *Tyroglyphus,* near to the ubiquitous *T. farinae* L., but may be separated by the striated hysterosoma (it is pitted in *farinae*), and the outer spatulate setae being longer than the inner. Womersley will later publish a full specific description.

Descriptions of New Species

Asaropoda albiceps, sp. nov.

Type, Male. Length 13 mm. approx.

Head covered with white hair; clypeus yellow, with two black lines laterally, the wide lateral yellow marks slightly higher than clypeus; a very large supra-

clypeal mark; antennae missing; mesothorax with buff hair lightly tipped with black; terga black, wide amber margins, much buff-red hair; sterna black and amber; legs reddish with buff-red hair; the black hair of the inner surface of basitarsi visible laterally as a black fringe; second cubital cell almost quadrate. The black band on abdomen more defined than on a female which seems to agree.

Allotype, Female. Length 15 mm. approx.

Head covered with deep-buff hair; clypeus yellow, with two wide bars of suffused amber; no supraclypeal or lateral marks; antennae dark above, reddish beneath; mesothorax with buff-coloured hair tipped with black; terga black with wide red margin, the dense hair redder than thoracic fleece; sterna black with wide ferruginous margins; some black hair above the pygidial plate, which has a narrow rim and striae persisting throughout; tegument of legs dark-brown, hair red. Wings sub-hyaline, second cubital cell narrow, much contracted at top. There is some doubt of this association with the male.

Locality. Studley Park, Melbourne, Victoria. Chas French, Junr.

Allies. Approaches *dentiventris* Raym. and *victoriensis* Raym.

Asaropoda albigena Raym. stat. nov.

Jour. Roy. Soc. West. Aust., Vol. XVII, p. 182, 1930-1931.

Male. Length 12 mm. approx. The whole insect covered with a fleece of reddish-yellow hair.

Head small, scape yellow in front, flagellum black, obscurely red beneath; third segment of antennae long and slender; genae with conspicuous long white hair; mesothorax with some black hair intermixed; margins of abdominal terga broadly red; large contiguous punctures on mesothorax; pygidial plate short, dentate.

Locality. Lander Station, West Australia. H. Newman?

Allies. Clearly close to *albiceps* and *rickae.*

Asaropoda alpha Ckll., stat. nov.

(Smith's *var. A.* of *bombiformis*)

Ann. Mag. Nat. Hist., Ser. 7, Vol. XIV, p. 204, 1904.

Male. Length 10-11 mm. approx.

Head small, clypeus laterally with a broad black band on the yellow; flagellum ferruginous beneath; legs blackish, with much orange hair, except on posterior tarsi, where hair is entirely black; some black hair adjacent to pygidial plate, which is dentate.

Female not known.

Locality. Toowoomba and Mackay, Queensland. Coll. not known.

Asaropoda anomala Ckll., stat. nov.

American Museum Novitates, No. 346, p. 14, 1929.

Male. Length 12 mm. approx. The largest and reddest species of the group.

Clypeus yellow, with a marginal black dot laterally; lateral marks suffused with orange and not quite so high as clypeus; supraclypeal mark ivory-yellow; third antennal segment short and thick; scape yellow, flagellum blackish; a few black hairs among the very red ones of the mesothorax; terga with much dark-red hair and a conspicuous black band on second tergum; legs largely red, with some black hair on the inner surface; pygidial plate obtusely bilobed (not

distinctly angled as in *bombiformis*, for which it would be taken on casual inspection: Cockerell).

Locality. Brisbane, Queensland. H. Hacker?
Lismore, New South Wales. Dudley Townley.

Female. Length 17 mm. approx.; larger than *bombiformis.*

Head small; clypeus suffused with reddish, no lateral or supraclypeal mark; the dark antennae long, third antennal segment long and slender; scape ferruginous; red hair of mesothorax with a few black hairs intermixed; the hairs on the abdominal terga are lighter on the anterior half; sterna black; considerable black hair about the pygidial plate, which has a fine rim and striae persisting throughout.

Locality. Lismore, New South Wales. Dudley Townley.

Asaropoda bombiformis (Sm.), stat. nov.

Cat. Hym. B.M., II, p. 318, 1854.

Male. Length 12 mm. approx. Smaller, and not so rufous as *anomala.*

Clypeus yellow, two suffused amber bars laterally, and a black dot; yellow lateral face-marks as high as clypeus, a large yellow supraclypeal mark; scape yellow, flagellum dark; mesothorax with much black hair among the buff-coloured hair; terga black, margins obscurely lighter, with much golden hair, a conspicuous black band on tergum three; sterna ferruginous, with a black dot; pygidial plate dentate, no black hair about the pygidial plate. Legs very light ferruginous in certain lights; wings sub-hyaline, the large second cubital cell almost quadrate.

Female. Length 16 mm. approx.

Head small; clypeus suffused with reddish; no lateral or supraclypeal marks; scapes and flagellum beneath ferruginous; disc of mesothorax with less hair, so that the sculpture is evident; the black band of the terga is very conspicuous; no black hair about the pygidial plate, which has the striae failing over a large area. Legs dark-red, with much black hair on inner surface. Wings sub-hyaline, the large second cubital cell contracted at top.

Locality. Sydney, New South Wales, Feb., 1942. Rayment.
Hunters Hill, Sydney, 20th March, 1940. L. Robertson.
Lismore, New South Wales, 13th March, 1940. Dudley Townley.
Sydney, New South Wales. Owen Dawson.
Richmond River, New South Wales?
Magnetic Island, Queensland. J. Stewart.
Toowoomba, Queensland? } Recorded by H. Hacker.
Brisbane, Queensland? } Recorded by H. Hacker.
Buderim Mountain, Queensland? } Recorded by H. Hacker.
Montville, Queensland? C. Borch.
Binaturi River, New Guinea? Included by Cockerell.

This last recorded by Cockerell, but all the six must be doubtful, since both authors had more than one species.

Allies. A. anomala Ckll., *A. rufa* Raym., and *A. rubricata* Raym.

Asaropoda dentiventris, sp. nov.

Type, Male. Length 7 mm. approx. The smallest male in the group.

Hair of head white; clypeus ivory-yellow, lateral marks a trifle below apex of clypeus, a large supraclypeal mark of similar colour; antennae dark-brown above,

flagellum reddish beneath; scapes yellow beneath; mesothorax with reddish hair, a few black-tipped; terga black, obscurely lighter on margins, much foxy-red hair; sterna black with wider amber margins; sixth sternum with a pair of lateral teeth (see Fig. 2, Pl. 5); legs red, with much foxy-red hair; the dark hair of the inner surface visible laterally as a black fringe; the fifth sternum has a sharp tooth laterally. Second cubital small and much contracted at top.

Female not known.

Locality. Broadmeadows, Victoria, 5th October, 1922. F. P. Spry.

Allies. Closely allied to *albiceps* Raym. and *victoriensis* Raym.

Asaropoda imitata, sp. nov.

Type, Female. Length 15 mm. approx.

Head covered with foxy-red hair; clypeus yellow, suffused with amber; not any lateral or supraclypeal marks; stout scapes reddish-amber, flagellum reddish beneath, darker above; mesothorax with buff-red hair and many black ones intermixed; about the tegulae the hair is bright-orange; terga black, margins obscurely reddened, much appressed red hair, among which is a few long black ones; a black spot of hair above the pygidial plate which has the striae absent on a narrow median line; sterna brownish-black; the black band and hair on the abdomen is very distinct; legs reddish with much red hair, blackish on inner surface; wings very pale; large second cubital cell almost quadrate.

Male not known.

Locality. New South Wales. Rayment Coll.

Allies. Plainly very close to *rufa* Raym., *rubricata* Raym., and *bombiformis* (Sm.).

Asaropoda meltonensis, sp. nov.

Type, Female. Length 16 mm. approx.

Hair of head white; clypeus yellow, suffused with amber; a wide thin supraclypeal mark; obscure lateral marks; scape excessively short, flagellum brownish-black; mesothorax covered with foxy-red hair, not any black; abdomen with reddish-brown terga and sterna, and much red hair; copious black hair about the apical segments; pygidial plate with striae persisting throughout; legs with similar red hair on red tegument; wings sub-hyaline, second cubital cell large, almost quadrate, slightly contracted at top. Mouth-parts could not be examined.

Male not known.

Locality. Melton, Victoria. F. E. Wilson.

Allies. Approaches *albiceps* Raym., but not very close.

On flowers of mistletoe (*Loranthus* sp.).

Asaropoda punctata Raym., stat. nov.

Jour. Roy. Soc. West Aust., XVII, 1930-1931.

Type, Male. Length 13 mm. approx.

Head small, with much long buff hair; clypeus butter-yellow, white hair; lateral yellow marks higher than clypeus; large yellow supraclypeal mark; scapes yellow in front, flagellum dark above, reddish beneath; hair of genae and pleura white; mesothorax with sparse buff-coloured and black hair; terga black, margins amber, much dull ferruginous hair, a few long black ones; sterna dark-amber; black band of abdomen but little evident; legs red, hair red, only a few

black hairs on inner surface. Wings almost clear, second cubital cell narrow, higher than wide, and contracted at top. Mouth-parts could not be studied.

Female not known.

This and *albiceps* are the lightest-coloured of all the group.

Locality. Brisbane, Queensland, 2nd March, 1923. Cedric Deane.

Allies. By the genitalia, *punctata* appears to link the two groups, *albiceps* and *bombiformis*.

Asaropoda rickae, sp. nov.

Allotype, Female. Length 14 mm. approx.

Hair of head ivory and pale-buff, with many long black hairs intermixed; clypeus yellow, with a wide black bar laterally, and which, taken with a nude area above, form a horse-shoe design; no lateral or supraclypeal marks; the silvery hair of the genae is very conspicuous; scape and flagellum all black, the third segment of the antennae exceedingly long and slender; mesothorax with dense straw-coloured, buff, and black hair, so that the disc appears to be grey in colour; about the tegulae the hair is bright-orange; terga black, obscurely lighter on margins, and covered with a dense fleece of buff-coloured hair; sterna black, with amber margins; much black hair about the pygidial plate which has no rim and striae persisting throughout; legs brownish-red and black, with much deep-buff hair, tarsi reddish. Wings sub-hyaline, the small second cubital cell greatly narrowed at top; there is an enclosed deeply infuscated appendicular cell.

This may prove to be the other sex of *albigena*.

Locality. Bolgart, West Australia, 26th March, 1949. Rica Erickson.

Allies. The yellowest in colour of all the group.

Taken at "nest." (See notes under headings Architecture and Behaviour.)

[A female, *Anthophora flava*, was described by Friese (Deutsch. Ent. Zeitschr., p. 448, 1911) from Fremantle, Western Australia. From the description, this species apparently approaches the *albigena* group of *Asaropoda*; the tegument of the abdomen is black, and the dense fleece yellowish in colour; legs, clypeus, mandibles, labrum, and tegulae yellow. The author has no bee conforming to the description, and since Friese does not include any critical characters (he said it resembled *Anthophora bombiformis*), only this brief reference can be included.

The same author also described *Anthophora rufescens* Fr., which is said to be related to *A. bombiformis* Sm., but Cockerell (Australian Zoologist, Vol. VII, Part I, p. 35, 1931) suggests that it "is evidently very close to *A. rhodoscymna* Ckll. *A. scymna* Grib. has the abdominal terga black.

Neither of Friese's types was available for study; no dissections appear to have been made, and in the absence of figures of critical characters the author is unable to determine their true relationships. These bees have been mentioned here because they could not be included in the author's critical revision of the Zonata group of *Anthophora*.]

Asaropoda rubricata, sp. nov.

Type, Male. Length 11 mm. approx.

Head small, with pale ferruginous hair; clypeus and supraclypeal mark yellowish-ivory, a suffused area laterally on the former; lateral face-marks paler, and higher than clypeus on orbital margin; scape yellow, flagellum blackish, reddish beneath; clypeus with much black hair; mesothorax with sparse buff-coloured hair intermixed with many black ones; abdominal terga with the black band marked with much long black hair, and margins lighter; sterna clear-ferruginous, with much red hair. Legs ferruginous, with copious red hair; only a few black hairs on the inner surface. Wings reddish, the small second cubital cell contracted at top, higher than wide.

The general aspect is redder than *bombiformis* but not so red as *anomala.*

Female. Length 14 mm. approx.

Hair of head reddish-yellow to pale-buff, no lateral face-marks; the supra-clypeal mark almost obsolete; clypeus deeply suffused with amber, copious black hair; scape black, flagellum black above and reddish beneath; mesothorax with many black hairs among the pale ferruginous ones; the black hair conspicuous about the tegulae; terga of abdomen black, with red hair, but two black bands are clearly defined; not any black hair about the pygidial plate; sterna black and ferruginous; pygidial plate with a narrow rim and striae persisting through-out; legs ferruginous, with red hair; wings reddish, the small second cubital cell higher than wide, contracted at top. This association of the sexes may not be correct.

Locality. Lismore, New South Wales, 9th March, 1940. Dudley Townley.
Lismore, New South Wales, 20th May, 1940. Dudley Townley.
Parramatta, New South Wales, February, 1933. N. A. Hall.

Taken on flowers of *Antignon* vine.

Asaropoda rubricata dentata, subsp. nov.

A male from Sydney is not typical. Hair of frons white; the black fringe of the posterior legs, especially the basitarsi, is very conspicuous; pygidial plate with a small tubercle between the two short stout teeth; wings distinctly yellowish, the small second cubital cell almost quadrate, a small enclosed appendiculate cell; mesothorax has much black hair among the yellowish hair.

Location. Sydney, New South Wales, 7th February, 1943. Owen Dawson.

Asaropoda rufa Raym., stat. nov.

Jour. Roy. Soc. West Aust., Vol. XVII, p. 181, 1930-1931.

Male. Length 13 mm. approx.

Hair of head with a large amount of black among the orange-red hair; yellow of face suffused with reddish; supraclypeal mark deeply so; lateral face-marks as high as clypeus, which has much long black hair, and two longitudinal bars suffused with reddish; scape yellow, flagellum reddish beneath; mesothorax with bright ferruginous hair, many long black ones intermixed; terga black, broadly lighter margins, much appressed ferruginous hair with a few long black ones; venter clear-ferruginous; legs red, basitarsi long, the black hair of the inner surface shows laterally as a fringe against the ubiquitous red hair; wings yellow, second cubital cell slightly higher than wide.

This species is redder than *bombiformis* but not so red as *anomala.*

The type, male, was taken at Enoggera, Queensland—not Sydney, New South Wales, as given in the original description. Specimens from the latter locality are not quite typical.

Female. Length 16 mm. approx.

Head very small, and covered with bright-ferruginous hair, among which is a number of black ones; clypeus yellow, suffused with amber; not any lateral marks; supraclypeal mark so deeply suffused as to be almost obsolete; antennae reddish beneath, slightly darker above; mesothorax with many black hairs among the foxy-red fleece; terga black, with wide golden margins; sterna similar, much orange-red hair; in a certain light each of the terga show a blackish band; no black hair about the pygidial plate, on which the striae fail over a large area; wings yellowish, second cubital cell large and almost quadrate.

The pattern of the pygidial plate is after the manner of *Anthophora longmani* Raym.

The sexes may not be correctly associated.

Locality. Lismore, New South Wales, 1st January, 1940. Dudley Townley.
Hunters Hill, Sydney, 20th March, 1940. L. Robertson.
Ennogera, Queensland, 27th December, 1912. Coll. not known.
Marrickville, Sydney, 6th January, 1931. Phillip Whiteley.

Allies. Plainly close to *bombiformis.*

Taken at "nest" in the ground. (See description of the Architecture.)

Asaropoda victoriensis, sp. nov.

Type, Male. Length 8 mm. approx.

Head covered with white hair; clypeus ivory-yellow; two wide short black bars laterally, lateral face-marks wide, and a trifle lower than the clypeus; antennae dark-brown, but scape yellow in front; mesothorax with foxy-red hair and a few black ones intermixed; terga black, margins obscurely lighter; two basal segments have copious black hair-bands, but all others covered with dense foxy-red hair; sterna brownish; legs dull-reddish, hair red, but blackish on inner surface. Wings almost clear, the second cubital cell almost quadrate.

Female not known.

Locality. Broadmeadows, Victoria, 1st January, 1918. F. P. Spry.

Allies. Clearly in the *albiceps* and *dentiventris* group.

Anthophora dawsoni, sp. nov.

Male. Length 18 mm. approx., the smallest specimens 15 mm. Red and black.

Head transverse, with pale fulvous and white hair; face-marks lemon-yellow, lateral marks separated from the clypeus by a black undulating mark like that of *Anthophora zonata*; black frons with scattered coarse punctures; clypeus lemon-yellow, with two pale-amber longitudinal lines, white hair; supraclypeal area a wide low triangle of yellow; vertex rugose, with long pale fulvous hair; compound eyes large, claret; genae with dense fulvous hair fading to white near mandibles; labrum square, yellow, very coarsely punctured, with two black nodules on anterior margins; mandibulae yellow, blackish apically; black antennae, with yellow patch on front of scape; segments well marked.

Prothorax with dense fulvous short hair; tubercles fulvous; mesothorax with numerous large shallow punctures under a dense mat of plumose reddish hair; beneath the hair is paler; scutellum and postscutellum with a like mass of fulvous hair; metathorax masked with similar red hair; ventral segments with whitish hair; abdominal dorsal segments of a rich reddish-brown tegument; 1 with a mass of fulvous hair as on mesothorax; 2-6 with lighter margins, and coarse appressed black hair; 7 like an oblong plate with two nodules laterally.

Legs dark-reddish, with amber hair on anterior and median pairs; much long black hair on posterior pair; tarsi reddish, with close fulvous hair on anterior, black on posterior; claws dark-reddish; hind calcar black, finely serrated, pale apically; tegulae reddish-amber, polished.

Wings suffused with a beautiful dark dusky-purple iridescence; nervures heavy and black; third cubital cell almost quadrate; pterostigma blackish, inconspicuous; hamuli powerful, about 24.

Locality. Onslow, North-West Australia, 2nd August, 1944. Owen Dawson.

Type in the collection of the author.

Allies. A very distinctive bee, resembling some of the *Chalicodoma* of Europe. Genitalia typical of the genus. Easily known by the dark wings and reddish-brown body.

CRITICAL REVISION OF GENUS *ASAROPODA*

Explanation of Plate I

No. 1. Pygidial plate of female *Asaropoda bombiformis* (Sm.).
2. The plate of *A. anomala* Ckll. has the striae persisting throughout except over a wide rim.
3. The striae persists over the narrow rim in *A. rubricata,* sp. nov.
4. Striae fails over a wide band on *A. rufa* Raym.
5. *A. imitata* has the striae failing on a narrow median line.
6. The plate of *Anthophora grisescens* Raym. has a high median rise with striae persisting throughout.
7. There is no rim, and striae persists over plate of *Asaropoda meltonensis,* sp. nov.
8. There is a narrow rim on *Asaropoda albiceps,* sp. nov.
9. Striae persists over a low narrow rim on *Anthophora rhodoscymna* Ckll.
10. Striae fails entirely but there is an elevated area on *Anthophora calva* Raym.
11. Striae persists over a low narrow rim in *Anthophora preissi froggattii* Ckll. The plates of *Anthophorae* Nos. 6 and 10 are illustrated here because they could not be included in the blue-banded *Zonata* Group, being nearer to *A. rhodoscymna* Ckll.

12-17. There is a distinctive patch of black hair on fifth abdominal sternum of *A. anomala* Ckll. (All at the same magnification, but allowance must be made for distortion by pressure of the cover-glass.)

18. Eighth tergum of male *Asaropoda rubricata,* sp. nov.
19. Anterior wing of mutation showing stump on second intercubitus nervure.
20. Posterior wing.
21. The twenty-two hamuli indicate strong flight.
22. Much of the wing area is nude, but apically there are alar papillae; a few stiff hairs are in the costal region.

Explanation of Plate II.

Eighth Tergum and Genitalia of Males

1-2. *Asaropoda bombiformis* (Sm.)
3-4. *Asaropoda anomala* Ckll.
5-6. *Asaropoda rubricata, sp. nov.*
7-8. *Asaropoda rufa* Raym.
9-10. *Asaropoda albiceps.*

11-12. *Asaropoda victoriensis,* sp. nov.
13-14. *Asaropoda dentiventris,* sp. nov.
15-16. *Anthophora rhodoscymna* Ckll. is closer to *Asaropoda* by the genitalia pygidial plate.
17-18. *Anthophora dawsoni* Raym. is unlike other Australian species, for the pygidial plate has an almost straight margin, after the manner of certain American Anthophorid bees, such as *A. edwardsii* Cresson.

Explanation of Plate III

Eighth Abdominal Sternum of Males

1. *Asaropoda bombiformis* (Sm.)
2. *Asaropoda anomala* Ckll.
3. *Asaropoda rubricata,* sp. nov.
4. *Asaropoda rufa* Raym.
5. *Asaropoda albiceps,* sp. nov.
6. *Asaropoda victoriensis,* sp. nov.
7. *Asaropoda dentiventris,* sp. nov.
8. *Anthophora rhodoscymna* Ckll.
9. *Anthophora dawsoni* Raym.

By the genitalia of the males 2, 4, 6, 8 are definitely closely related, and approach typical *Anthophora,* but 10, 12, 14 are farthest away, and constitute a distinct group.

The eighth tergum of the males is bidentate, with 14 approaching the form of *Anthophora dawsoni*; that of *Anthophora rhodoscymna* is distinct, having an undulate margin.

Explanation of Plate IV

Seventh and Ninth Sterna of Males

1 and 2. *Asaropoda bombiformis* (Sm.)
3 and 4. *Asaropoda anomala* Ckll.
5 and 6. *Asaropoda rubricata,* sp. nov.
7 and 8. *Asaropoda rufa* Raym.
9 and 10. *Asaropoda albiceps.*
11 and 12. *Asaropoda victoriensis,* sp. nov.
13 and 14. *Asaropoda dentiventris,* sp. nov.
15 and 16. *Anthophora rhodoscymna* Ckll.
17 and 18. *Anthophora dawsoni* Raym.

By the ninth sternum 2, 4, 6, 8 are in one group, with the plate short and wide, and 10, 12, 14 are in the second group, with the plate long and narrow, as in the Zonata Group of *Anthophora.*

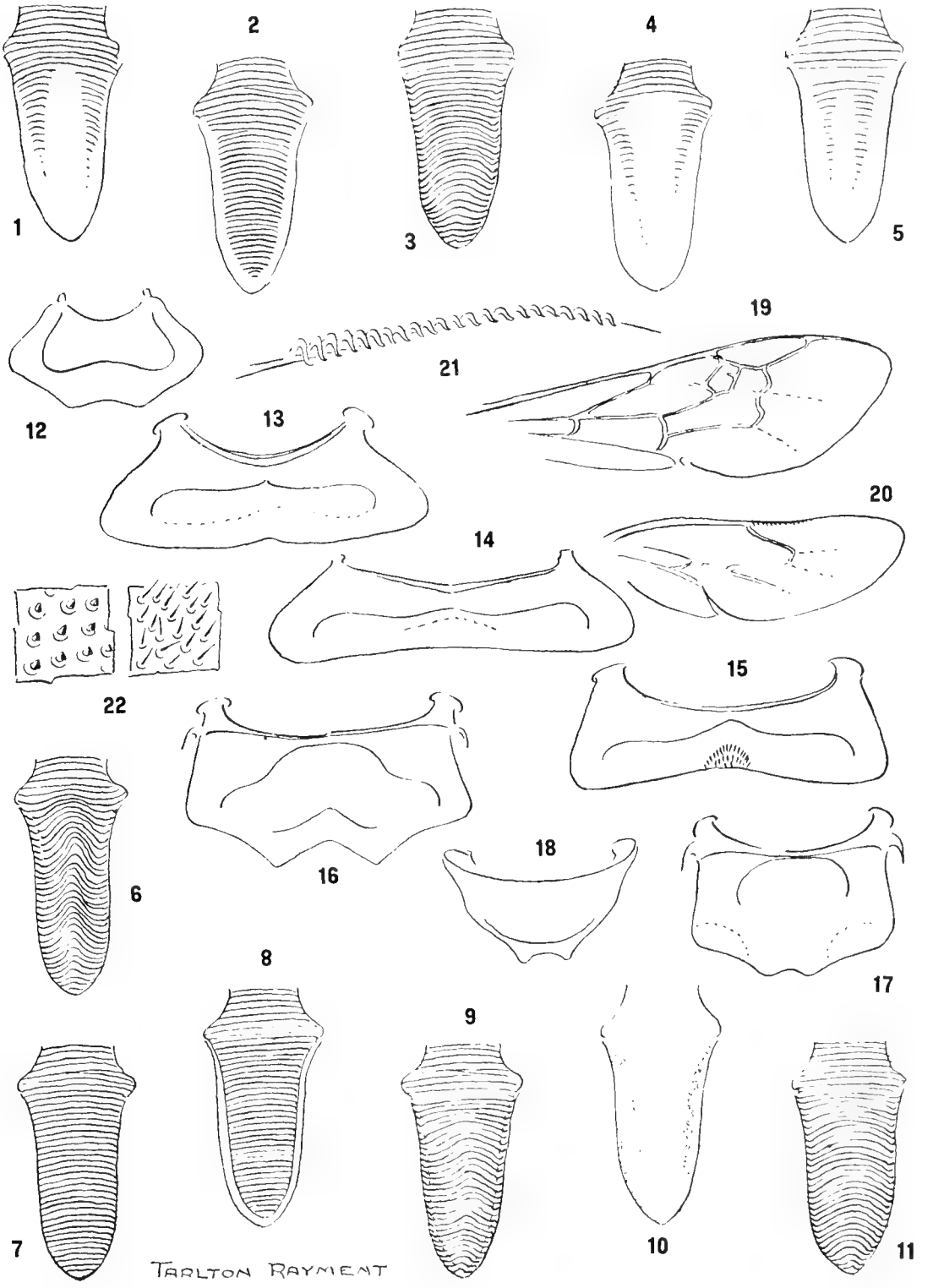
The gradulus of the seventh sternum also shows close affinity, except in the case of 17, where the large plate is quite distinct, and only 13 shows any approach to this form.

A. rufa is close to *A. anomala,* but *A. rubricata* is closer to *A. bombiformis.*

Explanation of Plate V

1. Front of head-capsule of female *Asaropoda rickae,* sp. nov. Note the horse-shoe pattern.
2. Sixth sternum of *A. dentiventris,* sp. nov.
3. Seventh sternum of *A. punctata* Raym.
4. Sixth sternum of *A. victoriensis,* sp. nov.
5. Pygidial plate of female *A. imitata,* sp. nov.

6. Pygidial plate of female *A. rickae,* sp. nov.
7. Bouton, or spoon, at apex of glossa of male *A. anomala* Ckll.
8. Eighth sternum of male *A. punctata* Raym.
9. Strigilis of male *A. anomala* Ckll.
10. Maxilla with comb and maxillary palpus.
11. Maxillary palpus more highly magnified.
12. Dentate pygidial plate of male *A. punctata* Raym.
13. Posterior calcar of male.
14. Ninth sternum of *A. punctata* Raym.
15. Apex of stipite of genitalia of male.
16. Four tarsal segments and claws of *A. anomala* Ckll.
17. Third antennal segment of female *A. imitata,* sp. nov.
18. Third antennal segment of male *A. anomala* Ckll.
19. Mandible of male.
20. Labrum of male.
21. One of the spatulate setae of the glossa of male.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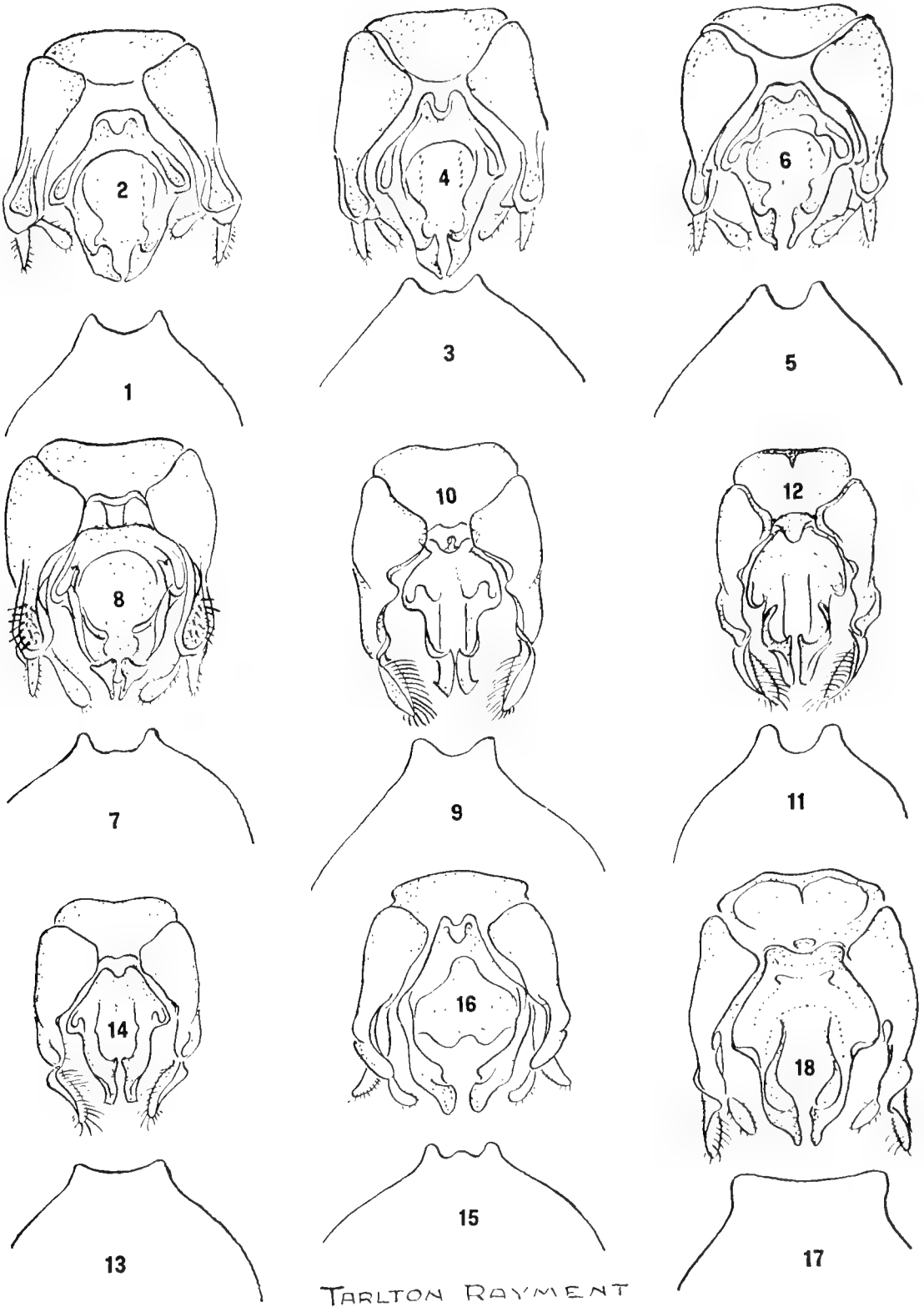
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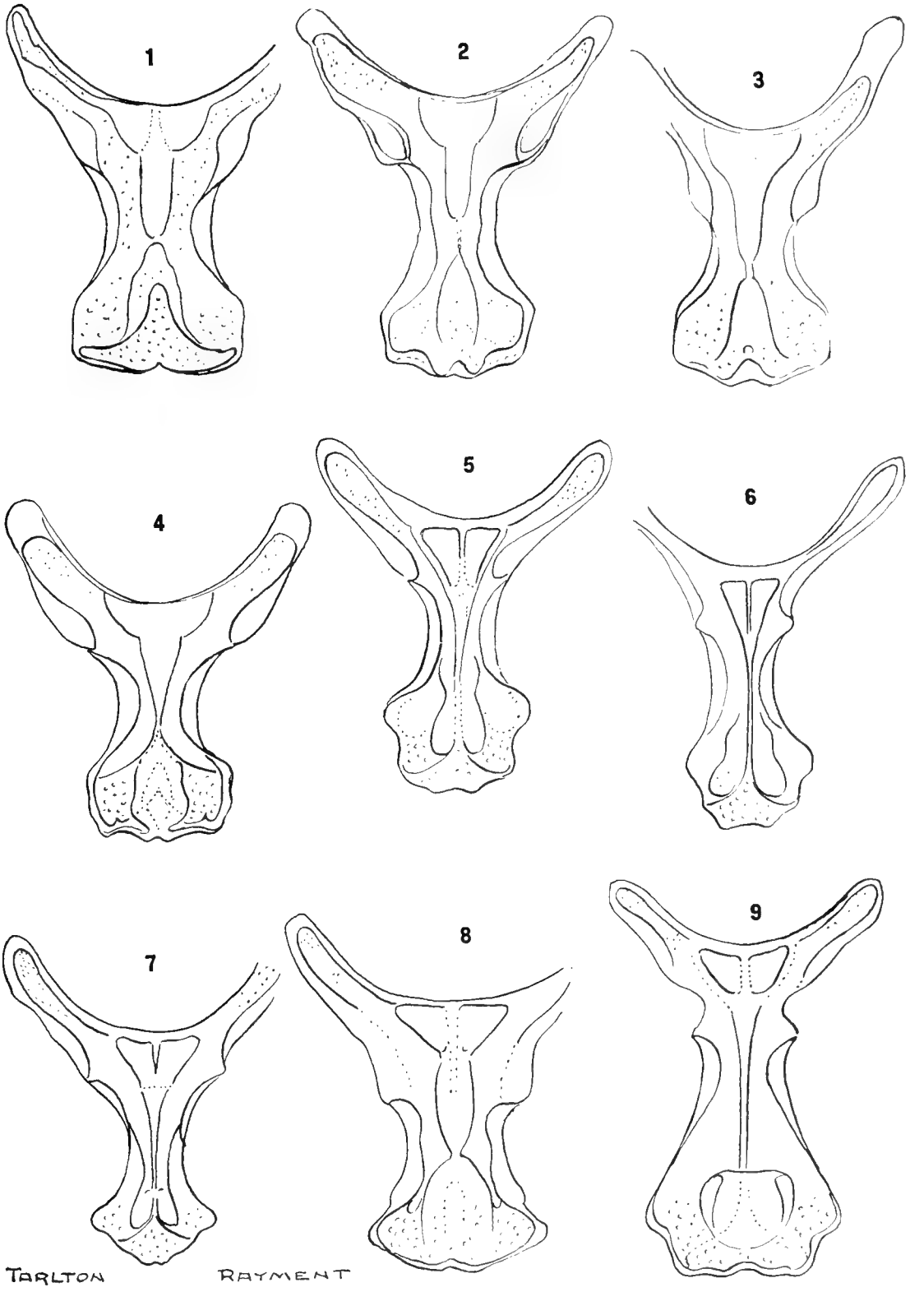
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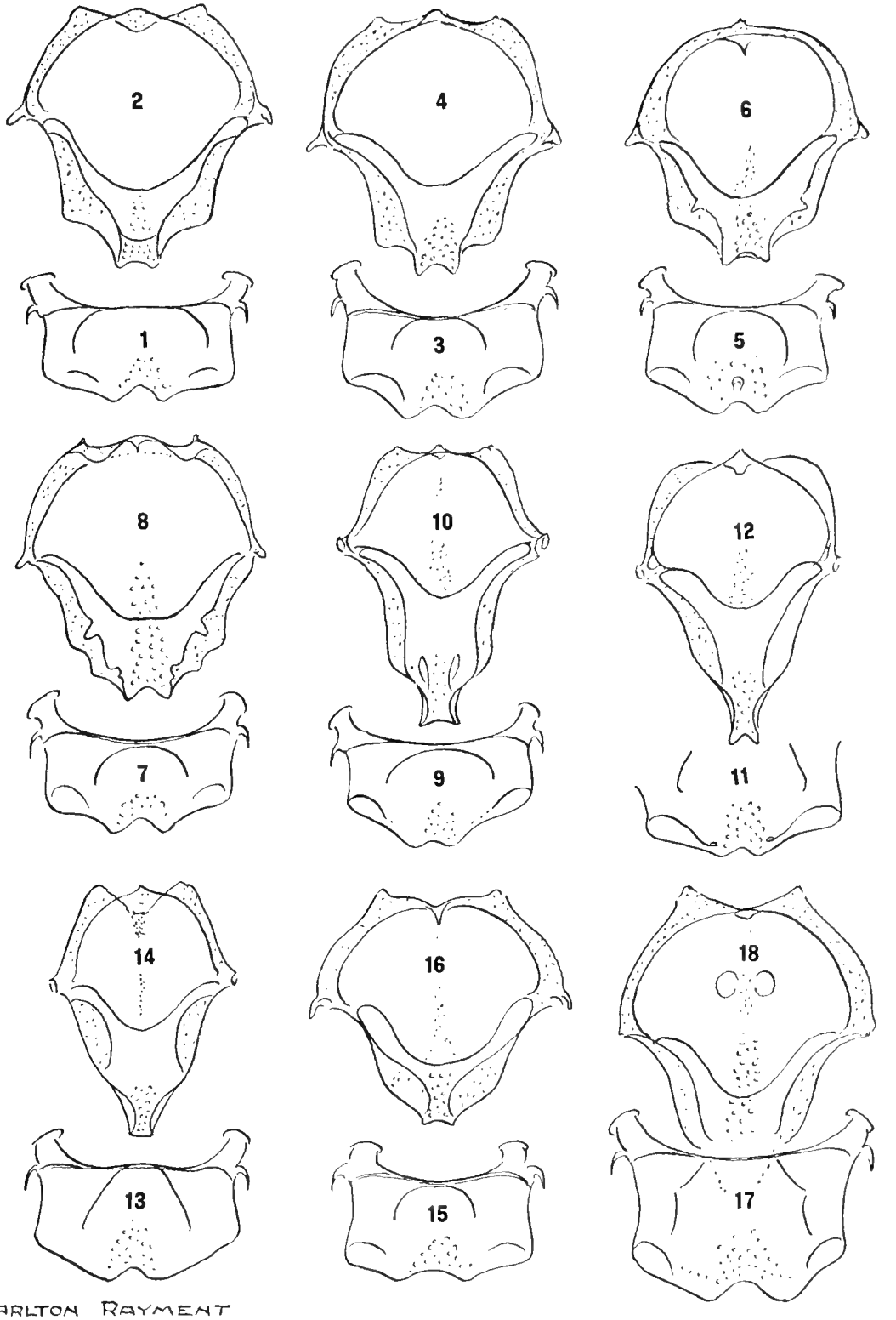

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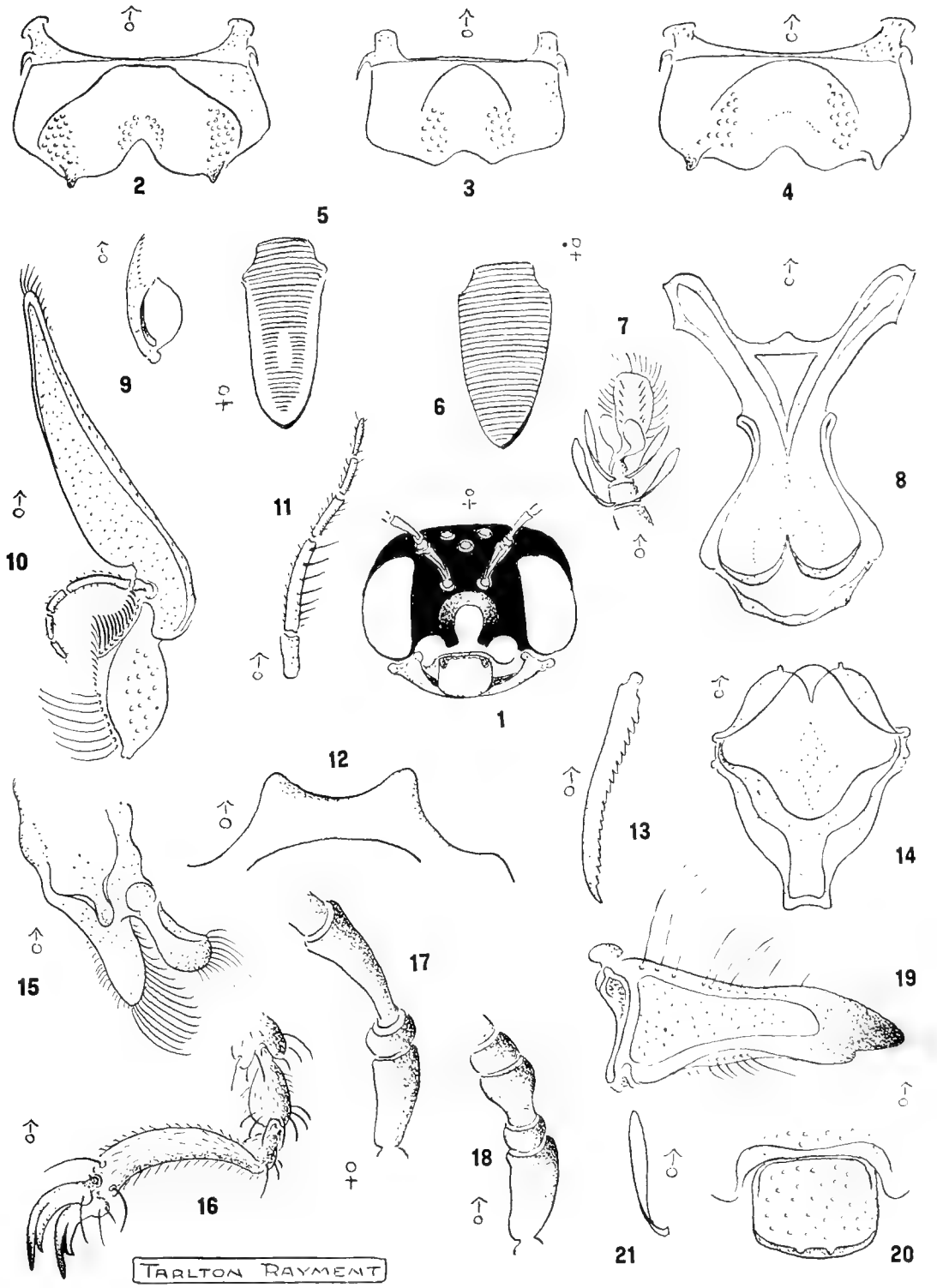
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A NEW SPECIES OF MYADORA FROM VICTORIA (MOLLUSCA, MYOCHAMIDAE)

By J. Hope Macpherson, B.Sc., Conchologist, National Museum of Victoria.

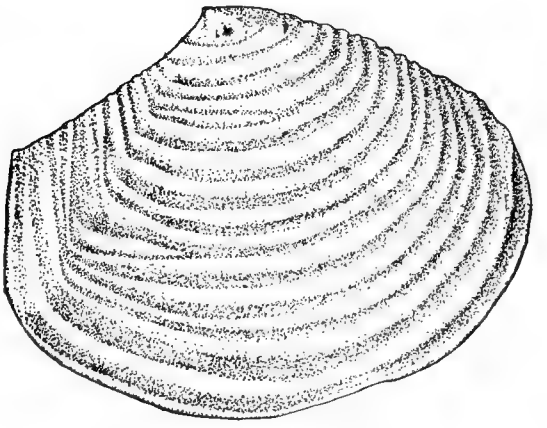
(Received for publication July 20, 1949.)

Myadora gabrieli, sp. nov.

Shell thin, white, oblong-ovate, abruptly truncated posteriorly, rounded anteriorly, concentrically ridged; ridges about 16 in number, regularly spaced and inflated, the slightly flattened top being broader than the base. Umbos central, acute.

Interior of the shell white, shining and showing impressions of the ridges. Muscle scars and pallial line indistinct.

Right valve convex, with an angle extending from the umbo to the posterior margin, defining the truncated area. A corresponding area in the flat left valve is slightly depressed.



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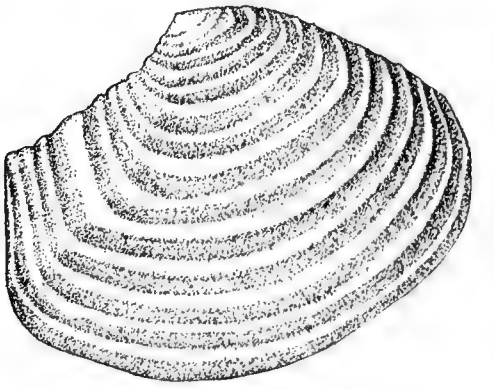

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Fig. 1. *Myadora complexa* Iredale (right valve), Twofold Bay, N.S.W.
Fig. 2. *Myadora gabrieli,* sp. nov. (right valve), off Rhyll, Western Port, Victoria.
Fig. 3. Cross-section of ridges of *Myadora complexa* Iredale.
Fig. 4. Cross-section of ridges of *Myadora gabrieli,* sp. nov.

Type.—Dimensions. Anterior-posterior 20 mm.; umbo-ventral 15 mm.

Locality. Off Rhyll, Western Port, Victoria.

Type in National Museum of Victoria, Reg. No. F.5685. Paratypes (16) Reg. No. F.5061.

Observations. This shell has some affinities to *Myadora complexa* Iredale, but differs from it in the following characters:

(1) Its more angular shape and elongate proportions.
(2) Its thinner shell.
(3) Its stronger, more inflated ridges which do not coalesce.
(4) Its ridged interior and less distinct muscle scars and pallial sinus.

The 17 specimens on which this species is founded were dredged in approximately 8 fathoms by Messrs. J. H. Gatliff and C. J. Gabriel in April, 1892, and are part of the Gatliff Collection.

NOTES ON AUSTRALIAN RHOPALOCERA WITH DESCRIPTIONS OF NEW SUBSPECIES AND LIFE HISTORIES

By A. N. Burns, B.Sc., Entomologist,
National Museum of Victoria

Family HESPERIDAE
Subfamily TRAPEZITINAE
Hesperilla flavescens flavescens Whs.
and
Hesperilla flavescens flavia Whs.

H. donnysa flavescens Whs. and *H. donnysa flavia* Whs. were described by Waterhouse (1927, 1941) as geographical races of *H. donnysa* Hew. *H. donnysa donnysa* Hew. was described in 1868 by Hewitson from specimens reputed to come from Moreton Bay, Queensland. This is clearly set out by Waterhouse (1937). Waterhouse expresses a doubt as regards Moreton Bay being the correct locality but, on a visit to England some years ago, established the fact that Hewitson did receive his eastern Australian material from near Brisbane. *H. donnysa* is not a common butterfly in southern Queensland and northern New South Wales. Its distribution extends through south-eastern, southern, and south-western Australia, where it has developed a number of geographical races. These are all listed by Waterhouse (1941) and may be annexed to the following regions:

H. donnysa donnysa Hew. The coastal portion of New South Wales about 40 miles south of Sydney to the Newcastle area.

H. donnysa icaria Whs. (1941). The northern race, from a point north of Newcastle to the Richmond River (N.S.W.), Burleigh Heads, and Brisbane, including Stradbroke Island, Queensland.

H. donnysa samos Whs. (1941). Apparently confined to the Blue Mountains, where it is a common butterfly at an altitude of 2000-3000 ft. A dark race slightly smaller than *icaria*.

H. donnysa patmos Whs. (1941). Far eastern Victoria, throughout Gippsland, the Dandenongs, parts of coastal Victoria (Inverloch, Frankston, Dromana), parts of the Western District, inland at Ararat, and the Grampians.

H. donnysa aurantia Whs. (1927). At present this is the only race named from Tasmania, where it occurs freely near Hobart (on Mt. Wellington) and other localities on the island.

H. donnysa diluta Whs. (1932). Found in South Australia, originally near Goolwa; also at Woods Well, Kingston, and Robe (Parsons). No doubt at other localities in the Coorong.

H. donnysa delos Whs. (1941). Near Adelaide, South Australia, chiefly in the hilly country, Mt. Lofty, Bridgewater, Aldgate, Woodside, also at Mt. Compass and Second Valley (F. Angel).

H. donnysa albina Whs. (1932). Western Australia, near and at Bunbury (H. L. Whitlock and A. N. Burns), Waroona (F. E. Wilson). This race appears to be centred around Bunbury. It is a rare butterfly during the spring, but appears in greater numbers during March.

H. donnysa galena Whs. (1927). Geraldton, Western Australia. This is a yellowish race, bred from pupae collected by Waterhouse at Geraldton.

H. donnysa flavia Whs. (1941). Near Adelaide, at St. Kilda, West Beach (F. Angel), and Henley Beach (Parsons). Probably at other coastal places in South Australia where its food plant occurs.

H. donnysa flavescens Whs. (1927). Until recently confined to Altona Bay, Victoria. Now also recorded from the Bellarine Peninsula and Ararat (F. E. Wilson).

With the exception of the races *flavescens, flavia,* and the upperside of *galena,* all the other races bear a resemblance to the typical form *donnysa donnysa*; but after careful examination of long series of the first two of the above-named races (only few specimens of *galena* are yet available for study) it appears conclusive that *flavescens* and *flavia* should be elevated to specific and sub-specific rank respectively. This has been based on considerable study of their life histories, breeding experiments, times of appearance, microscopic examination of genitalia, and an examination of long series of specimens bred and collected over the past few years.

Much valuable information has been gleaned from the recent studies of Goldschmidt (1940) and Mayr (1942), and an endeavour has been made to ascertain the necessary data on which to substantiate the claim that *flavescens* and *flavia* are now at the stage in which they are distinct species and sub-species respectively from *donnysa* and its other races. Various theories based on observation and experiment have been advanced with regard to the status of a species. It has been stated that subspecies are not incipient species, nor models for the origin of the species, but are simply blind alleys within a species, and the change from one species to another requires methods other than those afforded by an accumulation of micro-mutations.

Species have a separate existence, and do not grade into one another. Subspecies are similar forms or types which replace each other in geographical regions, whereas species can live in the same region or area without inter-breeding; thus one species is separated from another by a definite gap. It is in time that variation within a species is found—the formation of races and

species being due to genic differentiation and differentiation in the chromosome structure. Specific differences are clear-cut—with subspecies, intergrading may occur, but the stable specific characters remain, e.g., genital armature, etc. Gradation in subspecies may extend over a geographic range beginning with one particular type and ending with another, thus expressing the extremes of intergradation.

Modern research in genetics and evolution has demonstrated that subspecific differences are not only the result of one or two gene mutations, but are the outcome of many mutational steps, as well as additional chromosomal re-arrangements. Physiological differences are important, and these in dispersion and time give rise to geographical races. Species have a genetic origin, therefore the question arises, "Are the differences between geographical races phenotypical or genotypical?" Practically all genetic factors are embodied in the chromosomes, and in all normal individuals reproducing sexually there are two sets of homologous chromosomes, one from each parent, and the genes of the two homologous chromosomes in the same individual do not merge but segregate at the formation of gametes. This is simple Mendelian inheritance, and explains most genetic phenomena.

Speciation is normal and progressive, and gives rise to the origin of new species. Mutations are abnormal, and though they occur frequently, may not be adaptive, and even may be upsetting factors in the normal course of speciation. It is generally accepted that by the gradual building up of minor mutational degrees, eventually a stage is reached where a new species is evolved.

Within a species, or even more precisely within a subspecies, individuals of a population will vary (polymorphism), and these variants will be seen to fall into certain similar types. Rarely extreme variants occur, such as albinos (whites), or on the other hand melanic (dark) forms. Polymorphism may vary in geographical races which are widely separated geographically, and have been thus over a long period of time.

The geographical race or "subspecies" has hence become a specialized subdivision of the original species, and differs genetically and taxonomically from the other geographical races of the same species. In races not widely separated by geographical barriers, it is natural to consider that these differences would not be so marked, and intergradation might even occur. This shows the desirability, or rather necessity, for having large numbers of specimens from many localities for study and examination. It is generally accepted that all forms which produce fertile offspring belong to one species; this is the outcome of a process,

and forms which have attained this level have diverged physiologically to the extent that they can live in association with each other without interbreeding. Thus each species in a genus consists of a population of individuals which may replace another population geographically or ecologically, and each such group is reproductively isolated from other such groups.

Not all species, however, break up into geographical races; some species are static, others plastic, and upon this characteristic depends the ability to change gradually. The formation of a new species has been summarized as follows: "The geographic isolation from the parent species has brought about characteristics which make reproductive isolation certain if the two species are brought together" (Mayr).

Other theories exist regarding the origin of speciation:

(1) Semi-geographic, i.e., the origin of species gaps in zones of intergradation.

(2) Non-geographic or sympatric speciation. This would be either instantaneous or by ecological specialization, and would be confined within a single population or interbreeding unit.

If gradual, the idea is regarded as being possible through the formation of biological or ecological races which gradually build up differences, until the stage of specific distinctiveness is reached. Sympatric forms which are morphologicaly identical, but which may possess specific biological characters and are reproductively isolated, are called Sibling species, but must not be confused with geographical races.

Size as a character does not enter largely into the *donnysa flavescens* problem as it does in the classical example of the moth *Lymantria* and its various races; *donnysa* and its various races are all of similar size, and any great departure from the normal would be due to the influence of environmental characters.

The subspecies *samos* (Blue Mountains) is generally smaller and darker than *donnysa* and the races *patmos* and *icaria,* and can easily be picked and distinguished by visible characters. The females in particular have the hyaline markings clear-cut. *Patmos* (Victoria, excepting Altona Bay and parts of the Bellarine peninsula), *icaria* (northern N.S.W. and southern Queensland), *donnysa donnysa* (Sydney - Newcastle), *delos* (near Adelaide), and *diluta* (Coorong) all exhibit great similarity; if anything, *delos* is larger and a little more richly coloured than the other races; *diluta* is slightly paler, has a duller and wider sex mark in the male, and tends to have pinkish suffusion on the underside. The Tasmanian race, *aurantia,* has the hyaline markings richer

and deeper in colour than the mainland forms—and fresh specimens, especially females, have a faint plum-coloured suffusion on the underside.

The south-western Australian form *albina* has the markings on both sexes considerably reduced and paler in colour, and the underside has a definite brownish suffusion.

Galena is smaller than either *flavescens* or *flavia,* and not as yellow. In the male, the sex mark is wavy, brown, and oblique, and extends from just below vein 1A to just above vein 4, and the cilia are grey-brown. The underside of the male is much more like *donnysa,* and is greyish-brown. Although the upperside of the female resembles a small *flavescens,* the underside, too, is greyish-brown. The writer has not seen enough specimens yet to prove whether this race belongs to *donnysa* or *flavescens.* It is very unlike the south-western *albina,* and until many more specimens are collected and studied, and specimens of one or both obtained from between Geraldton and Perth, it must remain as a race of *donnysa.* Its food plant is *Gahnia trifida.*

In the case of *Lymantria,* a definite gradient in racial types parallels a climatic change. *H. donnysa* extends from the latitude of Brisbane, through coastal N.S.W., Victoria (chiefly south of the Divide), South Australia, and Western Australia from near Albany to Geraldton. This distribution presents a great diversity in climate from a mild and comparatively humid one, through one with warm dry summers and cold damp winters, to one with a fairly mild winter and a hot dry summer. Yet unless one was familiar with *donnysa* and its races, it is unlikely that it would be possible for other than a specialist to pick out specimens of each race from a large number of specimens and assign each to its correct region. This is excluding *samos,* which is a mountain form and darker, and *aurantia,* the Tasmanian form, which is also darker. *H. donnysa flavescens* and *flavia* have purposely been omitted here, and will be discussed later. This distribution, with the exception of Western Australia, is probably due to the ability of the species to widen its range, rather than to have been isolated in certain areas due to geological changes. Its occurrence, however, in Western Australia, with an apparent gap from South Australia, makes it appear to be a residual butterfly there. This seems also to apply to the Satyrid butterfly *Heteronympha merope duboulayi* (Butl.) and the Hesperid, *Trapezites sciron* (Whs. and Lyell) and other species which occur in that State as well as in the east of Australia.

H. donnysa appears to be fairly constant in its races, only two types of variation usually being found—one in which the central

hyaline patch of the hind wing in the female has one or two small orange dots, and that in which the third hyaline spot near the tornus in the forewing of the male is absent. Other much less apparent variations also occur. These are inherited in a simple Mendelian way, and do not bear any relation to any particular subspecies.

To define the limits of distribution of each of the subspecies referred to above, with the exception of *samos* (Blue Mountains) *aurantia* (Tasmania), and *albina* (W.A.), would be somewhat difficult. *H. donnysa donnysa,* from the Sydney-Newcastle area, is smaller than the northern race *icaria* (Whs.), and the species no doubt occurs right through the coastal country from Newcastle to Brisbane, wherever its food plant occurs. The Victorian race, *patmos,* is found from far eastern Gippsland across the State to the Grampians and the far south-western corner, and appears to be constant throughout.

Subspecies are the product of a number of micro-mutations brought about to cope with local conditions, climate, etc.—in the process of adaptation to environment in time. In the process of evolution, the transition of one stable organic system into another still stable system brings about the origin of the new species (Goldschmidt). This is possible only by means of an initial change in the chromosomes which then gives rise to the formation of a new and stable organism.

Of all the races of *H. donnysa donnysa, flavescens* and *flavia* are outstanding; the factors governing their separation as a distinct species (*flavescens*) with a geographical race (*flavia*) will be set out hereunder. *Flavescens* was first recorded by the late F. P. Spry, then Entomologist of the National Museum of Victoria, from Altona Bay, Victoria, in 1927, where it breeds on *Cladium filum,* a clumpy sword or "cutty" grass which grows in the swamps behind the shore-line. A spring and autumn brood are produced, the first appearing during October and early November, and the latter during March and early April. The species was also taken by the author during October-November, 1946, at several places at Lake Coonewarre near Barwon Heads, where it was breeding on *Cladium filum.*

It is of interest that *H. donnysa patmos* occurs within 20 miles of Altona Bay (near Box Hill), where it breeds on *Gahnia radula.* It, too, produces a spring and an autumn brood, the former appearing during November and early December, and the latter during March. Of several hundred specimens bred over a period of three years from larvae and pupae collected within 25 miles of Melbourne (excepting Altona Bay), in addition to many captured

specimens, no *flavescens*-like specimen has been observed. Likewise, of over 250 specimens of *flavescens* bred from Altona Bay, no *donnysa patmos* type has been noted. Although the difference in the food plant of these insects is an important point, it is not, however, in itself sufficient to prove the specificity of *flavescens.*

Another point worthy of consideration is that *flavescens* appears on the wing from three weeks to a month earlier than *patmos,* so that when one is finishing the other is only beginning.

These facts led to a detailed study of *flavia,* which occurs at St. Kilda, Henley Beach, West Beach, and other low-lying coastal places near Adelaide, where the food plant grows. This is *Cladium filum,* and during August, 1947, when the writer was in Adelaide, a visit was made to St. Kilda, in company with N. B. Tindale of the South Australian Museum, and F. Angel of Parkside, Adelaide, where a large number of larvae and pupae was collected. As with *flavescens,* these began emerging fully three weeks in advance of *H. donnysa delos* (Whs.) from the Adelaide hills. I am indebted to Mr. F. Angel for specimens and much valuable information relative to the above species.

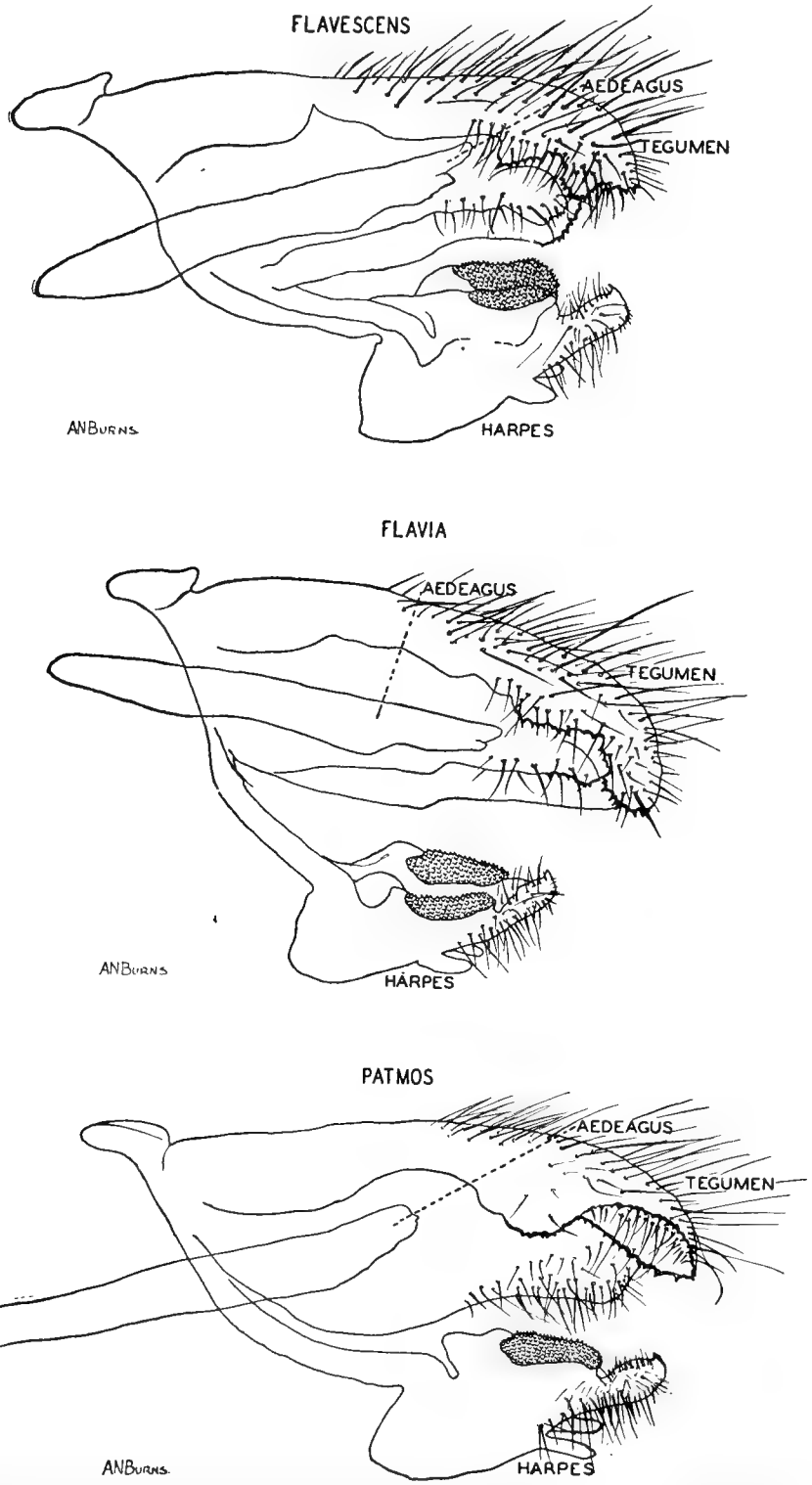
H. donnysa patmos is not confined to feeding on *Gahnia radula*; occasionally it is found feeding on *Gahnia psittacorum,* but, as far as the writer is aware, has not been recorded as feeding on *Cladium filum.*

In July, 1947, at Ararat, Victoria, F. E. Wilson collected three *donnysa* type skipper larvae from a sword grass which resembled *Gahnia radula*; these he was successful in breeding to the adult stage. There were one male and two females, all of which bear a very strong resemblance to *flavescens.* Close examination of and comparison with *flavescens* shows them to be this species. They all emerged from pupae in early November, 1947.

Slides were made of the male genitalia of *donnysa patmos, flavescens* and *flavia,* the specimens coming from Ferntree Gully, Victoria, Altona Bay, Victoria, and St. Kilda, S.A., respectively. Careful examination of these shows considerable differences which are detailed in the camera lucida drawings.

M. W. Mules carried out an interesting experiment in 1948, when he caged 12 freshly emerged males with 12 freshly emerged females of *donnysa patmos,* but results were entirely negative in that no pairs mated.

In the spring of 1947 the writer placed several three-quarter grown larvae of *flavescens* on *Gahnia radula* (food plant of *donnysa patmos*), but they refused to feed. This, however, does not



Male genitalia of *Hesperilla flavescens flavescens* Whs., *Hesperilla flavescens flavia* Whs., and *Hesperilla donnysa patmos* Whs.

necessarily mean that they would not do so if placed on this plant when very young.

Accurate enlarged colour drawings of the larvae and pupae of *flavescens, flavia,* and *patmos* have been made by P. J. O'Brien, late Preparator of the National Museum. The drawings were made in each case from an average specimen selected from a number, and some interesting differences are apparent; these are set out in the descriptions of the larvae and pupae hereunder:

Hesperilla flavescens Whs.

Larva. Length (average) 1¼ inches (32 mm.)

Colour: Body—Apple green, tinged bluish at junction of segments. Dorsal line dull green, much darker than body; ventral surface bright green slightly tinged blue. Head—Coriaceus, yellowish green slightly tinged brown; a wedge-shaped marking narrowing from mandibles to back of head, dull piceus. A moderately wide stripe on the sides of the head from base of mandibles to back of the head in some specimens, in others to half way or further, piceus. Mandibles shining black. Anal Plate—Indistinctly blue-green with numerous small black granules. From anal end of plate just before the margin about 8 bristle-like setae, brown. Extreme margin fringed with very fine white setae. Spiracles—Light brown, first larger than the others, transversely oval, last slightly larger than medians, also transversely oval, medians round. Prolegs—Hyaline tipped black. Claspers—Bright green, hooks blackish.

Food plant: *Cladium filum.*

Pupa. Length (male) ⅞ inch (22-24 mm.); (female) 1 inch or a little more (26-28 mm.).

Colour: Dark piceus, margin of wing cases much diluted, abdominal segments with fairly short brownish setae, many of which arise from umbilicate pustules. Cremaster—Black, fringed with fairly long brown setae. Operculum—Nitid, tripartite, coarsely sculptured and clothed with fine reddish setae. A tuft of short setae on each shoulder, brown.

Dorsal surface of abdominal segments with umbilicate pustules sparse on basal segments, increasing in size and number towards apex.

Localities. Altona Bay, near Lake Coonewarre, and Ararat, Vic.

The writer recently visited St. Kilda, S.A., where *flavia* occurs; the type of country and general ecology is identical with that where this species occurs.

Adult

Male. Above: Forewing brown, suffused yellow giving a yellowish-brown appearance. A series of from 2 to 5 small subapical spots hyaline yellow, an elongate spot at distal end of cell darker hyaline yellow, and a series of from 3 to 4 similar discal spots. The extent of the yellow suffusion varies in individuals, and may extend from over half way from the base to completely covering the wing. Sexmark grey-brown, oblique, normally from just below vein 1A to just above vein 4. Cilia greyish white.

Hindwing brown suffused yellow, a central dark yellow spot slightly hyaline. In some specimens there may be one or two minute yellow dots immediately below and bordering the central marking. Cilia greyish white.

Beneath: Forewing apex extending almost to tornus pale ashy grey; apical, cellular, and discal spots indistinctly as above; below the subapical spots a dull

black patch; the area from distal end of and below cell also black. Cilia greyish white.

Hindwing greyish white faintly suffused yellowish or pale ashy grey, a small central spot sometimes whitish, narrowly encircled dull black, sometimes reduced to a small dull black spot. A curved series of 6 or 7 similar spots extending from near apex to near dorsum. Cilia greyish white.

Female. Above: Forewing brown suffused yellow, this suffusion usually being more pronounced than in the male. A series of from 4 to 5 subapical spots hyaline yellow, an elongate spot at distal end of cell darker hyaline yellow, and a series of from 3 to 5 similar discal spots. In some specimens these spots coalesce to form an irregular band. Sexmark absent. Cilia greyish white.

Hindwing brown suffused yellow, a moderately large central marking dark yellow, very slightly hyaline. As in the male, there may be one or two small yellow circular dots immediately below and bordering the central marking. Cilia greyish white.

Beneath: Forewing similar to the male, spots larger and more clearly defined, an obscure dull black streak in the yellow of the cell.

Hindwing also as in the male, the central spot sometimes whitish and only faintly visible, the narrow dull black encircling margin sometimes being absent. The curved series of spots as in the male and varying in number in individuals, from 5 to 7. Cilia greyish white.

Distribution. Victoria: Altona Bay, Bellarine Peninsula near Lake Cooneware, and Ararat.

Hesperilla flavescens flavia Whs.

Larva. Length (average) 1¼ inches (32 mm.).

Colour: Body—Apple green, tinged bluish at junction of segments. Dorsal line dull green, much darker than body; ventral surface bright green, slightly tinged blue. Head—Coriaceus, yellowish green slightly tinged brown; a wedge-shaped marking narrowing from mandibles to back of head, dull piceus. A moderately wide stripe on the sides of the head from base of mandibles to the back of the head in some specimens, in others to half way or further, piceus. Mandibles shining black. Anal Plate—Indistinctly blue-green with numerous small black granules. Just before margin about 8 bristle-like setae, brown, a few shorter semi-erect ones between. Extreme margin fringed with very fine white setae. Spiracles—Light brown, first larger than the others, transversely oval, last slightly larger than medians, also transversely oval, medians round. Prolegs—Hyaline tipped brown-black. Claspers—Bright green, hooks brown.

Food plant: *Cladium filum.*

Pupa. Length (male) ⅞ inch (22-24 mm.); (female) 1 inch (25-27 mm.).

Colour: Dark piceus, margins of wing cases much diluted, abdominal segments with fairly short setae, many of which arise from umbilicate pustules. Cremaster—Black, fringed with long brown setae. Operculum—Nitid, tripartite, coarsely sculptured and clothed with fine reddish setae. A tuft of short setae on each shoulder, brown.

Dorsal surface of abdominal segments with umbilicate pustules, sparse on basal segments, increasing in number towards apex. In this subspecies these pustules tend to extend further laterally, especially in male pupae, than in *flavescens.*

It is doubtful if this really warrants a racial name, close examination of long series of specimens showing it to present exactly the same types of variation as *flavescens*. The tendency for the discal spots in the forewing of the female to coalesce and form an irregular band as in *flavescens* occurs in about the same percentage of specimens. The sexmark in the male is also oblique and greyish brown. The food plant is the same (*Cladium filum*) and the insect is found in precisely similar localities on the swampy flats near the sea.

In company with N. B. Tindale and F. Angel of Adelaide the writer was able to visit St. Kilda near Adelaide and collect a number of larvae and pupae—these, as the accompanying figures show, are identical with those of *flavescens*; the feeding habits and shelters made by the larvae also agree in every way.

Distribution. South Australia: St. Kilda, West Beach, and other places near the sea where the food plant grows.

Hesperilla donnysa patmos Whs.

Larva. Length (average) 1¼ inches (32 mm.).

Colour: Body—Yellowish green, darker green at junctions of segments laterally and at base of prolegs. Ventral surface slightly darker and less yellowish. Surface of body with very minute scattered brown setae arising from minute granules, these interspersed sparsely with very fine white setae. Head—Brownish green, finely granulate, a wedge-shaped marking narrowing from mandibles to back of head, piceus; a very fine brown line running down middle from vertex to half way, where it forks and runs to the margin of markings at mandibles. A wide stripe on sides of head sometimes from base of mandibles to back of head, sometimes only part of the way, piceus. Mandibles shining black. Anal Plate—Yellowish green with numerous small black granules; from end and sides just before margin 6 long brown setae, extreme margin with a few fairly long brown setae tipped white, interspersed with a few shorter white setae. Spiracles—Light brown, first larger than the others, transversely oval, last slightly larger than median ones, also transversely oval, medians round. Prolegs—Hyaline tipped shining pale brown. Claspers—Yellowish green, hooks light brown.

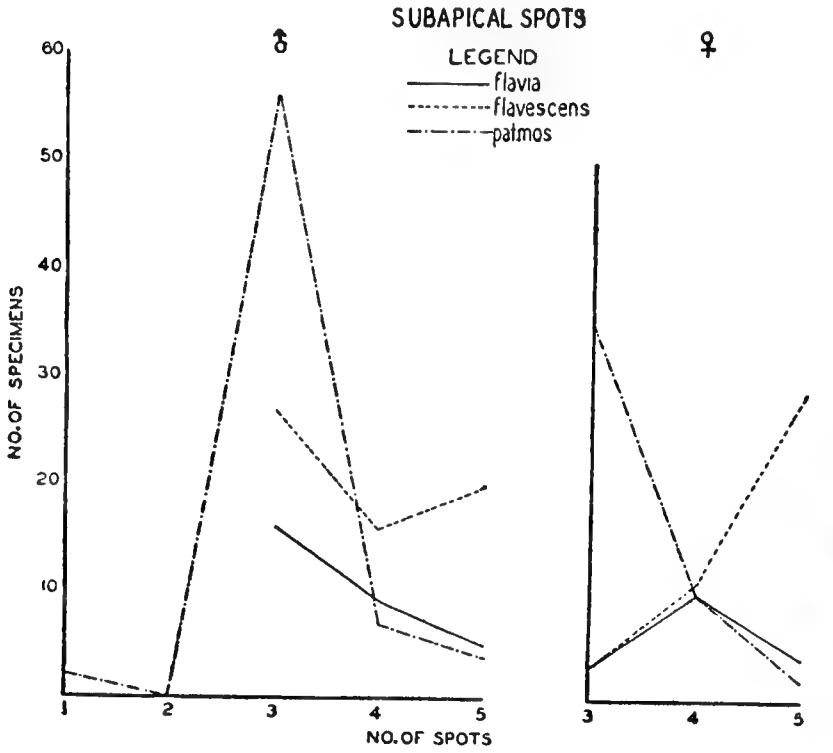
Food plant: *Gahnia radula,* rarely *G. tetragonocarpa* and *G. psittacorum.*

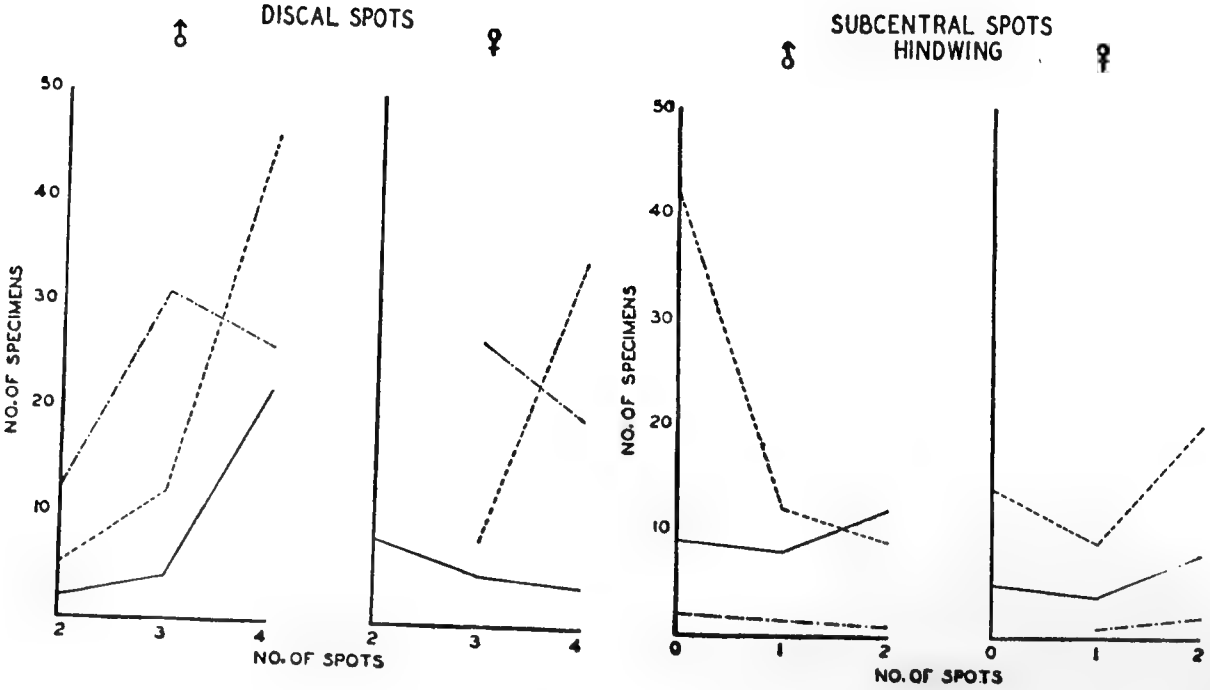
Pupa. Length (male) ⅞ inch almost to 1 inch (23-25 mm.); (female) 1 inch or a little more (25-27 mm.).

Colour. Dark piceus, margin of wing cases much diluted, usually more so in male pupae, and suffused greenish; junctions of abdominal segments lighter in colour, also suffused greenish, and with fairly short brown setae arising from umbilicate pustules which are sparser on basal segments, and increase in size and number towards apex. Cremaster—Black, fringed with long brown setae. Operculum—Nitid, tripartite, coarsely sculptured angularly, dotted sparsely with fine reddish brown setae; palpal shields dark brown, almost black. A tuft of setae on each shoulder, reddish brown.

Sexmarks. (Found only in males.)

1. *Hesperilla donnysa donnysa* Hew. Dull black, extends from below vein 1A to vein 4. Narrow and nearly uniform.
2. *Hesperilla donnysa icaria* Whs. Dull black, extends from below vein 1A to vein 4. Broadest near 4, gradually narrowing towards 1A.


SUBAPICAL SPOTS
♂
♀
LEGEND
flavia
flavescens
palmos
NO. OF SPECIMENS
60
50
40
30
20
10
1
2
3
4
5
NO. OF SPOTS
3
4
5


DISCAL SPOTS
♂
♀
NO. OF SPECIMENS
50
40
30
20
10
2
3
4
2
3
4
NO. OF SPOTS
SUBCENTRAL SPOTS
HINDWING
♂
♀
50
40
30
20
10
0
1
2
0
1
2
NO. OF SPOTS

3. *Hesperilla donnysa samos* Whs. Dull black, extends from below vein 1A to vein 4, practically uniform.
4. *Hesperilla donnysa patmos* Whs. Dull black, extends from below vein 1A to vein 4, usually slightly widening towards 4.
5. *Hesperilla donnysa delos* Whs. Dull black, extends from below vein 1A to vein 4, almost uniform.
6. *Hesperilla donnysa diluta* Whs. Dull black, extends from below vein 1A to vein 4, sometimes broadening towards 4.
7. *Hesperilla donnysa aurantia* Whs. Dull black, extends from below vein 1A to vein 4. In some examples inclined to be interrupted, usually almost uniform.
8. *Hesperilla donnysa albina* Whs. Dull black, extends from below vein 1A to vein 4. Narrow, almost uniform, sometimes slightly interrupted.
9. *Hesperilla donnysa galena* Whs. Greyish black, oblique, extends from below vein 1A to vein 4. Irregular and of uniform width.
10. *Hesperilla flavescens flavescens* Whs. Obliquely greyish black, extends from below vein 1A to vein 4. In some specimens almost uniform, usually not interrupted, narrow.
11. *Hesperilla flavescens flavia* Whs. Obliquely greyish black, extends from below vein 1A to vein 4. In some specimens widest near 4, gradually narrowing towards 1A, in others almost uniform, generally not interrupted.

Table showing extremes in variation of markings in H. flavescens, H. flavescens flavia, and H. donnysa patmos

MALES FEMALES

flavescens

Total Specimens examined, 63 males, 43 females

No. Spec.	Discal Spots	No. Spec.	Sub-Apical Spots	No. Spec.	Sub-Central Spots	No. Spec.	Discal Spots	No. Spec.	Sub-Apical Spots	No. Spec.	Sub-Central Spots
46	4	20	5	9	2	35	4	29	5	20	2
12	3	16	4	12	1	8	3	11	4	9	1
5	2	27	3					3	3		

flavia

Total Specimens examined, 29 males, 17 females

23	4	5	5	12	2	4	4	4	5	8	2
4	3	9	4	8	1	5	3	10	4	4	1
2	2	15	3			8	2	3	3		

patmos

Total Specimens examined, 69 males, 47 females

26	4	4	5	1	2	20	4	2	5	1	1
31	3	7	4			27	3	10	4	2	2
12	2	56	3					35	3		
		2	1								

Deductions made from Table and Graphs

Subapical Spots

The *flavescens* and *flavia* graphs V in the opposite direction to the *patmos* graph.

Flavescens males tend to a high number with 3 and 5 spots, but fewer with 4, thus showing strongly a variation within the species of greater numbers with the maximum and minimum number of spots. In the females the tendency towards the maximum is more marked.

Flavia males show a decreasing tendency towards the maximum number; this is slightly more marked in the females. This may be a pointer towards a geographical difference.

Patmos shows 3 spots to be typical in the males, and in the females the greatest number exhibited the same number. Thus in all three the typical number of spots is 3, but the number distribution is very different, particularly with *patmos* as compared with *flavescens* and *flavia*.

Discal Spots

Flavescens shows a marked tendency towards more spots, especially in the males; this is almost equally marked in the females.

Flavia males show a similar inclination, but the females indicate a slight decrease towards the maximum amount of spotting.

Patmos shows a mean of 3 spots with a marked tendency in both sexes to lesser numbers with the maximum number of spots.

Subcentral Spots

Hindwing: *Flavescens* and *flavia* show a different distribution from *patmos* in numbers having a particular number of spots. *Patmos* males show a limitation of range to lower numerals; in the females the tendency is to a higher range. *Flavescens* females show a mean round one spot with a rather marked tendency towards two; *flavia* exhibits this tendency to a lesser degree. *Flavescens* males show a slightly decreasing inclination towards two spots, in contrast with *flavia* males which show a slightly increasing tendency. This again may be movement towards geographical change.

Order LEPIDOPTERA
Suborder RHOPALOCERA
Family SATYRIDAE

Geitoneura klugi insula n. subsp.

Male. Above: Forewing black with rich orange brown markings which are slightly more restricted than in mainland specimens (W.A.) and examples from

the eastern States. A white pupilled ocellus near apex, sexmark brown-black and extending from vein 4 to the mid-point of vein 1A. Tornus black, dorsum brown-black, cilia greyish.

Hindwing with central area rich orange brown, a central black band extending from vein 4 to vein 1B, a white pupilled ocellus in discal area at tornus and another smaller ocellus near apex. In most examples this ocellus shows the white pupil clearly but in some specimens it is reduced to a black spot. Cilia grey.

Beneath: Forewing similar to the upperside, apical ocellus larger and brighter, apex greyish black, sexmark absent, orange markings darker towards base.

Hindwing not nearly as variable as in typical *klugi*; light grey with rich brown-black striae and markings which are darker and generally more extensive than in the typical form. The central dark band sharply edged black. Ocelli faintly visible.

Female. Above: Similar to the male, markings orange but paler and more extensive; ocellus near apex white pupilled and clearly defined. Dorsum brown-black near tornus, almost merging to orange near base. Cilia grey.

Hindwing similar to the male but with orange area much more extensive, margins narrower, central dark band in some examples almost absent, only the portion near vein 4 being clearly visible, in others brown but less conspicuous than in the typical form. Cilia grey.

Beneath: Forewing similar to the upperside, apical ocellus larger and more distinct, apex grey finely suffused black, orange markings darker and richer near base.

Hindwing grey with dark brown and black striae and markings which are more numerous and generally darker than in mainland (W.A.) specimens and *klugi* from eastern Australia. The central dark band much less conspicuous than in the male, sharply edged black. Ocelli faintly visible. The black markings in the discal area are so numerous as to constitute an almost continuous greyish black area.

This race is considerably brighter than *klugi* from the mainland and on the wing presents quite a different appearance. *G. klugi* Guer. is a common butterfly in southern Australia and Tasmania, and as far as is at present known has not developed many geographical races, *G. klugi mulesi* Bns. from Wardang Island, S.A., being the only one so far described.

It is likely, however, that when further long series of specimens are collected and studied from South and Western Australia other races will be found. Specimens from the mainland of Western Australia, which at the nearest point is about 9 miles from Rottnest Island, are definitely distinct from this new race. The writer collected a number of specimens at Bunbury, Kings Park (Perth), and Wembley during November, 1947, and again in company with F. E. Wilson at the same and additional localities in November, 1948. Although the females are brighter in colour and appear different from eastern specimens, the males exhibit little difference. One male captured at the 64-mile post on the Geraldton road on 12.11.48 is smaller and paler than all other specimens collected, and at first glance resembles specimens from

the Grampians area in western Victoria. The collection of further material from this locality in the future will provide valuable data for study of this interesting butterfly.

It is worthy of note to mention that an allied species, *Geitoneura minyas minyas* Whs. and Lyell, is a common butterfly in coastal south-western Australia and so far has never been recorded from Rottnest Island. The distribution of *minyas* on the mainland is extensive, occurring from east of Albany in the south to north of Geraldton (*minyas mjobergi* Aur.) in the north, a total distance of at least 700 miles. F. E. Wilson and the writer collected intensively on Rottnest Island and examined many places which looked promising for *minyas,* but without result.

On the mainland both species fly freely together. *Minyas* appears on the wing about the first week of October, and persists until the end of November (Perth area); *klugi* appears towards the end of October and continues until December, so that by the end of October and beginning of November overlapping of both species occurs.

A large series of *minyas* was collected because of the great variation exhibited in this species; many females, especially those captured late in its season, bear a striking resemblance to *G. klugi* both on the upper and undersides of the wings. This variation is not a geographical one, because at all places where the insect was collected a similar range of variations was found. Much further interesting study remains to be done with regard to this species also.

I am indebted to Mr. L. Glauert, Director of the West Australian Museum, for valuable assistance and notes covering his observations made over a number of years and trips to Rottnest Island, and he states that he has never seen *G. minyas* there, although *G. klugi* is always plentiful.

Types in the collection of the writer.

Distribution. As known, Rottnest Island, 9 miles from the mainland of Western Australia, opposite Cottesloe.

Family LYCAENIDAE

Subfamily THECLINAE

Ialmenus icilius parvus n. subsp.

Male. Above: Forewing smoky brown with a large central area metallic green faintly tinged blue. The brown margins have a faint bronzy lustre. Cilia greyish brown.

Hindwing smoky brown with a large central area metallic green faintly tinged blue. Vein 2 prolonged into a short tooth at the base of which is a black dot above which again is a small faint almost obscure orange-brown marking. In

some specimens the black dot at the base of the tooth is absent. Cilia greyish brown.

Beneath: Forewing pale greyish brown with slightly darker markings which are narrowly edged greyish white. The intra-marginal markings run from the apex to the tornus, forming a slightly lunulated irregular band which is more clearly defined in some specimens than others. Cilia dull brown.

Hindwing as the forewing with rather darker markings which are narrowly edged greyish white. The intra-marginal band runs from the apex to the dorsum and, as in the female, is much more distinct in some specimens than others.

Female. Above: Forewing smoky brown, rather paler than in the male, with a large central area pale metallic blue. A narrow smoky brown marking interrupts the metallic blue at end of cell. Cilia greyish white.

Hindwing smoky brown, central area pale metallic blue, vein 2 prolonged into a short tooth at the base of which is a small black spot; above this, extending along each side, is a narrow orange-brown marking. In some specimens this marking is so pale that it is almost obscured. Some specimens show another minute black dot near the end of vein 1A. Cilia greyish white.

Beneath: Forewing as in the male; markings more variable, in some examples being so faint as to merge into the grey-brown colour of the wing, in others darker but usually not so conspicuously edged greyish white. Cilia dull greyish brown.

Hindwing as the forewing, markings as in the male, with the same degree of variation in individuals as stated for the forewing. In nearly all the specimens examined two black dots narrowly and obscurely edged orange-brown, one at the end of vein 2, the other near the end of vein 1A. Cilia dull greyish brown.

Microscope slides have been made of the male genitalia of both Geraldton and Walebing (W.A.) specimens, and examination shows them to be identical.

This race is much smaller, and the females considerably duller, than other specimens of *I. icilius* from Western Australia and the eastern States. A number of *icilius* was captured and bred from Walebing, 95 miles north of Perth along the Geraldton road, and these were quite typical, perhaps a little larger than the usual type of specimen from the eastern States. Further specimens were captured at National Park (F. E. Wilson), near Perth, and these were typical though definitely larger than normal eastern specimens.

Larvae and pupae of this new race were collected, these corresponding in habits and markings with the specimens from Walebing, and life history stages observed by the writer in western Victoria. Larvae and pupae were attended by a small black ant.

Food plant: A phyllode type of Acacia (*A. cyanophylla*?).

Distribution. Geraldton district, Moonyoonooka, Western Australia.

Types in the collection of the writer.

Ialmenus schraederi Felder

Through the courtesy of J. Macqueen of Milmerran, Queensland, I have been able to have photographs made of the larva and pupa of this interesting butterfly. A description of these was given in the Queensland Naturalist, Vol. 13, No. 4, August 1947, pp. 75-79, together with interesting notes regarding the habits, ant association, and feeding of this and another closely allied species, *Ialmenus ictinus* Hew.

In the adult stage *I. schraederi* and *I. ictinus* are practically indistinguishable. Mr. Macqueen has examined many specimens of each species and states as a result that he cannot find any single constant point of difference between them. Dr. Waterhouse, who is a notable authority on the subject, has seen and examined the same series of specimens, and he too agrees that no constant point of difference can be found. The writer has examined very carefully long series of *I. ictinus* and has compared them with a number of specimens of *I. schraederi* sent to him by Mr. Macqueen, and has come to the same conclusion. In some of the females of *I. schraederi* the metallic area of the wings appears to be very slightly tinged purplish-blue, but variation in the colour and its intensity also occurs in some examples of *I. ictinus.*

The larva of each species is very dissimilar in appearance, markings, and body features, and is in each instance attended by a different species of ant. *I. ictinus* is always attended by the common red Meat or Mound Ant (*Iridomyrmex detectus*), whilst *I. schraederi* is attended by a small reddish coloured ant (*Froggatella kirbyi*).

The food plant of both species is Brigalow (*Acacia harpophylla*), but Mr. Macqueen records having once taken *I. schraederi* on *Heterodendron diversifolium.* He further states that *I. ictinus* is widely distributed throughout the district (near Milmerran, Q.), whilst *I. schraederi* is very local and favours the same feeding trees year after year; and although the two species have been taken within ten feet of one another, each remained on its own food plant with its own particular species of ant.

Considerable differences exist in the shape and colouration of the pupa of each species. *I. ictinus* varies from pale brown to almost black in colour and is stouter and less elongate than that of *I. schraederi,* which is invariably black. Mr. Macqueen makes mention of the interesting fact that whilst *I. ictinus* pupates in twos and threes amongst the twigs or leaves of the food plant, those of *I. schraederi* (unless parasitized) are invariably found in sheltered places under bark or holes in fence posts some distance from the feeding tree.

Whilst figuring the larva and pupa of each of the above species, two pairs each of the butterflies of *I. ictinus* and *I. schraederi* have been photographed to show the identical appearance of both upper and undersides of the wings.

Recently I had the opportunity of examining further specimens of *I. schraederi* ?Feld. and agree with the later observations of Mr. J. Macqueen that in this species the costa of the forewing is not as straight as in *I. ictinus*; that the metallic area in *ictinus* females is more purplish, and in the males more bluish.

Both species occur during the summer months, from December until the end of March (Macqueen). The writer has had *I. ictinus* from the Rockhampton district in central coastal Queensland, New South Wales (near Paterson) and Victoria (Bacchus Marsh and Broadmeadows), and in each instance, though feeding on a different species of Acacia, the larvae and pupae have always been attended by the red Meat or Mound Ant (*Iridomyrmex detectus*). From each of these localities the specimens were obtained during the summer months, i.e., from December to March.

Ialmenus inous Hew.

Larva. Length (average) $\frac{7}{8}$ inch (20-22 mm.)

Colour: Dark brown, almost chocolate; dorsal line broad, brown; on either side a broad greyish brown longitudinal stripe, outside this a broad chocolate stripe marked intersegmentally with a narrow greyish stripe which is not continuous through the segments. Lateral area paler brown, with three interrupted pale greyish brown longitudinal stripes. Anterior segment with two flange-like projections directed forwards and carrying a number of long white setae. Central area of this segment depressed, with a large diamond-shaped shiny dark brown marking. Second and third segments each with a rounded projection which carries short dark-brown stiff bristles arising from pustules. Anal segment much depressed and carrying a shiny black plate. Pre-anal segment with two conical prominences bearing a stellate tuft of short white setae. Head retractile, black. Body ventrally pale yellowish green suffused pale green. Extreme lateral edges of segments with pale brown setae arising from small black pustules.

Larvae shelter during the day, either singly or in twos or threes, along the stems of the food plant just below ground level. They harmonize perfectly with their surroundings, and are always attended profusely by numerous brown ants (*Iridomyrmex gracilis*?) whose mound nests are usually close to the feeding shrubs. In habits larvae of *I. inous* greatly resemble those of *I. icilius*. Occasionally small larvae may be found resting in daytime along the young shoots of the food plant. Rarely larvae may be found with the chocolate coloured areas bright apple green.

Pupa. Length (average) $\frac{1}{2}$ inch (11-13 mm.).

Stout and much flattened ventrally. Attached by the tail and a central girdle to leaves, stems, debris or clods of earth, or the stem of the food plant just below ground level, and attended by ants.

Colour: Dull black, varying to greyish, irregularly blotched with black markings and spots; ventral area paler and with fewer and similar black markings. In some examples where the ground colour is greyish there is a pink suffusion. In no two pupae are the black markings similar in pattern.

Food plant: *Acacia cyanophylla.*

Locality. Western Australia, at Bunbury, Hamel, and Waroona, during the months of October, November and December. It is probable that butterflies may also be found from January to March. During the first week of November, 1947, at Bunbury butterflies were flying, and eggs, larvae in all stages, and pupae were collected.

Family HESPERIDAE
Subfamily TRAPEZITINAE

Description of the Larva and Pupa of *Anisyntoides argenteo-ornata insula* Whs.

Larva. Length (average) ¾ inch (18-20 mm.).

General body colour faintly pinkish grey, with a series of black angular longitudinal lines. Body surface closely granulate. Dorsal line narrow, slightly irregular, black, more clearly defined towards the anterior end of the body. On either side of this four irregular longitudinal lines, black, those nearest the dorsal line being the broadest and the others decreasing in width towards the lateral area.

Anal Plate slightly depressed, on this a median black line and a black crescent-shaped marking which joins the median marking at the anterior end and extending round the margins. The anal plate also carries a few minute black spots.

Head coarsely granulate; a nitid median broad marking extends from the vertex to the centre of the face, where it forks into two narrower markings each of which extends to the region of the mandibles. On either side of this a pale pinkish grey area which margins the black markings. Mandibles nitid, shining. Sides of head broadly and irregularly nitid and extending to lateral centre.

Ventral area of body pale pinkish white.

In general appearance the larva of this butterfly bears a strong resemblance to that of *Trapezites luteus* Tepper., and the habits and flight of the butterfly to that species also.

The larva was first taken by F. E. Wilson on Rottnest Island, Western Australia, on 1st November, 1948, and the pupa by the writer on 27th October, 1947.

Unlike the larvae of *Trapezites,* which construct shelters of leaves drawn together and situated right at the base of the food plant, the larva of this insect spins a whitish cocoon which is open at one end and which is usually situated amongst the foliage quite near the top of the food plant.

A larva of the mainland form was collected at Bunbury, W.A., on 5.11.48.

Food plant: *Acanthocarpus pressii.*

Pupa. Enclosed within a white silky cocoon which is open at the top or placed between several leaves of adjacent grass or similar plants which are incorporated into a cocoon-like structure.

Length $\frac{5}{8}$ inch (12-14 mm.). Stout, resembles a *Trapezites* pupa.

Colour: Light brown, darker dorsally and in the region of the legs and antennae ventrally. Eyes prominent.

Operculum not well defined, small, rounded, irregularly furrowed and bearing short greyish setae. Another tuft of setae on each side of the prominence above the eyes, so that they are almost surrounded with setae.

Whole of dorsal area and abdomen finely clothed with short greyish setae, dorsal area marked with darker brown irregular transverse lines.

Cremaster long, dark brown and curved forwards.

Locality. Western Australia at Rottnest Island during October and November. Also recorded from Monte Bello Island and the Abrolhos Islands.

The butterflies are attracted to flowers of several species; those most frequently visited are Senecio and a yellow flowering tussocky herbaceous plant, *Conostilis radicans.*

The food plant (*Acanthocarpus preissii*) of this insect was observed at Bunbury, Wembley, Rottnest Island and Geraldton.

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7. Waterhouse, G. A., 1937. Australian Hesperidae, Part VII. Notes on the Types and Type Localities. Proc. Linn. Soc. N.S.W., LXII, Parts 3-4, pp. 107-125.
8. Waterhouse, G. A., 1941. Australian Hesperidae, Part X. On *Hesperilla donnysa* Hew., 1868. Proc. Linn. Soc. N.S.W., LXVI, Parts 3-4, pp. 215-218.
9. The Butterflies of Australia. Waterhouse and Lyell. (Angus & Robertson, Sydney, 1914.)

EXPLANATION OF PLATES

Plate I

Fig. 1. *Hesperilla flavescens flavescens* Whs.
(a) Larva, lateral view.
(b) Head of larva, front view, enlarged.
(c) Male pupa.
(d) Operculum of male pupa, enlarged.
(e) Operculum of female pupa, enlarged.
(f) Female pupa.

Fig. 2. *Hesperilla flavescens flavia* Whs.
(a) Larva, lateral view.
(b) Head of larva, front view, enlarged.
(c) Male pupa.
(d) Operculum of male pupa, enlarged.
(e) Operculum of female pupa, enlarged.
(f) Female pupa.

Fig. 3. *Hesperilla donnysa patmos* Whs.
(a) Larva, lateral view.
(b) Head of larva, front view, enlarged.
(c) Male pupa.
(d) Operculum of male pupa, enlarged.
(e) Operculum of female pupa, enlarged.
(f) Female pupa.

Fig. 4. *Ialmenus inous* Hew.
(a) Larva, lateral view.
(b) Larva, dorsal view.
(c) Pupa, lateral view.
(d) Pupa, dorsal view.

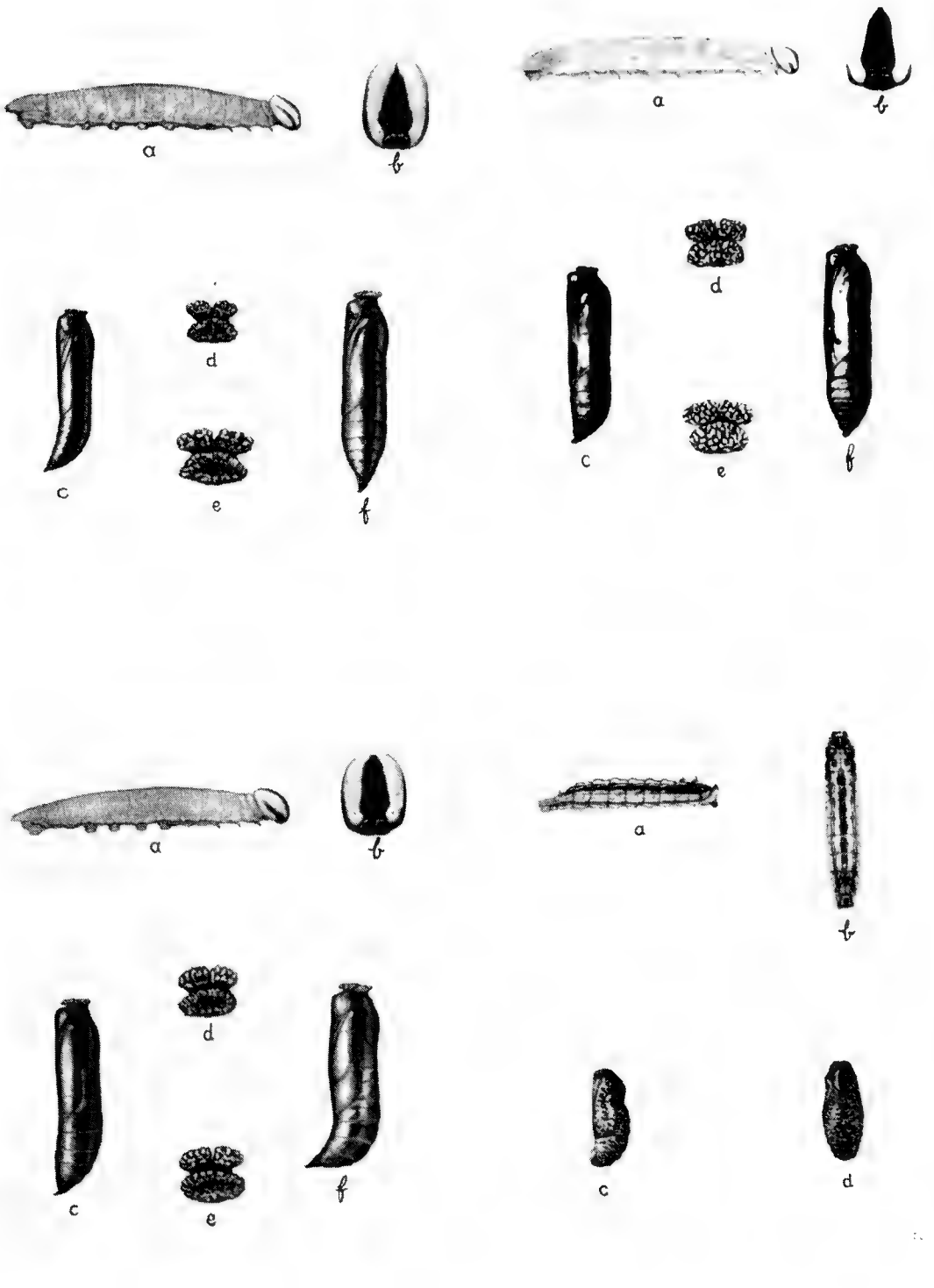
Plate II

Fig. 1. *Hesperilla flavescens flavescens* Whs.

(a)-(f) Males, the last one in the series (f) showing the underside.
(g)-(l) Females, the last one in the series (l) showing the underside.
These specimens were chosen from long series to show the extremes of range in markings.

Fig. 2. *Hesperilla flavescens flavia* Whs.

(a)-(f) Males, the last one in the series (f) showing the underside.
(g)-(l) Females, the last one in the series (l) showing the underside.
These specimens were chosen from long series to show the extremes of range in markings.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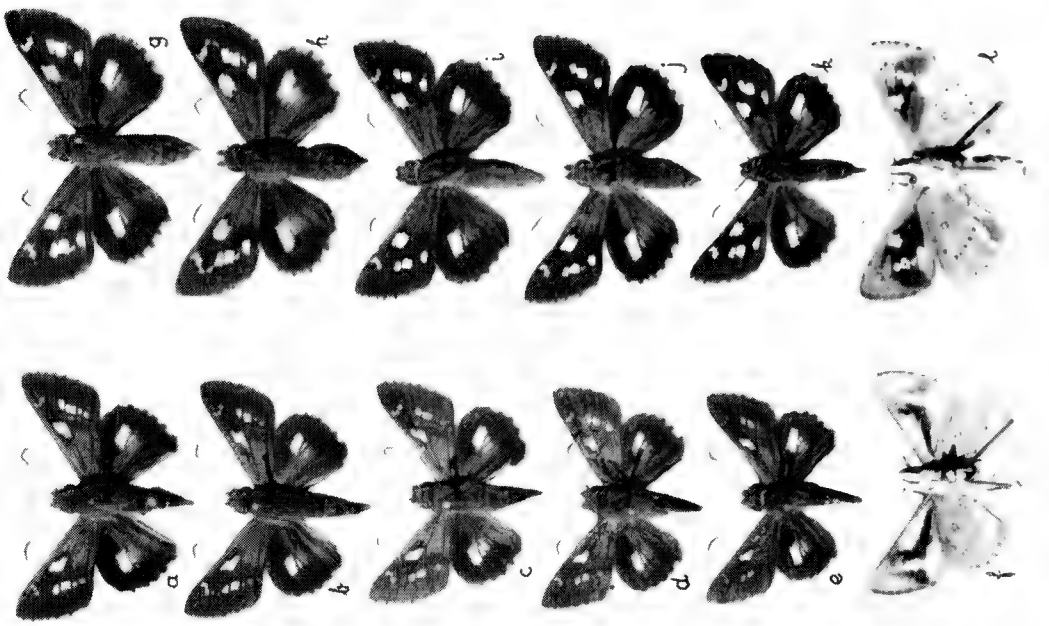
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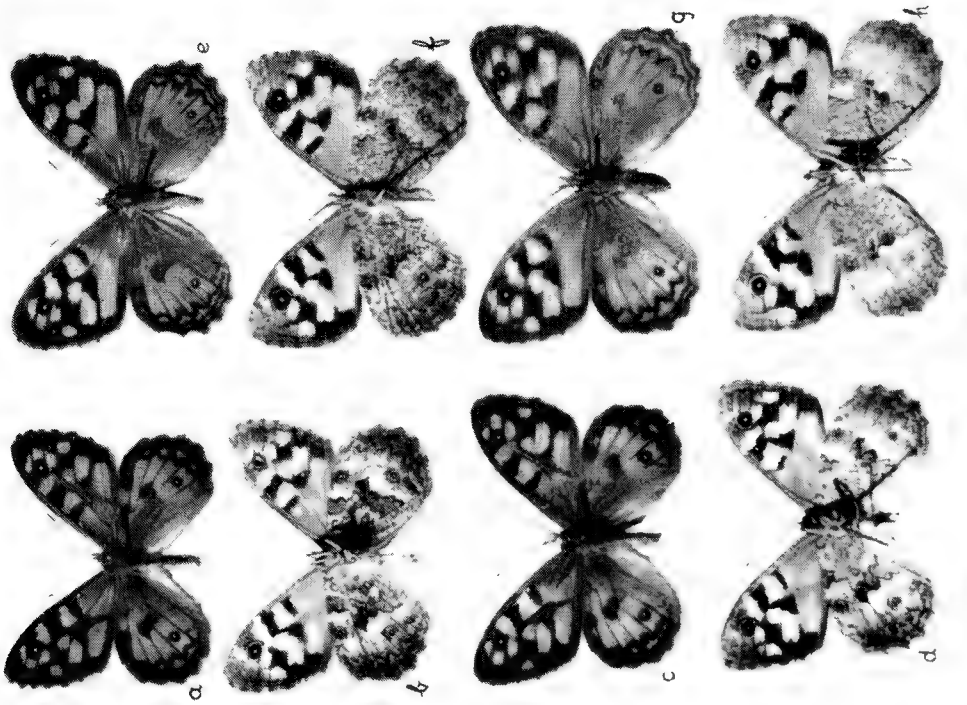
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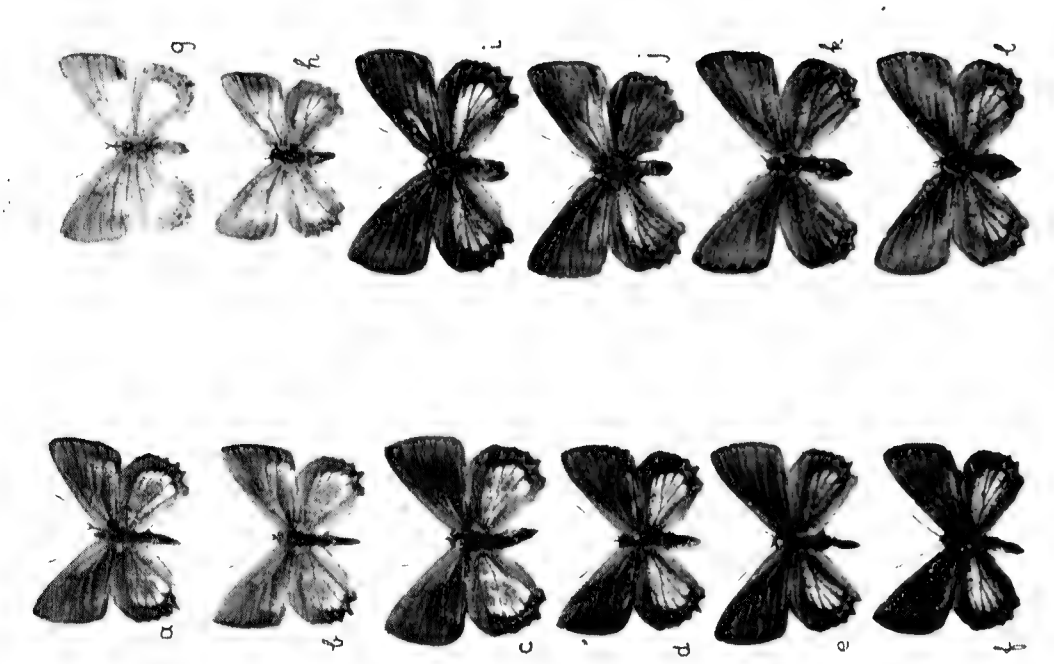
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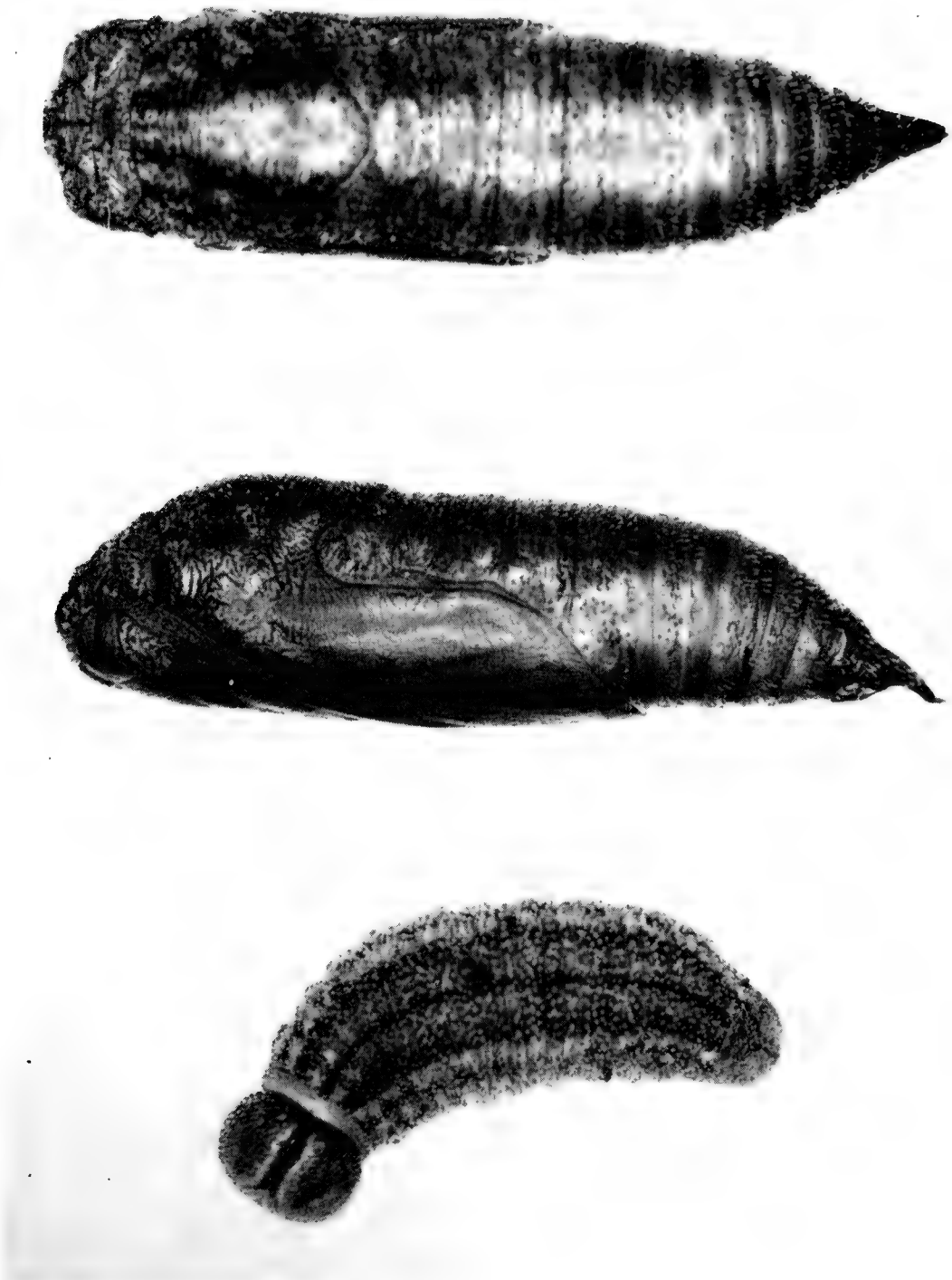


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Plate III

Fig. 1. *Hesperilla donnysa patmos* Whs.
(a)-(f) Males, the last one in the series showing the underside.
(g)-(l) Females, the last one in the series showing the underside.
These specimens were chosen from long series to show the extremes of range in markings.

Fig. 2. (a) *Geitoneura klugi insula* n. subsp. Male.
(b) *Geitoneura klugi insula* n. subsp. Male, underside.
(c) *Geitoneura klugi klugi* Geur. Male, underside.
(d) *Geitoneura klugi klugi* Geur. Male.
(e) *Geitoneura klugi insula* n. subsp. Female.
(f) *Geitoneura klugi insula* n. subsp. Female, underside.
(g) *Geitoneura klugi klugi* Guer. Female.
(h) *Geitoneura klugi klugi* Guer. Female, underside.

Plate IV

Fig. 1. (a) and (b) *Ialmenus icilius parvus* n. subsp. Males. Geraldton, W.A.
(c) and (d) *Ialmenus icilius icilius* Hew. Males. Walebing, W.A.
(e) and (f) *Ialmenus icilius icilius* Hew. Males. Western Grampians, Vic.
(g) and (h) *Ialmenus icilius parvus* n. subsp. Females. Geraldton, W.A.
(i) and (j) *Ialmenus icilius icilius* Hew. Females. Walebing, W.A.
(k) and (l) *Ialmenus icilius icilius* Hew. Females, Western Grampians, Vic.

Fig. 2. (a) *Ialmenus schraederi* ?Feld. Male, upperside.
(b) *Ialmenus schraederi* ?Feld. Male, underside.
(c) *Ialmenus ictinus* Hew. Male, upperside.
(d) *Ialmenus ictinus* Hew. Male, underside.
(e) *Ialmenus schraederi* ?Feld. Female, upperside.
(f) *Ialmenus schraederi* ?Feld. Female, underside.
(g) *Ialmenus ictinus* Hew. Female, upperside.
(h) *Ialmenus ictinus* Hew. Female, underside.

Plate V

Fig. 1. *Anisyntoides argenteo-ornata insula* Whs.—mature larva.
Fig. 2. *Anisyntoides argenteo-ornata* Whs.—pupa, lateral view.
Fig. 3. *Anisyntoides argenteo-ornata insula* Whs.—mature larva.
[Photography by M. W. Mules.]

Plate VI

Fig. 1. *Ialmenus schraederi* ?Feld.
(a) Young larva.
(b) Mature larva.
(c) Pupa.
Fig. 2. *Ialmenus ictinus* Hew.
(a) Mature larva.
(b) Pupa.

A SYSTEMATIC LIST OF THE MARINE AND ESTUARINE MOLLUSCA OF VICTORIA

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Introduction

This list is an attempt to express, in terms of modern nomenclature, the species recorded from the Victorian coast. It is based entirely upon the writings of earlier workers, and the authors have had no opportunity of personally verifying all the species listed. The data with some original specimens is loose, and they require critical comparison with recently collected and adequately dated specimens, on which some morphological work can be done.

In the meantime it is felt that the present revised list will serve a useful purpose in allowing workers to directly relate Victorian mollusca with the modern nomenclature used in recent lists from other parts of Australasia.

Early Victorian conchologists were fortunate in having a detailed checklist, the "Catalogue of the Marine Shells of Victoria," by G. B. Pritchard and J. H. Gatliff, published in parts in the Proceedings of the Royal Society of Victoria, between 1897 and 1905. It was kept up to date until 1930 by a series of papers, "Additions to and Alterations in the Catalogue of Victorian Marine Mollusca," by J. H. Gatliff and C. J. Gabriel, in the same publication. Since this time no attempt has been made to bring our nomenclature into line with that accepted in other States.

Mr. C. J. Gabriel, while retaining a keen interest in marine conchology, has of late years contributed only in the field of land and freshwater mollusca.[1]

[1] *Gabriel, J. C.* "Catalogue of the Land Shells of Victoria," Proc. Roy. Soc. Vict., Vol. 43, Pt. 1 (n.s.), 1930, p. 62.
"Additions to and Alterations in the Catalogue of the Land Shells of Victoria," Mem. Nat. Mus. Vict., Vol. 15, 1947, p. 109.
"The Freshwater Mollusca of Victoria," Mem. Nat. Mus. Vict., Vol. 11, 1939, p. 100.

Acknowledgements

We would like to acknowledge the help of several workers. Firstly, we wish to record our thanks to Mr. C. J. Gabriel, whose generosity in sharing both his specimens and his wide knowledge has greatly helped us.

We are also indebted to Mrs. J. J. Freame for the loan of specimens of *Nudibranchia,* to Mr. A. Carter for allowing us to see the MS. of his list of *Sepiidae,* and to Miss P. Hoggart for preparation of the index and proof reading.

Explanation of Text

This list follows the generally accepted classification of molluscs to the level of genera, but, for convenience, species are listed in alphabetical order. Original generic descriptions are listed, and the type of the genus will be found, in brackets, at the end of the reference.

The original reference to each specific description is also given and where the species has since been removed from its original genus, the latter is inserted after the author's name.

PHYLUM MOLLUSCA

Class CREPIPODA

Order EOPLACOPHORA

Family LEPIDOPLEURIDAE

Terenochiton Iredale, Proc. Mal. Soc., 11, 1914, p. 28. (*subtropicalis* Iredale.)

badius Hedley and Hull, *Lepidopleurus,* Rec. Aust. Mus., 7, 1909, p. 260, pl. 73, f. 1 and 2.

liratus H. Adams and Angas, *Lepidopleurus,* Proc. Zool. Soc., 1864, p. 192.

matthewsianus Bednall, *Lepidopleurus,* Proc. Mal. Soc., 7, 1906, p. 92, pl. 9, f. 1-1f.

Parachiton Thiele, Revision Chitonen (Chun's Zoologica, heft 5-6), Part 1, 1909, p. 14. (*acuminatus* Thiele.)

collusor Iredale and Hull, Aust. Zool., 3, 1925, p. 346, pl. 39, f. 22.

columnarius Hedley and May, *Lepidopleurus,* Rec. Aust. Mus., 7, 1908, p. 123, pl. 24, f. 27-28.

profundus May, *Lepidopleurus,* Illustrated Index Tasm. Shells, 1923, App. and pl. 14, No. 2.

Order MESOPLACOPHORA

Family ISCHNOCHITONIDAE

Subterenochiton Iredale and Hull, Aust. Zool., 3, 1924, p. 227. (*gabrieli* Hull.)

gabrieli Hull, *Ischnochiton,* Proc. Roy. Soc. Vic., 25, 1912, p. 120, pl. 8, f. 1a-f.

Ischnochiton Gray, Proc. Zool. Soc., 1847, p. 126. (*textilis* Gray.)

atkinsoni Iredale and May, Proc. Mal. Soc., 12, 1916, p. 110, pl. 4, f. 3.

cariosus Pilsbry, *Heterozona,* Man. Conch., 14, 1892, p. 65, pl. 24, f. 20-22.

contractus Reeve, *Chiton,* Conch. Icon., 4, 1847, pl. 15, f. 78.

elongatus Blainville, *Chiton,* Dict. Sci. Nat., 36, 1825, p. 542.

falcatus Hull, Proc. Roy. Soc. Vic., 25, 1912, p. 121, pl. 8.
fruticosus Gould, *Chiton*, Proc. Bost. Soc. Nat. Hist., 2, 1846, p. 142.
lentiginosa Sowerby, *Chiton*, Mag. Nat. Hist., Charlesworth, 4, 1840, p. 293.
lineolatus Blainville, *Chiton*, Dict. Sci. Nat., 36, 1825, p. 541.
pura Sykes, Proc. Mal. Soc., 2, 1896, p. 88, pl. 6, f. 3, 3a.
resplendens Bednall and Matthews, Proc. Mal. Soc., 7, 1906, p. 91, pl. 9, f. 4-4f.
smaragdinus Angas, *Lophyrus*, Proc. Zool. Soc., 1867, p. 115, pl. 13, f. 28.
subviridis Iredale and May, Proc. Mal. Soc., 12, 1916, p. 105, pl. 4, f. 2.
tateanus Bednall, Proc. Mal. Soc., 2, 1897, p. 147, pl. 12, f. 3 and text fig.
thomasi Bednall, Proc. Mal. Soc., 2, 1897, p. 149, text fig. and pl. 12, f. 4 and 5.
torri Iredale and May, Proc. Mal. Soc., 12, 1916, p. 111, pl. 5, f. 3.
versicolor Sowerby, *Chiton*, Mag. Nat. Hist., Charlesworth, 4, 1840, p. 292.
virgatus Reeve, *Chiton*, Conch. Icon., 4, 1847, pl. 28, f. 192.
wilsoni Sykes, Proc. Mal. Soc., 2, 1896, p. 89, pl. 6, f. 1, 1a.

STENOCHITON H. Adams and Angas, Proc. Zool. Soc., 1864, p. 193. (*juloides* H. Adams and Angas.)
cymodocealis Ashby, Trans. Roy. Soc. S.A., 42, 1918, p. 70, pl. 13 and 14, f. 1, 4, 5, 11, 12 (a, b, c, d, e).
longicymba Blainville, *Chiton*, Dict. Sci. Nat., 36, 1825, p. 542.
pallens Ashby, Trans. Roy. Soc. S.A., 24, 1900, p. 86, pl. 1, f. 1a-g.
pilsbryanus Bednall, *Ischnochiton*, Proc. Mal. Soc., 2, 1897, p. 142, text fig.

ISCHNORADSIA Shuttleworth, Mittheil. Natur. Gesell. Berne., 1853, p. 189. (*australis* Sowerby.)
australis Sowerby, *Chiton*, Mag. Nat. Hist., Charlesworth, 4, 1840, p. 290.
evanida Sowerby, *Chiton*, Mag. Nat. Hist., Charlesworth, 4, 1840, p. 291.

Family CALLISTOCHITONIDAE

CALLISTELASMA Iredale and Hull, Aust. Zool., 3, 1925, p. 351. (*antiqua* Reeve.)
antiqua Reeve, *Chiton*, Conch. Icon., 4, 1847, pl. 25, f. 169.
meridionalis Ashby, *Callistochiton*, Trans. Roy. Soc. S.A., 43, 1919, p. 400, pl. 42, f. 7.

CALLISTASSECLA Iredale and Hull, Aust. Zool., 3, 1925, p. 351. (*mawlei* Iredale and May.)
mawlei Iredale and May, *Callistochiton*, Proc. Mal. Soc., 12, 1916, p. 113, pl. 4, f. 5.

Order ISOPLACOPHORA

Family CRYPTOCONCHIDAE

CRASPEDOPLAX Iredale and Hull, Aust. Zool., 4, 1925, p. 96. (*variabilis* H. Adams and Angas.)
cornuta Torr and Ashby, *Acanthochites*, Trans. Roy. Soc. S.A., 1898, p. 217,
variabilis H. Adams and Angas, *Hanleya*, Proc. Zool. Soc., 1864, p. 194. pl. 6, f. 3.

METUROPLAX Pilsbry, Nautilus, 7, 1894, p. 107. (*retrojecta* Pilsbry.)
retrojecta Pilsbry, *Acanthochites*, Nautilus, 7, 1894, p. 107.

ACANTHOCHITON Gray, London Medical Repository, 15, 1821, p. 234. (*fascicularis* Linn.)
bednalli Pilsbry, *Acanthochites*, Proc. Acad. Nat. Sci. Philad., 1894, p. 81, pl. 2, f. 7-11.

coxi Pilsbry, *Acanthochites,* Nautilus, 7, 1894, p. 119.
gatliffi Ashby, Trans. Roy. Soc. S.A., 43, 1919, p. 398, pl. 42, f. 2-5.
granostriatus Pilsbry, *Acanthochites,* Nautilus, 8, 1894, p. 119.
kimberi Torr, *Acanthochites,* Trans. Roy. Soc. S.A., 36, 1912, p. 167, pl. 6, f. 5a-f.
pilsbryi Sykes, *Acanthochites,* Proc. Mal. Soc., 2, 1896, p. 91, pl. 6, f. 6, 6a.
sueurii Blainville, *Chiton,* Dict. Sci. Nat., 36, 1825, p. 553.
wilsoni Sykes, *Acanthochites,* Proc. Mal. Soc., 2, 1896, p. 92, pl. 6, f. 2, 2c.

NOTOPLAX H. Adams, Proc. Zool. Soc., 1861, p. 385. (*speciosa* H. Adams.)
costata H. Adams and Angas, *Acanthochites,* Proc. Zool. Soc., 1864, p. 194.
speciosa H. Adams, *Cryptoplax,* Proc. Zool. Soc., 1861, p. 385.

BASSETHULLIA Pilsbry, Nautilus, 41, 1928, p. 105. (*matthewsi* Pilsbry.)
glypta Sykes, *Acanthochites,* Proc. Mal. Soc., 2, 1896, p. 92, pl. 6, f. 5, 5a.
matthewsi Pilsbry, *Acanthochites,* Nautilus, 7, 1894, p. 120.

Family CRYPTOPLACIDAE

CRYPTOPLAX Blainville, Dict. Sci. Nat. (Levrault), 12, 1818, p. 124. (*larvaeformis* Burrow.)
iredalei Ashby, Trans. Roy. Soc. S.A., 47, 1923, p. 238, pl. 19, f. 4.
striata Lamarck, *Chitonellus,* Anim. s. Vert., 6, 1819, p. 317.

Family PLAXIPHORIDAE

PONEROPLAX Iredale, Proc. Mal. Soc., 11, 1914, p. 32. (*costata* Blainville.)
albida Blainville, *Chiton,* Dict. Sci. Nat. (Levrault), 36, 1825, p. 547.
costata Blainville, *Chiton,* Dict. Sci. Nat. (Levrault), 36, 1825, p. 548.

KOPIONELLA Ashby, Trans. Roy. Soc. S.A., 43, 1919, p. 71. (*matthewsi* Iredale.)
matthewsi Iredale, *Plaxiphora,* Proc. Mal. Soc., 9, 1910, p. 99.

Order TELEOPLACOPHORA

Family AULACOCHITONIDAE

LORICELLA Pilsbry, Man. Conch., 14, 1893, p. 238. (*angasi* H. Adams.)
angasi H. Adams, *Lorica,* Proc. Zool. Soc., 1864, p. 193.

AULACOCHITON Shuttleworth, Mitt. Naturf. Ges. Berne., 1853, p. 192. (*volvox* Reeve.)
cimolia Reeve, *Chiton,* Conch. Icon., 4, 1847, pl. 21, f. 141.

Family LEPIDOCHITONIDAE

PARICOPLAX Iredale and Hull, Aust. Zool., 6, 1929, p. 87. (*crocina* Reeve.)
crocina Reeve, *Chiton,* Conch. Icon., 4, pl. 22, f. 146.

ACUTOPLAX Cotton and Weeding, Trans. Roy. Soc. S.A., 63, 1939, p. 189. (*mayi* Torr.)
mayi Torr, *Callochiton,* Proc. Roy. Soc. Tas., 1912, p. 1.
rufa Ashby, *Callistochiton,* Trans. Roy. Soc. S.A., 24, 1900, p. 87, pl. 1, f. 2a-g.

Family CHITONIDAE

ANTHOCHITON Thiele, Das Gebiss den Schnecken (Troschel), 2, 1893, p. 377. (*tulipa* Quoy and Gaimard.)
bednalli Pilsbry, *Chiton,* Nautilus, 9, 1895, p. 90.
calliozona Pilsbry, *Chiton,* Nautilus, 8, 1894, p. 55.
diaphora Iredale and May, *Rhyssoplax,* Proc. Mal. Soc., 12, 1916, p. 115, pl. 5, f. 1.
exoptanda Bednall, *Chiton,* Proc. Mal. Soc., 2, 1897, p. 152, text fig. and pl. 12, f. 7.

jugosa Gould, *Chiton,* Proc. Bost. Soc. Nat. Hist., 2, 1846, p. 142.
orukta Maughan, *Chiton,* Trans. Roy. Soc. S.A., 24, 1900, p. 89, pl. 1, f. 3a-g.
tricostalis Pilsbry, *Chiton,* Nautilus, 8, 1894, p. 54.
MUCROSQUAMA Iredale and Hull, Aust. Zool., 4, 1926, p. 182. (*carnosus* Angas.)
verconis Torr and Ashby, *Chiton,* Trans. Roy. Soc. S.A., 2, 1898, p. 215, pl. 6, f. 1.

Class GASTROPODA

Subclass STREPTONEURA

Order ASPIDOBRANCHIA

Suborder ARCHAEOGASTROPODA

Superfamily ZEUGOBRANCHIA

Family HALIOTIDAE

HALIOTIS Linne, Syst. Nat., ed. 10, 1758, p. 779. (*midae* Linne.)
coccoradiatum Reeve, Conch. Icon., 3, 1846, pl. 13, f. 46.
conicopora Peron, Voy. "Terre. Aust.," 2, 1816, p. 80.
cyclobates Peron, Voy. "Terre Aust.," 2, 1816, p. 80.
emmae Reeve, Conch. Icon., 3, 1846, pl. 10, f. 29.
improbulum Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 222.
laevigata Donovan, Rees Encyclopaedia, Conch. Series, 1808, pl. 6.
ruber Leach, Zool. Misc., 1, 1814, p. 54, pl. 23.

Family SCISSURELLIDAE

SCISSURONA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 215. (*rosea* Hedley.)
remota Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 215.
SCHIZOTROCHUS Monterosata, Ann. Mus. Stoc. Nat. Genova, 9, 1877, p. 416. (*crispata* Flemming.)
australis Hedley, *Scissurella,* Mem. Aust. Mus., 4, 1903, p. 329, f. 63.
SCHISMOPE Jeffrey, Ann. Mag. Nat. Hist., 17, 1856, p. 321. (*striatula* Philippi.)
atkinsoni T. Woods, *Scissurella,* Proc. Roy. Soc. Tas., 1876, p. 149.
beddomei Petterd, Journ. of Conch., 4, 1884, p. 139.
pulchra Petterd, Journ. of Conch., 4, 1884, p. 139.

Family FISSURELLIDAE

SCUTUS Monfort, Conch. Syst., 2, 1810, p. 58. (*ambiguus* Chemnitz.)
anatinus Donovan, Rees. Encyclop. Conch., 5, 1820, pl. 16.
antipodes Montfort, Conch. Syst., 2, 1810, p. 58.
TUGALIA Gray, Dieffenbach's New Zealand, 2, 1843, p. 240. (*elegans* Gray.)
cicatricosa A. Adams, Proc. Zool. Soc., 1851, p. 89.
EMARGINULA Lamarck, Syst. Anim., 1801, p. 69. (*conica* Lamarck.)
amitina Iredale, Rec. Aust. Mus., 14, 1925, p. 257, pl. 42, f. 12, 13.
australis Quoy and Gaimard, Voy. "Astrolabe," Zool. 3, p. 328, pl. 68, f. 11-12.
candida A. Adams, Proc. Zool. Soc., 1851, p. 85.
dilecta A. Adams, Proc. Zool. Soc., 1851, p. 85.
superba Hedley and Petterd, Rec. Aust. Mus., 6, 1906, p. 216, pl. 37, f. 7, 8.
MONTFORTULA Iredale, Trans. New Zeal. Instit., 47, 1914, p. 433. (*rugosa* Q. and G.)
conoidea Reeve, *Emarginula,* Conch. Syst., 2, 1842, pl. 140, f. 7.

rugosa Quoy and Gaimard, *Emarginula,* Voy. "Astrolabe," Zool. 3, 1834, p. 331, pl. 68, f. 17-18.

HEMITOMA Swainson, Malacology, 1840, p. 356. (*tricostata* Swainson.)

subemarginata Blainville, *Emarginula,* Dict. Sci. Nat. (Levrault), 14, 1819, p. 382.

COSMETALEPAS Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 218. (*concatenata* Crosse and Fischer.)

concatenata Crosse and Fischer, *Fissurella,* Journ. de Conch., 12, 1864, p. 348.

AMBLYCHILEPAS Pilsbry, Man. Conch., 12, 1890, p. 184. (*javanicensis* Lamarck.)

javanicensis Lamarck, *Fissurella,* Anim. s. Vert., 6 (2), 1822, p. 14.

omicron Crosse and Fischer, *Fissurella,* Journ. de Conch., 12, 1864, p. 348.

SOPHISMALEPAS Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 219. (*nigrita* Sowerby.)

crusis Beddome, *Fissurella,* Proc. Roy. Soc. Tas., 1882, p. 169.

nigrita Sowerby, *Fissurella,* Proc. Zool. Soc., 1834, p. 127.

oblonga Menke, *Fissurella,* Moll. Nov. Holl., 1834, p. 33.

MACROCHISMA Swainson, Malac., 1840, p. 356. (*hiatula* Swainson.)

producta A. Adams, Proc. Zool. Soc., 1850, p. 202.

tasmaniae Sowerby, Thes. Conch., 3, 1866, p. 206, pl. 244, f. 223.

ELEGIDION Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 220. (*audax* Iredale.)

audax Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 220.

VACERRA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 221. (*demissa* Hedley.)

demissa Hedley, *Puncturella,* Rec. Aust. Mus., 5, 1904, p. 93, f. 19.

harrisoni Beddome, *Cemori,* Proc. Roy. Soc. Tas., 1882, p. 168.

Suborder DOCOGLOSSA

Superfamily PATELLACEA

Family PATELLIDAE

PATELLANAX Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 239. (*squamifera* Reeve.)

chapmani T. Woods, *Patella,* Proc. Roy. Soc. Tas., 1876, p. 157.

peroni Blainville, *Patella,* Dict. Sci. Nat. (Levrault), 38, 1825. p. 111.

squamifera Reeve, *Patella,* Conch. Icon., 8, 1855, pl. 32, sp. 94.

victoriana Singleton, Proc. Roy. Soc. Vic., 49, 1937, p. 391, pl. 23, f. 1.

CELLANA H. Adams, Proc. Zool. Soc., 1869, p. 274. (*cernica* H. Adams.)

laticostata Blainville, *Patella,* Dict. Sci. Nat. (Levrault), 38, 1825, p. 111.

rubraurantiaca Blainville, *Patella,* Dict. Sci. Nat. (Levrault), 38, 1825, p. 110.

tramoserica Sowerby, *Patella,* Cat. Tankerville Coll., 1825, p. 30.

Family LOTTIIDAE

PATELLOIDA Quoy and Gaimard, Voy. "Astrolabe," Zool. 3, 1834, p. 349. (*rugosa* Quoy and Gaimard.)

alticostata Angas, *Patella,* Proc. Zool. Soc., 1856, p. 56, pl. 2, f. 11.

latistrigata Angas, *Patella,* Proc. Zool. Soc., 1865, p. 154.

nigrosulcata Reeve, *Patella,* Conch. Icon., 8, 1855, pl. 30, sp. 84.

submarmorata Pilsbry, *Acmaea,* Man. Conch., 13, 1891, p. 52, pl. 42, f. 69-70.

CHIAZACMEA Oliver, Trans. and Proc. New Zealand Inst., 56, 1926, p. 558. (*flammea* Quoy and Gaimard.)

flammea Quoy and Gaimard, *Patelloida,* Voy. "Astrolabe," Zool., 3, 1834, p. 354, pl. 71, f. 15, 16.

mixta Reeve, *Patella,* Conch. Icon., 8, 1855, pl. 39, sp. 129.

ASTERACMEA Oliver, Trans. and Proc. New Zealand Inst., 56, 1926, p. 563. (*illibrata* Verco.)
illibrata Verco, *Helcioniscus,* Trans. Roy. Soc. S.A., 30, 1906, p. 205, pl. 10, f. 6-14.
stowae Verco, *Nacella,* Trans. Roy. Soc. S.A., 30, 1906, p. 209, pl. 10, f. 4-5.
NACCULA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 238. (*parva* Angas.)
parva Angas, *Nacella,* Proc. Zool. Soc., 1878, p. 862, pl. 54, f. 12.
ACTINOLEUCA Oliver, Trans. and Proc. New Zealand Inst., 56, 1926, p. 567. (*campbelli* Filhol.)
calamus Crosse and Fischer, *Patella,* Journ. de Conch., 1864, p. 348.
NOTOACMEA Iredale, Trans. New Zealand Inst., 47, 1915, p. 428. (*pileopsis* Quoy and Gaimard.)
mayi May, Illus. Index Tas. Shells, 1923, App. and pl. 22, f. 3.
scabrilirata Angas, *Acmea,* Proc. Zool. Soc., 1865, p. 154.
septiformis Quoy and Gaimard, *Patelloida,* Voy. "Astrolabe," Zool., 3, 1834, p. 362, pl. 71, f. 43, 44.
CONACMEA Oliver, Trans. New Zealand Inst., 56, 1926, p. 577. (*parviconoidea* Suter.)
alta Oliver, *Notoacmea,* Trans. New Zealand Inst., 56, 1926, p. 579, pl. 99, f. 6.

Suborder RHIPIDOGLOSSA

Superfamily TROCHACEA

Family TROCHIDAE

CLANCULUS Montfort, Conch. Syst., 2, 1810, p. 190. (*pharaonius* Linne.)
aloysii T. Woods, Proc. Zool. Soc. Tas., 1875, p. 155.
brunneus A. Adams, Proc. Zool. Soc., 1851, p. 161.
dunkeri Koch, *Trochus,* In Philippi, Abbild und Besch Neuer Conch. k., 1, 1843, p. 67, pl. 2, f. 5.
flagellatus Philippi, *Trochus,* Zeit f. Malak., 5, 1848, p. 105.
floridus Philippi, *Trochus,* Zeit f. Malak., 6, 1849, p. 156.
limbatus Quoy and Gaimard, *Trochus,* Voy. "Astrolabe," Zool., 3, 1834, p. 245, pl. 63, f. 1-6.
maugeri Wood, *Trochus,* Index Test. Suppl., 1828, p. 17, pl. 5, f. 27.
ochroleucus Philippi, *Trochus,* Conch. Cab., No. 310, 1853, p. 243, pl. 36, f. 16.
personatus Philippi, *Trochus,* Zeits. f. Malak., 1846, p. 99.
plebjus Philippi, *Trochus,* Zeits. f. Malak., 8, 1851, p. 41.
undatus Lamarck, *Monodonta,* Encycl. Meth., 1816, p. 16, pl. 447, f. 3a, b.
CANTHARIDUS Montfort, Syst. Conch., 2, 1810, p. 251. (*iris* Gmelin.)
pulcherrimus Wood, *Trochus,* Index Test. Suppl., 1828, p. 18, pl. 6, f. 45.
ramburi Crosse, *Trochus,* Journ. de Conch., 1864, p. 342, pl. 13, f. 3.
PHASIANOTROCHUS Fischer, Man. Conch., 1885, p. 819. (*eximius* Perry.)
apicinus Menke, *Monodonta,* Moll. Nov. Holl., 1843, p. 15.
bellulus Dunker, *Trochus,* In Philippi, Abild. Besch. Neuer Conch., 2, 1845, p. 34, pl. 7, f. 6.
eximius Perry, *Bulimus,* Conch., 1811, pl. 30, f. 2.
irisodontes Quoy and Gaimard, *Trochus,* Voy. "Astrolabe," Zool., 3, 1834, p. 246, pl. 63, f. 7-12.
nitidulus Philippi, *Trochus,* Conch. Cab., 1849, p. 295.
rutilus A. Adams, *Elenchus,* Proc. Zool. Soc., 1851, p. 171.
THALOTIA Gray, Syn. Cont. Brit. Mus. ed., 42, 1840, p. 147. (*conica* Gray.)
comtessi Iredale, Rec. Aust. Mus., 18, 1931, p. 208, pl. 23, f. 8.
conica Gray, *Monodonta,* King's Survey Aust., App. 2, 1827, p. 479.

Bankivia Krauss, Die Sudafr. Mollusk., 1848, p. 105. (*fasciata* Menke.)
fasciata Menke, *Phasianella*, Syn. Meth. Moll., 1830, p. 141.
Leiopyrga, H. and A. Adams, Ann. Mag. Nat. Hist., ser. 3, 11, 1863, p. 19. (*lineolaris* Gould.)
lineolaris Gould, *Cantharidus*, Proc. Boston Soc. Nat. Hist., 8, 1861, p. 18.
octona Tate, Proc. Roy. Soc. S.A., 14, 1891, p. 260, pl. 11, f. 5.
Cantharidella Pilsbry, Man. Conch., 11, 1889, p. 197. (*picturata* Ad. and Ang.)
tiberiana Crosse, *Trochus*, Journ. de Conch., 11, 1863, p. 381, pl. 13, f. 2.
Austrocochlea Fischer, Man. Conch., 1885, p. 820. (*constricta* Lamarck.)
adelaidae Philippi, *Trochus*, Conch. Cab., 2, 1849, p. 140, pl. 24, f. 1.
concamerata Wood, *Trochus*, Index Test. Supp., 1828, p. 17, pl. 6, f. 35.
constricta Lamarck, *Monodonta*, Anim. s. vert., 7, 1822, p. 36.
obtusa Dillwyn, *Trochus*, Descrip. Cat., 2, 1817, p. 809.
odontis Wood, *Trochus*, Index Test. Supp., 1828, p. 17, pl. 6, f. 37.
Gibbula Risso, Hist. Nat. Europe, 4, 1826, p. 134. (*magus* Linne.)
coxi Angas, Proc. Zool. Soc., 1867, p. 115, pl. 13, f. 26.
lehmanni Menke, *Turbo*, Moll. Nov. Holl., 1843, p. 18.
preissiana Philippi, *Trochus*, Zeits. f. Malak., 1848, p. 123.
tasmanica Petterd, Journ. of Conch., 2, 1897, p. 103.
Fossarina Adams and Angas, Proc. Zool. Soc., 1863, p. 423. (*patula* Ad. and Ang.)
brazieri Angas, Proc. Zool. Soc., 1871, p. 18, pl. 1, f. 24.
legrandi Petterd, Journ. of Conch., 2, 1897, p. 104.
petterdi Crosse, Journ. de Conch., 18, 1870, p. 303.

Family CALLIOSTOMATIDAE

Calliostoma Swainson, Malacology, 1840, p. 351. (*conulum* Linne.)
allporti T. Woods, *Zizyphinus*, Proc. Roy. Soc. Tas., 1875, p. 155.
armillata Wood, *Trochus*, Index Test. Suppl. 1828, p. 16, pl. 5, f. 5a.
australis Broderip, *Trochus*, Zool. Journ., 5, 1835, p. 331.
compta A. Adams, *Zizyphinus*, Proc. Zool. Soc., 1854, p. 38.
hedleyi Pritchard and Gatliff, Proc. Roy. Soc. Vic., 14, 1902, p. 182, pl. 9, f. 4.
incerta Reeve, *Zizyphinus*, Conch. Icon., 14, 1863, pl. 5, sp. 28.
legrandi T. Woods, *Zizyphinus*, Proc. Roy. Soc. Tas., 1875, p. 154.
nobile Philippi, *Trochus*, Conch. Cab., 1846, p. 86, pl. 15, f. 6, and pl. 38, f. 1.
zietze Vereo, Trans. Roy. Soc. S.A., 29, 1905, p. 166, pl. 31, f. 1-3.
Astele Swainson, Proc. Roy. Soc. V.D. Land, 3, 1854, p. 38. (*subcarinatum* Swainson.)
subcarinatum Swainson, Proc. Roy. Soc. V.D. Land, 3, 1854, p. 38, pl. 6, f. 1, 2.
Astelena Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 230. (*scitula* A. Adams.)
scitula A. Adams, *Zizyphinus*, Proc. Zool. Soc., 1854, p. 38.

Family UMBONIIDAE

Nanula Thiele, Nitt. Zool. Mus., Berlin, 11, 1924, p. 54. (*tasmanica* Petterd.)
tasmanica Petterd, *Margarita*, Proc. Roy. Soc. Tas., 1877, p. 143.
Spectamen Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 227. (*philippensis* Watson.)
philippensis Watson, *Trochus*, Journ. Linn. Soc. Zool., 15, 1881, p. 92.

Family STOMATELLIDAE

STOMATELLA Lamarck, Encyl. Meth. (Vers), 1816, p. 10, pl. 450. (*imbricata* Lamarck.)
imbricata Lamarck, Anim. S. Vert., 6 (2), 1822, p. 209 .
HERPETOPOMA Pilsbry, Man. Conch., 11, 1890, p. 430. (*scabriuscula* Ad. and Angas.)
atrata Gmelin, *Turbo*, Syst. Nat., 13, 1791, p. 3601.
baccata Menke, *Monodonta*, Moll. Nov. Holl., 1843, p. 14.
profundior May, *Euchelus*, Proc. Roy. Soc. Tas., 1915, p. 98, pl. 7, f. 39.
pumilio Tate, *Euchelus*, Proc. Roy. Soc. S.A., 17, 1893, p. 196, pl. 1, f. 3.
scabriuscula Angas, *Euchelus*, Proc. Zool. Soc., 1867, p. 215.
tasmanica, T. Woods, *Euchelus*, Proc. Roy. Soc. Tas., 1875, p. 152.

Family STOMATIIDAE

GENA Gray, Proc. Zool. Soc., 1847, p. 146. (*nigra* Quoy and Gaimard.)
auricula Lamarck, *Stomatella*, Tabl. Encly. Meth., 1818, p. 10, pl. 450, f. 1.
impertusa Burrow, *Haliotis*, Elem. Conch., 1825, p. 162, pl. 21, f. 2.

Family LIOTIIDAE

CALLOMPHALA Adams and Angas, Proc. Zool. Soc., 1864, p. 36. (*lucida* Ad. and Ang.)
lucida Adams and Angas, *Neritula*, Proc. Zool. Soc., 1864, p. 35.
CIRSONELLA Angas, Proc. Zool. Soc., 1877, p. 38. (*australis* Angas.)
microscopica Gatliff and Gabriel, *Cyclostrema*, Proc. Roy. Soc. Vic., 23, 1910, p. 85, pl. 18, f. 5-7.
translucida May, Proc. Roy. Soc. Tas., 1915, p. 97, pl. 7, f. 38.
weldii T. Woods, *Cyclostrema*, Proc. Roy. Soc. Tas., 1876, p. 147.
BROOKULA Iredale, Proc. Mal. Soc., 10, 1912, p. 219. (*stibarochila* Iredale.)
angeli T. Woods, *Rissoa*, Proc. Roy. Soc. Tas., 1876, p. 153.
crebrisculpta Tate, *Cyclostrema*, Proc. Roy. Soc. S.A., 23, 1899, p. 219, pl. 7, f. 5.
densilaminata Verco, *Cyclostrema*, Proc. Roy. Soc. S.A., 31, 1907, p. 306, pl. 29, f. 9.
johnstoni Beddome, *Cyclostrema*, Proc. Roy. Soc. Tas., 1882, p. 168.
nepeanensis Gatliff, *Scala*, Proc. Roy. Soc. Vic., 20, 1906, p. 1, pl. 1, f. 5.
LISSOTESTA Iredale, Trans. New Zealand Instit., 47, 1915, p. 442. (*micra* T. Woods.)
contabulata Tate, *Cyclostrema*, Proc. Roy. Soc. S.A., 23, 1899, p. 222, pl. 7, f. 6.
micra T. Woods, *Cyclostrema*, Proc. Roy. Soc. Tas., 1876, p. 147.
porcellana Tate and May, *Cyclostrema*, Proc. Roy. Soc. S.A., 24, 1900, p. 101.
ZALIPAIS Iredale, Trans. New Zealand Instit., 47, 1915, p. 442. (*lissum* Suter.)
inscripta Tate, *Cyclostrema*, Proc. Roy. Soc. S.A., 23, 1899, p. 216, pl. 7, f. 3a, 3b.
ELACHORBIS Iredale, Trans. New Zealand Instit., 47, 1915, p. 443. (*tatei* Angas.)
caperatum Tate, *Cyclostrema*, Proc. Roy. Soc. S.A., 23, 1899, p. 216, pl. 7, f. 1a, 1b.
delectabile Tate, *Cyclostrema*, Proc. Roy. Soc. S.A., 23, 1899, p. 216, pl. 7, f. 4.
harriettae Petterd, *Cyclostrema*, Journ. of Conch., 4, 1884, p. 141.

homalon Verco, *Cyclostrema*, Proc. Roy. Soc. S.A., 31, 1907, p. 305, pl. 29, f. 3, 4.

LIOTELLA Iredale, Trans. New Zealand Instit., 47, 1915, p. 442. (*polypleura* Hedley.)

annulata T. Woods, *Liotia*, Proc. Roy. Soc. Tas., 1878, p. 121.

kilcundae Gatliff and Gabriel, *Cyclostrema*, Proc. Roy. Soc. Vic., 27, 1914, p. 95, pl. 15, f. 8-10.

petalifera Hedley and May, *Liotia*, Rec. Aust. Mus., 7, 1908, p. 116, pl. 22, f. 6, 7, 8.

vercoi Gatliff and Gabriel, *Cyclostrema*, Proc. Roy. Soc. Vic., 27, 1914, p. 96, pl. 15, f. 1-3.

LODDERIA Tate, Proc. Roy. Soc. S.A., 23, 1899, p. 215. (*lodderae* Petterd.)

lodderae Petterd, *Liotia*, Journ. of Conch., 4, 1884, p. 135.

minima T. Woods, *Liotia*, Trans. Roy. Soc. Vic., 14, 1878, p. 58.

PSEUDOLIOTIA Tate, Trans. Roy. Soc. S.A., 22, 1898, p. 71. (*micans* Adams.)

micans Adams, *Cyclostrema*, Proc. Zool. Soc., 1850, p. 44.

MUNDITIA Finlay, Trans. New Zealand Instit., 57, 1926, p. 363. (*tryphenensis* Powell.)

australis Kiener, *Delphinula*, Icon. Coq. Viv., 10, 1839, p. 8, pl. 4, f. 7.

hedleyi Pritchard and Gatliff, *Liotia*, Proc. Roy. Soc. Vic., 12 (n.s.), 1899, p. 105.

subquadrata T. Woods, *Liotia*, Proc. Linn. Soc. N.S.W., 3, 1878, p. 236.

tasmanica T. Woods, *Liotia*, Proc. Roy. Soc. Tas., 1875, p. 153.

LIOTINA Munier-Chalmas, in Fischer, Man. Conch., 1885, p. 831. (*gervillei* Defrance.)

mayana Tate, *Liotia*, Proc. Roy. Soc. S.A., 23, 1899, p. 227, pl. 6, f. 5a-5c.

CHARISMA Hedley, Proc. Linn. Soc. N.S.W., 29, 1915, p. 711. (*compacta* Hedley.)

arenacea Pritchard and Gatliff, *Leptothyra*, Proc. Roy. Soc. Vic., 14 (n.s.), 1902, p. 181, pl. 9, f. 3.

josephi T. Woods, *Cyclostrema*, Proc. Roy. Soc. Tas., 1876, p. 147.

CROSSEOLA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 251. (*concinna* Angas.)

cancellata T. Woods, *Crossea*, Proc. Roy. Soc. Tas., 1878, p. 122.

carinata Hedley, *Crossea*, Mem. Aust. Mus., 4, 1903, p. 345, f. 71.

concinna Angas, *Crossea*, Proc. Zool. Soc., 1867, p. 911, pl. 44, f. 14.

naticoides Hedley, *Crossea*, Rec. Aust. Mus., 6, 1907, p. 290, pl. 54, f. 6-7.

DOLICROSSEA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 251. (*labiata* T. Woods.)

labiata T. Woods, *Crossea*, Proc. Roy. Soc. Tas., 1875, p. 151.

ARGALISTA Iredale, Trans. New Zealand Instit., 47, 1915, p. 445. (*fluctuata* Hutton.)

rosea, T. Woods, *Monilea*, Proc. Roy. Soc. Tas., 1876, p. 154.

MICRODISCULA Thiele, Dtsch. Sudpolar Exped., 13 (Zool., 5), 1912, p. 199. (*vanhoffeni* Thiele.)

charopa Tate, *Cyclostrema*, Trans. Roy. Soc. S.A., 23, 1899, p. 217, pl. 7, f. 2a-2c.

SKENELLA Pfeffer, Jahrb. Wiss. Anst. Hamburg, 3, 1886, p. 96. (*serpuloides* Montagu.)

bruniensis Beddome, *Cyclostrema*, Proc. Roy. Soc. Tas., 1882, p. 168.

Family TURBINIDAE

SUBNINELLA Thiele, Hand. Syst. Weight., 1929, p. 68. (*undulata* Solander.)

undulata Solander, *Turbo*, Cat. Portland Mus., 1786.

NINELLA Gray, Figs. Moll. Anim., 4, 1850, p. 87. (*torquata* Gmelin.)
torquata Gmelin, *Turbo,* Syst. Nat., 1788, p. 3597, no. 106.
EUNINELLA Cotton and Godfrey, Mal. Soc. S. Aust., Pub. No. 1, Gastr. 1938, p. 9. (*gruneri* Philippi.)
gruneri Phillipi, *Turbo,* Conch. Cab., 1846, p. 52, pl. 12, f. 7-8.
BELLASTREA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 232. (*kesteveni* Iredale.)
kesteveni Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 232.
sirius Gould, *Turbo,* Proc. Bost. Soc. Nat. Hist., 3, 1849, p. 90.
MICRASTRAEA Cotton, Syst. List Gastropoda, 1938, p. 9. (*aurea* Jonas.)
aurea Jonas, *Trochus,* Zeits. f. Malak., 1844, p. 168.

Family EUTROPIIDAE

PHASIANELLA Lamarck, Ann. Mus. Nat. Hist., Paris, 4, 1904, p. 295. (*australis* Gmelin.)
australis Gmelin, *Buccinum,* Syst. Nat., 1788, p. 3490.
variegata Lamarck, Anim. s. Vert., 7, 1822, p. 53.
ventricosa Swainson, Cat. Coll. Shells Bligh, Append., 1822, p. 12.
GABRIELONA Iredale, Proc. Mal. Soc., 12, 1917, p. 327. (*nepeanensis* Gat. and Gab.)
nepeanensis Gatliff and Gabriel, *Phasianella,* Proc. Roy. Soc. Vic., 21 (n.s.), 1908, p. 366, pl. 21, f. 9-10.
PELLAX Finlay, Trans. New Zealand Instit., 57, 1926, p. 368. (*huttoni* Pilsbry).
rosea Angas, *Eutropia,* Proc. Zool. Soc., 1867, p. 114, pl. 13, f. 24.

Superfamily NERITACEA

Family NERITIDAE

NERITA Linne, Syst. Nat., 10, 1758, p. 776. (*peloronta* Linne.)
melanotragus Smith, Voy. "Alert," Zool., 1884, p. 69.

Family PHENACOLEPADIDAE

PHENACOLEPAS Pilsbry, Nautilus, 5, 1891, p. 89. (*crenulata* Broderip.)
calva Verco, *Scutellina,* Proc. Roy. Soc. S.A., 30, 1906, p. 217, pl. 8, f. 9-10.

Superfamily COCCULINACEA

Family COCCULINIDAE

NOTOCRATER Finlay, Trans. New Zealand Instit., 57, 1926, p. 374. (*craticulata* Suter.)
tasmanica Pilsbry, *Acmaea,* Nautilus, 8, 1895, p. 128.

Family LEPETELLIDAE

COCCULINELLA Thiele, Conch. Cab. (2), 11, 1909, p. 21. (*minutissima* Sand.)
coercita Hedley, *Cocculina,* Rec. Aust. Mus., 6, 1907, p. 289, pl. 54, f. 1-2.

Order PECTINEBRANCHIA

Suborder TAENIOGLOSSA

Section PLATYPODA

Superfamily LITTORINACEA

Family LITTORINIDAE

PELLILITORINA Pfeffer, Jahrb. Wiss. Anst., Hamburg, 3, 1886, p. 77. (*setosa* Smith.)

globula Angas, *Amauropsis,* Proc. Zool. Soc., 1880, p. 416, pl. 40, f. 5.

LARINOPSIS Gatliff and Gabriel, Proc. Roy. Soc. Vic., 29 (n.s.), 1916, p. 104. (*turbinata* Gat. and Gab.)

turbinata Gatliff and Gabriel, *Larina,* Proc. Roy. Soc. Vic., 22 (n.s.), 1909, p. 35, pl. 13.

MELARAPHE Menke, Syn. Meth. Moll., 1828, p. 23. (*neritoides* Linne.)

praetermissa May, *Littorina,* Proc. Roy. Soc. Tas., 1908, p. 57, pl. 6, f. 3.

unifasciata Gray, *Littorina,* King's Survey of Aust., 2, 1826, App., p. 483.

LAEVILITORINA Pfeffer, Jahrb. Hamburg, 3, 1886, p. 81. (*caliginosa* Gould.)

mariae T. Woods, *Rissoa,* Proc. Roy. Soc. Tas., 1875, p. 147.

Family BEMBICIIDAE

BEMBICIUM Philippi, Zeit. Malak., 1846, p. 129. (*melanostoma* Gmelin.)

auratum Quoy and Gaimard, *Trochus,* Voy. "Astrolabe," Zool., 3, 1834, p. 276, pl. 62, f. 15-19.

melanostoma Gmelin, *Trochus,* Syst. Nat., 13, 1791, p. 3581.

nanum Lamarck, *Trochus,* Anim. s. Vert., 7, 1822, p. 30.

planum Quoy and Gaimard, *Trochus,* Voy. "Astrolabe," Zool., 3, 1834, p. 274, pl. 62, f. 13-14.

NODILITTORINA Martens, in Weber, Ergeb. Reise Niederl. O. Ind., 4, (1), 1897, p. 204. (*nodulosus* Gmelin.)

tuberculata Menke, *Litorina,* Syn. meth. Moll., 1830, p. 44.

Family PLANAXIDAE

HINIA Gray, Proc. Zool. Soc., 1847, p. 138. (*brasiliana* Lamarck.)

brasiliana Lamarck, *Buccinum,* Anim. s. Vert., 7, 1822, p. 272.

Superfamily RISSOACEA

Family RISSOIDAE

ESTEA Iredale, Trans. New Zealand Instit., 47, 1915, p. 451. (*zosterophila* Webster.)

approxima Petterd, *Rissoa,* Journ. of Conch., 4, 1884, p. 138.

bicolor Petterd, *Rissoa,* Journ. of Conch., 4, 1884, p. 137.

columnaria Hedley and May, *Rissoa,* Rec. Aust. Mus., 7, 1908, p. 117, pl. 22, f. 9.

crma Cotton, Trans. Roy. Soc. S.A., 68, 1944, p. 288, pl. 16, f. 1.

frenchiensis Gatliff and Gabriel, *Rissoa,* Proc. Roy. Soc. Vic., 1908, p. 379.

incidata Frauenfeld, *Sabanaea,* Novara, Exped. Moll., 1867, p. 12, pl. 2, f. 19.

iravadoides Gatliff and Gabriel, *Rissoa,* Proc. Roy. Soc. Vic., 26, 1913, p. 67, pl. 8, f. 1.

janjucensis Gatliff and Gabriel, *Rissoa,* Proc. Roy. Soc. Vic., 26, 1913, p. 67, pl. 8, f. 2.

kershawi T. Woods, *Rissoina,* Proc. Roy. Soc. Vic., 14, 1877, p. 57.

microcosta May, Proc. Roy. Soc. Tas., 1919, p. 61, pl. 15, f. 12.

obeliscus May, *Rissoa,* Proc. Roy. Soc. Tas., 1915, p. 92, pl. 5, f. 24.

olivacea Frauenfeld, *Alvania,* Novara Exped. Moll., 1867, p. 11, pl. 2, f. 14.

pyramidata Hedley, *Scrobs,* Mem. Aust. Mus., 4, 1903, p. 354, f. 77.

rubicunda Tate and May, *Rissoa,* Trans. Roy. Soc. S.A., 24, 1900, p. 100.

subfusca Hutton, *Rissoa,* Cat. New Zealand Moll., 1873, p. 28.

tasmanica T. Woods, *Eulima,* Proc. Roy. Soc. Tas., 1875, p. 29.

tumida T. Woods, *Diala,* Proc. Roy. Soc. Tas., 1875, p. 147.

SUBESTEA Cotton, Trans. Roy. Soc. S.A., 68, 1944, p. 292. (*seminodosa* May.)

flindersi T. Woods, *Rissoina,* Proc. Roy. Soc. Tas., 1876, p. 154.

salebrosa Frauenfeld, *Rissoa,* Novara Exped. Moll., 1867, p. 11, pl. 2, f. 15.

HAURAKIA Iredale, Trans. New Zealand Instit., 47, 1915, p. 449. (*hamiltoni* Suter.)
descrepans Tate and May, *Rissoa*, Trans. Roy. Soc. S.A., 24, 1900, p. 99.
liddelliana Hedley, *Rissoa*, Proc. Linn. Soc. N.S.W., 32, 1907, p. 494, pl. 17, f. 24.
strangei Brazier, *Rissoa*, Proc. Linn. Soc. N.S.W., 19, 1894, p. 173, pl. 14, f. 12.
supracostata May, Proc. Roy. Soc. Tas., 1919, p. 62, pl. 15, f. 16.

LIRONOBA Iredale, Trans. New Zealand Instit., 47, 1915, p. 450. (*suteri* Hedley.)
agnewi T. Woods, *Rissoa*, Proc. Roy. Soc. Tas., 1876, p. 152.
imbrex Hedley, *Rissoa*, Proc. Linn. Soc. N.S.W., 33, 1908, p. 469, pl. 10, f. 33.
layardi Petterd, *Rissoa*, Journ. of Conch., 4, 1884, p. 138.
schoutanica May, *Rissoa*, Proc. Roy. Soc. Tas., 1912, p. 47, pl. 2, f. 6.
wilsonensis Gatliff and Gabriel, *Rissoa*, Proc. Roy. Soc. Vic., 26, 1913, p. 68, pl. 8, f. 4.

BOTELLOIDES Strand, Arch. Naturgesch., 92, 1926, A. 8, 66. (*bassianus* Hedley.)
bassianus Hedley, *Onoba*, Zool. Res. Endeavour, 1, 1911, p. 108, pl. 19, f. 25.

MERELINA Iredale, Trans. New Zealand Instit., 47, 1915, p. 449. (*cheilostoma* T. Woods.)
australiae Frauenfeld, *Cingula*, Novara Exped. 2 Moll., 1867, p. 14, pl. 2, f. 23.
cheilostoma T. Woods, *Rissoa*, Proc. Roy. Soc. Tas., 1876, p. 152.
gracilis Angas, *Alvania*, Proc. Zool. Soc., 1877, p. 174, pl. 26, f. 16.
hulliana Tate, *Rissoa*, Hand. List. S.A. Moll., 1893, p. 7.

LINEMERA Finlay, Trans. New Zealand Instit., 55, 1924, p. 483. (*interrupta* Finlay.)
filocincta Hedley and Petterd, *Rissoa*, Rec. Aust. Mus., 6, 1906, p. 217, pl. 37, f. 2.
suprasculpta May, *Alvania*, Proc. Roy. Soc. Tas., 1915, p. 95, pl. 6, f. 31.

NOTOSETIA Iredale, Trans. New Zealand Instit., 47, 1914, p. 452. (*neozelandica* Suter.)
atropurpurea Frauenfeld, *Setia*, Novara Exped. 2 Moll., 1867, p. 13, pl. 2, f. 21.
muratensis Cotton, Trans. Roy. Soc. S.A., 68, 1944, p. 304, pl. 16, f. 9.
nitens Frauenfeld, *Setia*, Novara Exped. Moll., 1867, p. 13, pl. 2, f. 22.
pellucida Tate and May, *Rissoa*, Trans. Roy. Soc. S.A., 24, 1900, p. 100.
pertranslucida May, *Rissoa*, Proc. Roy. Soc. Tas., 1912, p. 48, pl. 2, f. 8.
purpureostoma May, Proc. Roy. Soc. Tas., 1919, p. 63, pl. 16, f. 18.
simillima May, *Rissoa*, Proc. Roy. Soc. Tas., 1915, p. 93, pl. 5, f. 26.

DARDANULA Iredale, Trans. New Zealand Instit., 47, 1915, p. 452. (*olivacea* Hutton.)
aurantiocincta May, *Amphiltalamus*, Proc. Roy. Soc. Tas., 1915, p. 96, pl. 6, f. 33.
dubitabilis Tate, *Rissoa*, Trans. Roy. Soc. S.A., 23, 1899, p. 232.
erratica May, *Amphiltalamus*, Proc. Roy. Soc. Tas., 1912, p. 48, pl. 2, f. 7.
flammea Frauenfeld, *Sabanaea*, Novara Exped. Moll., 1867, p. 12, pl. 2, f. 18.
melanochroma Tate, *Rissoa*, Trans. Roy. Soc. S.A., 23, 1899, p. 234.

EUSETIA Cotton, Trans. Roy. Soc. S.A., 68, 1944, p. 306. (*expansa* Powell).
brevis May, *Rissopsis*, Proc. Roy. Soc. Tas., 1919, p. 63, pl. 16, f. 19.
bulimnoides Tate and May, *Rissopsis*, Trans. Roy. Soc. S.A., 24, 1900, p. 101.
consobrina Tate and May, *Rissopsis*, Trans. Roy. Soc. S.A., 24, 1900, p. 101.
maccoyi T. Woods, *Rissoa*, Proc. Roy. Soc. Tas., 1876, p. 154.

EPIGRUS Hedley, Mem. Aust. Mus., 4, 1903, p. 355. (*ischna* Tate.)
apicilata Gatliff and Gabriel, *Rissoa,* Proc. Roy. Soc. Vic., 26 (n.s.), 1913, p. 68, pl. 8, f. 3.
badius Petterd, *Rissoa,* Journ. of Conch., 4, 1884, p. 138.
cylindraceus T. Woods, *Rissoina,* Proc. Linn. Soc. N.S.W., 2, 1877, p. 266.
dissimilis Watson, *Eulima,* Chall. Zool., 15, 1886, p. 522, pl. 37, f. 5.
SCROBS Watson, Chall. Zool., 15, 1886, p. 611. (*jacksoni* Brazier.)
jacksoni Brazier, *Rissoa,* Proc. Linn. Soc. N.S.W., 9, 1894, p. 695.
petterdi Brazier, *Rissoa,* Proc. Linn. Soc. N.S.W., 9, 1894, p. 697.
ANABATHRON Frauenfeld, Novara Exped. Moll., 1867, p. 13. (*contabulatum* Frauendfeld.)
contabulatum Frauenfeld, Novara Exped. Moll., 1867, p. 13, pl. 2, f. 20a-b.
COENACULUM Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 244. (*minutulum* Tate and May.)
minutulum Tate and May, *Scalaria,* Trans. Roy. Soc. S.A., 24, 1900, p. 95.

Family RISSOINIDAE

RISSOINA d'Orbigny, Voy. Amer. Merid., 1840, p. 395. (*inca* d'Orbigny.)
elegantula Angas, Proc. Zool. Soc., 1880, p. 417, pl. 40, f. 10.
fasciata A. Adams, Proc. Zool. Soc., 1851, p. 264.
gertrudis T. Woods, Proc. Roy. Soc. Tas., 1875, p. 146.
lintea Hedley and May, Rec. Aust. Mus., 7, 1908, p. 117, pl. 23, f. 11.
nivea A. Adams, Proc. Zool. Soc., 1851, p. 265.
rhyllensis Gatliff and Gabriel, Proc. Roy. Soc. Vic., 21, 1908, p. 367, pl. 21, f. 8.
spirata Sowerby, *Rissoa,* Genera of Shells, 2, 1824, No. 4, pl. 208, f. 3.
variegata Angas, *Rissoa,* Proc. Zool. Soc., 1867, p. 113, pl. 13, f. 19.
CITHNA A. Adams, Proc. Zool. Soc., 1863, p. 113. (*globosa* A. Adams.)
angulata Hedley, Rec. Aust. Mus., 6, 1907, p. 291, pl. 55, f. 16.
flexuosa Gould, *Rissoina,* Proc. Bost. Soc. Nat. Hist., 7, 1861, p. 400.
HETERORISSOA Iredale, Proc. Mal. Soc., 10, 1912, p. 221. (*secunda* Iredale.)
wilfredi Gatliff and Gabriel, *Jeffreysia,* Proc. Roy. Soc. Vic., 24 (n.s.), 1911, p. 188, pl. 46, f. 3.
RISSOLINA Gould, Proc. Boston Soc. Nat. Hist., 7, 1861, p. 401. (*elegantissima* d'Orbigny.)
angasi Pease, *Rissoina,* Am. Journ. Conch., 7, 1872, p. 20.
crassa Angas, *Rissoina,* Proc. Zool. Soc., 1871, p. 17, pl. 1, f. 16.
STIVA Hedley, Proc. Linn. Soc. N.S.W., 29, 1904, p. 192. (*ferruginea* Hedley.)
royana Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 245, pl. 34, f. 11.

Family TORNIDAE

NARICAVA Hedley, Proc. Linn. Soc. N.S.W., 38, 1913, p. 294. (*angasi* A. Adams.)
angasi A. Adams, *Adeorbis,* Proc. Zool. Soc., 1863, p. 424, pl. 37, f. 11-12.
kimberi Verco, *Adeorbis,* Trans. Roy. Soc. S.A., 31, 1907, p. 308, pl. 29, f. 1-2.
vincentiana Angas, *Adeorbis,* Proc. Zool. Soc., 1880, p. 417, pl. 40, f. 9.

Family ORBITESTELLIDAE

ORBITESTELLA Iredale, Proc. Mal. Soc., 12, 1917, p. 327. (*bastowi* Gat. and Gab.)
bastowi Gatliff and Gabriel, *Cyclostrema,* Proc. Roy. Soc. Vic., 19, 1906, p. 3, pl. 2, f. 8-10.
mayi Tate, *Cyclostrema,* Trans. Roy. Soc. S.A., 23, 1899, p. 218, pl. 6, f. 4a, c.

Superfamily CERTHIACEA

Family TURRITELLIDAE

KIMBERIA Cotton and Woods, Rec. S.A. Mus., 5, 1935, p. 370. (*kimberi* Verco.)
microscopica May, *Turritella,* Proc. Roy. Soc. Tas., 1910, p. 395, pl. 15, f. 23.
GAZAMEDA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 247. (*gunnii* Reeve.)
gunnii Reeve, *Turritella,* Conch. Icon., 5, 1849, pl. 9, sp. 45.
iredalei Finlay, Trans. New Zealand Instit., 57, 1927, p. 496.
subsquamosa Dunker, *Turritella,* Mal. Blat., 18, 1871, p. 152.
COLOSPIRA Donald, Proc. Mal. Soc., 4, 1900, p. 51. (*runcinata* Watson.)
accisa Watson, *Turritella,* Journ. Linn. Soc., 15, 1881, p. 220.
runcinata Watson, *Turritella,* Journ. Linn. Soc., 15, 1881, p. 218.
sinuata Reeve, *Turritella,* Conch. Icon., 5, 1849, pl. 11, sp. 62.
smithiana Donald, *Turritella,* Proc. Mal. Soc., 4, 1900, p. 52, pl. 5, f. 1-1c.
GLYPTOZARIA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 248. (*opulenta* Hedley.)
opulenta Hedley, *Turritella,* Rec. Aust. Mus., 6, 1907, p. 292, pl. 54, f. 9.
CTENOCOLPUS Iredale, Rec. Aust. Mus., 14, 1925, p. 266. (*australis* Lamarck.)
diffidens Iredale, Rec. Aust. Mus., 14, 1925, p. 267, pl. 43, f. 17.

Family MATHILDIDAE

OPIMILDA Iredale, Rec. Aust. Mus., 17, 1929, p. 187. (*decorata* Hedley.)
decorata Hedley, *Mathilda,* Mem. Aust. Mus., 4, 1903, p. 352, f. 75.

Family SOLARIIDAE

PHILIPPIA Gray, Proc. Zool. Soc., 1847, p. 146. (*lutea* Lamarck.)
lutea Lamarck, *Solarium,* Anim. s. Vert., 7,1822, p. 5.

Family VERMETIDAE

VERMICULARIA Lamarck, Mem. Soc. Nat. Hist., Paris, 1799, p. 78. (*lumbricalis* Linne.)
flava Verco., Trans. Roy. Soc. S.A., 1907, p. 214, f. 1.
sipho Lamarck, *Serpula,* Anim. s. Vert., 5, 1818, p. 367.
SILIQUARIA Bruguiere, Enclycl. Meth. (Vers), 1, 1789, p. 15. (*australis* Quoy and Gaimard.)
australis Quoy and Gaimard, Voy. "Astrolabe," Zool., 3, 1834, p. 302.
weldii T. Woods, *Tenogodus,* Proc. Roy. Soc. Tas., 1875, p. 144.
MAGILINEA Velain, Arch. Zool. Exped. Gen., Paris, 6, 1877, p. 105. (*serpuliformis* Velain.)
caperata Tate and May, *Thylocodes,* Trans. Roy. Soc. S.A., 24, 1900, p. 94.

Family CAECIDAE

CAECUM Fleming, Brewster's Edin. Enclycl., 7 (1), 1831, p. 67. (*trachea* Montagu.)
amputatum Hedley, Proc. Linn. Soc. N.S.W., 18, 1893, p. 504 and text fig.
STREBLOCERAS Carpenter, Proc. Zool. Soc., 26, 1858, p. 440. (*subannulatum* Folin.)
cygnicollis Hedley, Proc. Linn. Soc. N.S.W., 27, 1904, p. 189, pl. 8, f. 12-14.

Family CERITHIIDAE

ZEACUMANTUS Finlay, Trans. New Zealand Instit., 57, 1926, p. 380. (*subcarinata* Sowerby.)
cerithium Quoy and Gaimard, *Turritella,* Voy. "Astrolabe," Zool., 3, 1834, p. 139, pl. 55, f. 27, 28.

EUBITTIUM Cotton, Sth. Aust. Nat., 18, 1937, p. 2. (*lawleyanum* Crosse.)
insculptum Reeve, *Cerithium,* Conch. Icon., 15, 1865, pl. 18, sp. 128.
lawleyanum Crosse, *Bittium,* Journ. de Conch., 9, 1863, p. 87, pl. 1, f. 4.
BATILLARIELLA Thiele, Handb. Syst. Weicht., 1, 1929, p. 208. (*estuarina* Tate.)
estuarina Tate, *Bittium,* Trans. Roy. Soc. S.A., 1893, p. 190, pl. 1, f. 12.
VELACUMANTUS Iredale, Rec. Aust. Mus., 19, 1936, p. 292. (*australis* Quoy and Gaim.)
australis Quoy and Gaimard, *Cerithium,* Voy. "Astrolabe," Zool., 3, 1835, p. 131, pl. 55, f. 7.
CACOZELIANA Strand, Archiv. f. Naturgesch Jahrb., 92, 1928, A. 8, p. 66. (*granarium* Kiener.)
granarium Kiener, *Cerithium,* Coq. Viv., 1924, p. 72, pl. 19, f. 5.
icarus Boyle, *Cerithium,* Journ. de Conch., 28, 1880, p. 249.
PYRAZUS Montfort, Conch. Syst., 2, 1810, p. 458. (*paliestris* Linne.)
ebininus Bruguiere, *Potamides,* Encycl. Meth., pl. 442, f. 1a, b.
ATAXOCERITHIUM Tate, Journ. Roy. Soc. N.S.W., 32, 1894, p. 179. (*serotinum* A. Adams.)
serotinum A. Adams, *Cerithium,* Thes. Conch., 2, 1855, p. 861, pl. 180, f. 102.
HYPOTROCHUS Cotton, Rec. S. Aust. Mus., 4, 1932, p. 539. (*monachus* Crosse and Fischer.)
monachus Crosse and Fischer, *Cerithium,* Journ. de Conch., 1864, p. 347.

Family CERITHIOPSIDAE

JOCULATOR Hedley, Proc. Linn. Soc. N.S.W., 34, 1909, p. 442. (*ridiculus* Watson.)
cessicius Hedley, *Cerithiopsis,* Proc. Linn. Soc. N.S.W., 30, 1905, p. 529.
SEILAREX Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 246. (*attenuatus* Hedley.)
attenuatus Hedley, *Seila,* Proc. Linn. Soc. N.S.W., 25, 1900, p. 91, pl. 3, f. 9, 9a.
turritelliformis Angas, *Bittium,* Proc. Zool. Soc., 1877, p. 174, pl. 26, f. 14.
SPECULA Finlay, Trans. New Zealand Instit., 57, 1926, p. 382. (*styliformis* Suter.)
turbonilloides T. Woods, *Bittium,* Proc. Roy. Soc. Tas., 1878, p. 39.
ZACLYS Finlay, Trans. New Zealand Instit., 57, 1926, p. 382. (*sarissa* Murdoch.)
angasi Semper, *Cerithiopsis,* Cat. v. Mus. Godeffroy, 5, 1874, p. 108.
dannevigi Hedley, *Cerithiopsis,* Zool. Results F.I.S. "Endeavour," 1, 1911, p. 109, pl. 19, f. 26-27.
semilaevis T. Woods, *Bittium,* Proc. Roy. Soc. Vic., 1877, p. 58.
NOTOSEILA Finlay, Trans. New Zealand Instit., 57, 1926, p. 382. (*terebelloides* Hutton.)
albosutura T. Woods, *Cerithiopsis,* Proc. Roy. Soc. Tas., 1876, p. 140.
crocea Angas, *Cerithiopsis,* Proc. Zool. Soc., 1871, p. 16, pl. 1, f. 13.
marmorata Tate, *Cerithiopsis,* Trans. Roy. Soc. S.A., 17, 1893, p. 190.

Family TRIPHORIDAE

EUTRIPHORA Cotton and Godfrey, S. Aust. Nat., 12, 1931, p. 1. (*cana* Verco.)
cana Verco, *Triphora,* Trans. Roy. Soc. S.A., 33, 1909, p. 289, pl. 23, f. 2-4.
ISOTRIPHORA Cotton and Godfrey, S. Aust. Nat., 12, 1931, p. 2. (*tasmanica* T. Woods.)
disjuncta Verco, *Triphora,* Trans. Roy. Soc. S.A., 33, 1909, p. 292.
tasmanica T. Woods, *Triforis,* Proc. Roy. Soc. Tas., 1876, p. 151.

NOTOSINISTER Finlay, Trans. New Zealand Instit., 57, 1926, p. 384. (*fascelina* Suter.)
albavittata Hedley, *Triphora,* Proc. Linn. Soc. N.S.W., 27, 1903, p. 609, pl. 32, f. 26-27.
armillata Verco, *Triphora,* Trans. Roy. Soc. S.A., 33, 1909, p. 283, pl. 22, f. 5.
festiva A. Adams, *Triphoris,* Proc. Zool. Soc., 1851, p. 278.
granifera Brazier, *Triphora,* Proc. Linn. Soc. N.S.W., 19, 1894, p. 173, pl. 14, f. 10.
innotabilis Hedley, *Triphora,* Proc. Linn. Soc. N.S.W., 27, 1903, p. 608, pl. 32, f. 23-25.
mammillata Verco, *Triphora,* Trans. Roy. Soc. S.A., 33, 1909, p. 285.
pfeifferi Crosse and Fischer, *Triphoris,* Journ. de Conch., 13, 1865, p. 47, pl. 1, f. 14-15.
spina Verco, *Triphora,* Trans. Roy. Soc. S.A., 33, 1909, p. 280, pl. 22, f. 2-4.
CAUTOR Finlay, Trans. New Zealand Instit., 57, 1926, p. 384. (*obliqua* May.)
ampulla Hedley, *Triphora,* Proc. Linn. Soc. N.S.W., 27, 1903, p. 615, pl. 33, f. 38-39.
labiata A. Adams, *Triphoris,* Proc. Zool. Soc., 1851, p. 279.
maculosa Hedley, *Triphora,* Proc. Linn. Soc. N.S.W., 27, 1903, p. 614, pl. 32, f. 32-33.
regina Hedley, *Triphora,* Proc. Linn. Soc. N.S.W., 27, 1903, p. 608, pl. 32, f. 21.
TERETRIPHORA Finlay, Trans. New Zealand Instit., 57, 1926, p. 384. (*huttoni* Suter.)
angasi Crosse and Fischer, *Triphora,* Journ. de Conch., 13, 1865, p. 46, pl. 1, f. 12, 13.
cinerea Hedley, *Triphora,* Proc. Linn. Soc. N.S.W., 27, 1903, p. 612, pl. 33, f. 36-37.
gemmegens Verco, *Triphora,* Trans. Roy. Soc. S.A., 33, 1909, p. 290, pl. 23, f. 7-8.
leuca Verco, *Trifora,* Trans. Roy. Soc. S.A., 33, 1909, p. 282.
nigrofusca A. Adams, *Triphora,* Proc. Zool. Soc., 1851, p. 278.

Family LITIOPIDAE

DIALA A. Adams, Ann. Mag. Nat. Hist. (3), 8, 1861, p. 242. (*varia* A. Adams.)
imbrica A. Adams, *Alaba,* Ann. Mag. Nat. Hist. (3), 10, 1862, p. 297.
lauta A. Adams, Ann. Mag. Nat. Hist. (3), 10, 1862, p. 298.
magna Tate, Trans. Roy. Soc. S.A., 14, 1891, p. 259, pl. 11, f. 9.
monile A. Adams, *Alaba,* Ann. Mag. Nat. Hist. (3), 10, 1862, p. 296.
pagodula A. Adams, *Alaba,* Ann. Mag. Nat. Hist. (3), 10, 1862, p. 297.
picta A. Adams, Ann. Mag. Nat. Hist. (3), 8, 1861, p. 243.
pulchra A. Adams, *Alaba,* Ann. Mag. Nat. Hist. (3), 10, 1862, p. 296.
translucida Hedley, Proc. Linn. Soc. N.S.W., 30, 1905, p. 522, pl. 33, f. 35.
varia A. Adams, Ann. Mag. Nat. Hist. (3), 8, 1861, p. 243.

Superfamily PTENOGLOSSA

Family SCALIDAE

SCALA Brugiere, Encycl. Meth. (vers 1), 2, 1792, p. 532. (*scalaris* Linne.)
acanthopleuro Verco, Trans. Roy. Soc. S.A., 30, 1906, p. 145, pl. 4, f. 8.
aculeatum Sowerby, *Scalaris,* Proc. Zool. Soc., 1844, p. 12.

australis Lamarck, *Scalaris,* Anim. s. Vert., 6, 1822, p. 228.
granosa Quoy and Gaimard, *Turritella,* Voy. "Astrolabe," Zool., 3, 1834, p. 138, pl. 55, f. 29-30.
helicornua Iredale, *Limascala,* Rec. Aust. Mus., 19, 1936, p. 299, pl. 22, f. 11.
invalida Verco, Trans. Roy. Soc. S.A., 30, 1906, p. 148, pl. 4, f. 9-10.
jukesianum Forbes, *Scalaria,* Append. Voy. "Rattlesnake," 2, 1852, p. 383, pl. 3, f. 7.
martyr Iredale, *Dannevigena,* Rec. Aust. Mus., 19, 1936, p. 303, pl. 22, f. 25.
morchi Angas, Proc. Zool. Soc., 1871, p. 15, pl. 1, f. 7.
phillippinarum Sowerby, Thes. Conch., 1, 1844, p. 86, pl. 32, f. 1-3.
platypleura Verco, Trans. Roy. Soc. S.A., 30, 1906, p. 145, pl. 4, f. 6.
translucida, Gatliff, Proc. Roy. Soc. Vic., 19, 1906, p. 19, pl. 1, f. 3-4.

Family IANTHINIDAE

IANTHINA Bolten, Mus. Bolt., 2, 1798, p. 75. (*nitens* Menke.)
balteata Reeve, Conch. Icon., 11, 1858, pl. 3, sp. 11a, b.
exigua Lamarck, *Janthina,* Anim. s. Vert. (3rd ed.), 3, 1839, p. 505.
smithiae Reeve, Conch. Icon., 11, 1858, pl. 3, sp. 15a, b.
striolata Adams and Reeve, Voy. "Samarang," 1848, p. 54, pl. 11, f. 9.
violacea Bolten, Mus. Bolt., 2, 1798, p. 75.

Superfamily AGLOSSA

Family STROMBIFORMIDAE

EULIMA Risso, Hist. Nat. Europ. Merid., 4, 1826, p. 123. (*subulata* Donovan.)
augur Angas, Proc. Zool. Soc., 1865, p. 56.
commensalis Tate, Trans. Roy. Soc. S.A., 22, 1898, p. 82, pl. 4, f. 2.
coxi Pilsbry, Proc. Acad. Nat. Sci. Philad., 1899, p. 258, pl. 11, f. 3-4.
immaculata Pritchard and Gatliff, *Stilifer,* Proc. Roy. Soc. Vic., 13 (n.s.), 1900, p. 137, pl. 21, f. 2.
inflata Tate and May, Trans. Roy. Soc. S.A., 24, 1900, p. 95.
mucronata Reeve, Conch. Icon., 15, 1866, pl. 6, sp. 42.
orthopleura Tate, Trans. Roy. Soc. S.A., 1898, p. 80, pl. 4, f. 1.
tenisoni Tryon, Man. Conch., 8, 1886, p. 269, pl. 68, f. 16.
tryoni Tate and May, Trans. Roy. Soc. S.A., 24, 1900, p. 96.
victoriæ Gatliff and Gabriel, Proc. Roy. Soc. Vic., 27, 1914, p. 94, pl. 14, f. 1.
MELANELLA Bowdich, Elem. of Conch., 1, 1822, p. 27. (*dufresnii* Bowdich.)
petterdi Beddome, *Eulima,* Proc. Roy. Soc. Tas., 1882, p. 168.
STROMBIFORMIS da Costa, Brit. Conch., 1778, p. 107. (*glaber* da Costa.)
acutissima Reeve, *Leiostraca,* Conch. Icon., 15, 1866, pl. 2, sp. 10a, b.
joshuana Gatliff and Gabriel, *Leiostraca,* Proc. Roy. Soc. Vic., 23, 1910, p. 83, pl. 18, f. 41.
kilcundae Gatliff and Gabriel, *Leiostraca,* Proc. Roy. Soc. Vic., 27, 1914, p. 94, pl. 14, f. 2-3.
lodderae Hedley, Mem. Aust. Mus., 4, 1903, p. 360, f. 82.
perexigua Tate and May, *Rissoa,* Trans. Roy. Soc. S.A., 24, 1900, p. 100.
styliformis Gatliff and Gabriel, *Leiostraca,* Proc. Roy. Soc. Vic., 27, 1914, p. 95, pl. 14, f. 4-5.
topaziaca Hedley, *Eulima,* Proc. Linn. Soc. N.S.W., 33, 1908, p. 470, pl. 10, f. 29.

Family STILIFERIDAE

STILIFER Broderip, Proc. Comm. Sci. Zool. Soc. Lond., 1832, p. 60. (*astericola* Broderip.)
auricula Hedley, Proc. Linn. Soc. N.S.W., 32, 1907, p. 483.
brazieri Angas, Proc. Zool. Soc., 1877, p. 173, pl. 26, f. 12.
brunneus Tate, Trans. Roy. Soc. S.A., 1888, p. 65, pl. 11, f. 9.
lodderae Petterd, Journ. of Conch., 4, 1884, p. 140, No. 23.
petterdi Tate and May, Trans. Roy. Soc. S.A., 24, 1900, p. 96.

Family PYRAMIDELLIDAE

LEUCOTINA A. Adams, Ann. Mag. Nat. Hist. (3), 5, 1860, p. 406. (*niphonensis* A. Adams.)
casta Adams, *Monoptygma*, Proc. Zool. Soc., 1851, p. 223.
harrisoni Tate and May, *Syrnola*, Trans. Roy. Soc. S.A., 24, 1900, p. 96, pl. 25, f. 54.
micra Pritchard and Gatliff, *Turbonilla*, Proc. Roy. Soc. Vic., 13 (n.s.), 1900, p. 134, pl. 21, f. 1.
SYRNOLA A. Adams, Ann. Mag. Nat. Hist. (3), 5, 1860, p. 405. (*gracillima* A. Adams.)
aurantiaca Angas, *Styloptygma*, Proc. Zool. Soc., 1867, p. 112, pl. 13, f. 14.
bifasciata T. Woods, Trans. Roy. Soc. Tas., 1875, p. 145.
jonesiana Tate, *Odontostomia*, Trans. Roy. Soc. S.A., 1898, p. 70 and text fig. p. 82.
manifesta Hedley, Rec. Aust. Mus., 8, 1912, p. 143, pl. 42, f. 23-24.
tincta Angas, Proc. Zool. Soc., 1871, p. 15, f. 1.
ODOSTOMIA Fleming, Brewster's Edinb. Encycl., 7, 1813, p. 76. (*plicata* Montagu.)
angasi Tryon, Man. Conch., 8, 1886, p. 362, pl. 79, f. 68.
australis Angas, *Agatha*, Proc. Zool. Soc., 1871, p. 15, pl. 1, f. 9.
deplexa Tate and May, *Odontostomia*, Trans. Roy. Soc. S.A., 24, 1900, p. 97, pl. 25, f. 45.
laevis Angas, Proc. Zool. Soc., 1867, p. 112, pl. 13, f. 10.
mayii Tate, Trans. Roy. Soc. S.A., 22, 1898, p. 84, pl. 4, f. 6.
metcalfei Pritchard and Gatliff, Proc. Roy. Soc. Vic., 13, 1900, p. 136, pl. 21, f. 3.
nugatoria Hedley, *Odontostomia*, Mem. Aust. Mus., 4, 1903, p. 363, f. 87.
occultidens May, Trans. Roy. Soc. Tas., 1915, p. 90, pl. 4, f. 19.
petterdi Gatliff, Vict. Nat., 17, 1900, p. 54.
simplex Angas, Proc. Zool. Soc., 1871, p. 15, pl. 1, f. 10.
suprasculpta T. Woods, *Rissoina*, Proc. Roy. Soc. Vic., 14, 1877, p. 57.
victoriae Gatliff and Gabriel, Proc. Roy. Soc. Vic., 24, 1911, p. 187, pl. 46, f. 2.
TURBONILLA Risso, Hist. Nat. Europ. Merid., 4, 1826, p. 224. (*lactea* Linne.)
acicularis A. Adams, *Chemnitzia*, Proc. Zool. Soc., 1853, p. 182.
beddomei Petterd, *Chemnitzia*, Journ. of Conch., 4, 1884, p. 136.
brevis Pritchard and Gatliff, Proc. Roy. Soc. Vic., 13 (n.s.), 1900, p. 135, pl. 21, f. 4.
fusca A. Adams, *Chemnitzia*, Proc. Zool. Soc., 1853, p. 181.
hofmani Angas, Proc. Zool. Soc., 1877, p. 183.
mariae T. Woods, Trans. Roy. Soc. Tas., 1875, p. 144.

portseaensis Gatliff and Gabriel, Proc. Roy. Soc. Vic., 24 (n.s.), 1911, p. 188, pl. 46, f. 1.)
scalpidens Watson, *Odostomia,* Chall. Zool., 15, 1886, p. 489, pl. 32, f. 1.
tiara May, Trans. Roy. Soc. Tas., 1910, p. 396, pl. 15, f. 25, 25a, b.

OSCILLA A. Adams, Proc. Zool. Soc., 1867, p. 310. (*cingulata* A. Adams.)
tasmanica T. Woods, *Parthenia,* Proc. Roy. Soc. Tas., 1876, p. 150.

EULIMELLA Jeffrey, Ann. Mag. Nat. Hist., 19, 1847, p. 311. (*scillae* Gray.)
moniliformis Hedley and Musson, Proc. Linn. Soc. N.S.W., 16, 1891, p. 247, pl. 19, f. 1-3.
turrita Petterd, *Aclis,* Journ. of Conch., 4, 1884, p. 140.

CINGULINA A. Adams, Ann. Mag. Nat. Hist. (3), 6, 1860, p. 414. (*circinata* A. Adams.)
diaphana Verco, Trans. Roy. Soc. S.A., 30, 1906, p. 143, pl. 4, f. 11.
insignis May, Proc. Roy. Soc. Tas., 1910, p. 396, pl. 15, f. 24 and 24a.
magna Gatliff and Gabriel, Proc. Roy. Soc. Vic., 23, 1910, p. 84, pl. 19, f. 8.
rhyllensis Gatliff and Gabriel, Proc. Roy. Soc. Vic., 23, 1910, p. 84, pl. 19, f. 9.
spina Crosse and Fischer, *Turritella,* Journ. de Conch., 12, 1864, p. 347.

ACLIS Loven, Ofvers, Vetens Ahad. Forh., 3 (5), 1846, p. 148. (*nitidissima* Montagu.)
pellucida Gatliff and Gabriel, Proc. Roy. Soc. Vic., 24, 1911, p. 187, pl. 46, f. 4.

PSEUDORISSOINA Tate and May, Trans. Roy. Soc. S.A., 1900, p. 98. (*tasmanica* T. Woods.)
tasmanica T. Woods, *Stilifer,* Proc. Roy. Soc. Tas., 1876, p. 152.

Superfamily HIPPONICACEA

Family HIPPONICIDAE

SABIA Reeve, Conch. Syst., 2, 1842, p. 34. (*conica* Schumacher.)
australis Quoy and Gaimard, *Hipponix,* Voy. "Astrolabe," Zool., 3, 1835, p. 434, pl. 72, f. 25-34.

ANTISABIA Iredale, Aust. Zool. 8, 1937, p. 253. (*foliacea* Quoy and Gaimard.)
foliacea Quoy and Gaimard, *Hipponix,* Voy. "Astrolabe," Zool., 3, 1835, p. 439, pl. 72, f. 41-45.

Superfamily CHEILEACEA

Family CAPULIDAE

CAPULUS Montfort, Conch. Syst., 2, 1810, p. 54. (*hungaricus* Linne.)
devotus Hedley, Proc. Linn. Soc. N.S.W., 29, 1904, p. 190, pl. 8, f. 15-16.
violaceus Angas, Proc. Zool. Soc., 1867, p. 114, pl. 13, f. 23.

Family LIPPISTIDAE

ZELIPPISTES Finlay, Trans. New Zealand Instit., 57, 1926, p. 396. (*benhami* Suter.)
gabrieli Pritchard and Gabriel, *Trichotropis,* Proc. Roy. Soc. Vic., 1899, p. 183, pl. 20, f. 7.

INCUNCULA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 251. (*torcularis* T. Woods.)
zodiacus Hedley, *Lippistes,* Proc. Linn. Soc. N.S.W., 32, 1907, p. 502, pl. 18, f. 30.

SIRIUS Hedley, Proc. Linn. Soc. N.S.W., 25, 1900, p. 88. (*badius* T. Woods.)
badius T. Woods, *Raulinia,* Proc. Linn. Soc. N.S.W., 2, 1878, p. 264.

Family GALERIDAE

SIGAPATELLA Lesson, Voy. "Coquille," Zool., 2 (1), 1831, p. 389. (*novaezelandiae* Lesson.)
calyptraeformis Lamarck, *Trochus,* Anim. s. Vert., 7, 1822, p. 12.
ZEACRYPTA Finlay, Trans. New Zealand Instit., 57, 1926, p. 393. (*monoxyla* Lesson.)
immersa Angas, *Crepidula,* Proc. Zool. Soc., 1865, p. 57, pl. 2, f. 12.
scutum Lesson, *Calyptraea,* Voy. "Coquille," Zool., 2, p. 395.
CRYPTA Humphrey, Mus. Calonnianum, 1797, p. 4. (*fomicata* Linne.)
aculeata Gmelin, *Patella,* Syst. Nat., 13, 1791, p. 3693.

Family CHEILEIDAE

CHEILEA Modeer, K. Vetens Acad. Nya. Handl., 14, 1793, p. 110. (*equestris* Linne.)
equestris Linne, *Patella,* Syst. Nat., ed. 12, 1766, p. 257.

Superfamily NATICACEA
Family NATICIDAE

NOTOCOCHLIS Powell, Trans. New Zealand Instit., 63, 1933, p. 166. (*migratoria* Powell.)
sagittata Menke, *Natica,* Moll. Nov. Holl., 1843, p. 10.
schoutanica May, *Natica,* Proc. Roy. Soc. Tas., 1912, p. 45, pl. 2, f. 3.
COCHLIS Bolten, Mus. Bolten, 1798, p. 146. (*albula* Bolten.)
shorehami Pritchard and Gatliff, *Natica,* Proc. Roy. Soc. Vic., 13, 1900, p. 131, pl. 20, f. 4.
UBER Humphrey, Mus. Calonnianum, 1797, p. 21. (*mammilla* Linne.)
conicum Lamarck, *Natica,* Anim. s. Vert., 6, 1822, p. 198.
incei Philippi, *Natica,* Proc. Zool. Soc., 1851, p. 233.
melastoma Swainson, *Natica,* Zool. Illustr., 1st ser., 1822, pl. 79.
plumbeum Lamarck, *Natica,* Anim. s. Vert., 6, 1822, p. 198.
tasmanica, T. Woods, *Natica,* Proc. Roy. Soc. Tas., 1875, p. 148-149.
QUANTONATICA Iredale, Rec. Aust. Mus., 19, 1936, p. 311. (*subcostata* T. Woods.)
subcostata T. Woods, *Natica,* Proc. Linn. Soc. N.S.W., 2, 1878, p. 263.
FRIGINATICA Hedley, Moll. Aust. Antarctic Exped., 1916, p. 51. (*beddomei* Johnston.)
beddomei Johnston, *Natica,* Proc. Roy. Soc. Tas., 1884, p. 222.
ECTOSINUM Iredale, Rec. Aust. Mus., 18, 1931, p. 216. (*pauloconvexum* Iredale.)
zonale Quoy and Gaimard, *Cryptosoma,* Voy. "Astrolabe," Zool., 2, 1833, p. 221, pl. 66, f. 1-3.
PROPESINUM Iredale, Proc. Linn Soc., N.S.W., 49, 1924, p. 256. (*umbilicatum* Quoy and Gaim.)
nitidum Reeve, *Sigaretus,* Conch. Icon., 15, 1864, pl. 4, sp. 20a, b.
pictum Reeve, *Sigaretus,* Conch. Icon., 15, 1864, pl. 5, sp. 24.
umbilicatum Quoy and Gaimard, *Natica,* Voy. "Astrolabe," Zool., 2, 1833, p. 234, pl. 66, f. 22-23.

Superfamily LAMELLARIACEA

Family LAMELLARIIDAE

LAMELLARIA Montagu, Trans. Linn. Soc., 11 (2), 1815, p. 183. (*perspicua* Linne.)
ophione Gray, Proc. Zool. Soc., 1849, p. 169.
MYSTICONCHA Allan, Rec. Aust. Mus., 19, 1936, p. 393. (*wilsoni* Smith.)
wilsoni Smith, *Lamellaria,* Ann. Mag. Nat. Hist., 18, 1886, p. 270 and fig.
MERRIA Gray, Beechey's Voy., 1839, p. 137. (*cancellata* Lamk.)
quoyiana A. Adams, *Vanicoro,* Proc. Zool. Soc., 1853, p. 175, pl. 20, f. 4.

Superfamily STROMBIDIACEA

Family STROMBIDAE

STROMBUS Linne, Syst. Nat., 10, 1758, p. 742. (*vittatus* Linne.)
floridus Lamarck, Anim. s. Vert., 7, 1822, p. 211.

Superfamily CYPRAEACEA

Family CYPRAEIDAE

NOTOCYPRAEA Schilder, Arch. fur. Naturg. (Wiegm), 1927, 91, Abt. A, heft 10, p. 110. (*piperata* Gray.)
albata Beddome, *Cypraea,* Proc. Linn. Soc. N.S.W., 22, 1897, p. 571, pl. 21, f. 11.
angustata Gmelin, *Cypraea,* Syst. Nat., 13, 1791, p. 3421.
bicolor Gaskoin, *Cypraea,* Proc. Zool. Soc., 1848, p. 92.
comptoni Gray, *Cypraea,* Juke's Voy. H.M.S. "Fly," 2, 1847, p. 356, pl. 1, f. 3.
declivis Sowerby, *Cypraea,* Thes. Conch., 4, 1870, p. 31, f. 287, 329.
piperata Gray, *Cypraea,* Zool. Journ., 1, 1824, p. 498.
UMBILIA Jousseaume, Bull. Soc. Zool., France, 9, 1884, p. 90. (*hesitata* Iredale.)
hesitata Iredale, *Cypraea,* Proc. Mal. Soc., 12, 1916, p. 93.

Family TRIVIIDAE

ELLATRIVIA Iredale, Rec. Aust. Mus., 18, 1931, p. 221. (*merces* Iredale.)
merces Iredale, *Trivia,* Proc. Linn. Soc. N.S.W., 49, 1924, p. 257, pl. 35, f. 16-17.

Family ERATOIDAE

LACHRYMA Reeve, Conch. Syst., 1842, p. 261. (*lachryma* Sowerby.)
denticulata Pritchard and Gatliff, *Erata,* Proc. Roy. Soc. Vic., 1900, p. 133, pl. 20, f. 5.

Superfamily DOLIACEA

Family CASSIDIAE

HYPOCASSIS Iredale, Rec. Aust. Mus., 15, 1927, p. 329. (*decresensis* Hedley.)
fimbriata Quoy and Gaimard, *Cassis,* Voy. "Astrolabe," Zool., 2, 1833, p. 596, pl. 43, f. 7-8.
ANTEPHALIUM Iredale, Rec. Aust. Mus., 15, 1927, p. 350. (*semigranosum* Lamarck.)
semigranosum Lamarck, *Cassis,* Anim. s. Vert., 7, 1822, p. 228.
sinuosum Verco, *Cassidea,* Trans. Roy. Soc. S.A., 28, 1904, p. 141, pl. 26, f. 7-10, a-c.
XENOGALEA Iredale, Rec. Aust. Mus., 15, 1927, p. 339. (*pyrum* Lamarck.)
labiata Perry, *Cassidea,* Conchology, 1811, pl. 34, 1.

paucirugis Menke, *Cassis*, Moll. Nov. Holl., 1843, p. 23.
pyrum Lamarck, *Cassis*, Anim. s. Vert., 7, 1822, p. 226.
spectabilis Iredale, Rec. Aust. Mus., 17, 1929, p. 178, pl. 38, f. 6.
stadialis Hedley, *Cassidea*, Biol. Results F.I.S. "Endeavour," 2, 1914, p. 72, pl. 10, f. 4.
thomsoni Brazier, *Cassis*, Proc. Linn. Soc. N.S.W., 1, 1875, p. 8.

Family CYMATIIDAE

CHARONIA Gistel, Natung. Thier, 1848, p. 170. (*tritonis* Linne.)
rubicunda Perry, *Septa*, Conchology, 1811, pl. 14, f. 4.
CYMATIUM Bolten, Mus. Bolten, 1798, p. 129. (*femorale* Linne.)
exaratum Reeve, *Triton*, Proc. Zool. Soc., 1844, p. 116.
CYMATILESTA Iredale, Rec. Aust. Mus., 19, 1936, p. 307. (*spengleri* Perry.)
spengleri Perry, *Septa*, Conchology, 1811, pl. 14, f. 3.
waterhousei Adams and Angas, *Triton*, Proc. Zool. Soc., 1864, p. 35.
CYMATONA Iredale, Rec. Aust. Mus., 17, 1929, p. 177. (*kampyla* Watson.)
kampyla Watson, *Nassarius*, Journ. Linn. Soc. Zool., 16, 1883, p. 594 and f.
GONDWANULA Finlay, Trans. New Zealand Instit., 57, 1926, p. 399. (*tumida* Dunker.)
bassi Angas, *Triton*, Proc. Zool. Soc., 1869, p. 45, pl. 2, f. 2.
vexillum Sowerby, *Ranella*, Conch. Illus., f. 3.
NEGYRINA Iredale, Rec. Aust. Mus., 17, 1929, p. 177. (*subdistorta* Lamarck.)
subdistorta Lamarck, *Triton*, Anim. s. Vert., 7, 1822, p. 186.
MAYENA Iredale, Proc. Mal. Soc., 12, 1917, p. 324. (*australasia* Perry.)
australasia Perry, *Biplex*, Conchology, 1811, pl. 4, f. 2 and 4.
CYMATIELLA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 254. (*quoyi* Reeve.)
columnaria Hedley and May, *Cymatium*, Rec. Aust. Mus., 7, 1908, p. 119, pl. 23, f. 15.
gaimardi Iredale, Rec. Aust. Mus., 17, 1929, p. 176, pl. 40, f. 7.
lesueuri Iredale, Rec. Aust. Mus., 17, 1929, p. 175, pl. 40, f. 11.
quoyi Reeve, *Triton*, Conch. Icon., 2, 1844, pl. 19, sp. 93.
verrucosa Reeve, *Triton*, Conch. Icon., 2, 1844, pl. 17, sp. 71.
MACULOTRITON Dall, Smithson. Misc. Coll., 47, No. 1475, 1904, p. 136. (*bractealus* Hinds.)
australis Pease, *Tritonidea*, Amer. Journ. Conch., 7, 1872, p. 21.
AUSTROCASSIA Finlay, Trans. New Zealand Instit., 62, 1931-2, p. 7. (*parkinsonia* Perry.)
parkinsonia Perry, *Septa*, Conchology, 1811, pl. 14, f. 1.
RATIFUSUS Iredale, Rec. Aust. Mus., 17, 1929, p. 183. (*adjunctus* Iredale.)
bednalli Brazier, *Triton* (*Epidromus*), Proc. Linn. Soc. N.S.W., 1, 1875, p. 6.
reticulata, A. Adams, *Pisania*, Proc. Zool. Soc., 1854, p. 138.

Suborder STENOGLOSSA
Section RACHIGLOSSA
Superfamily MURICACEA
Family MURICIDAE

TORVAMUREX Iredale, Rec. Aust. Mus., 19, 1936, p. 323. (*denudatus* Perry.)
damicornis Hedley, *Murex*, Mem. Aust. Mus., 4, 1903, p. 378, f. 92.
denudatus Perry, *Triplex*, Conch., 1811, pl. 7, f. 2.
PTERYNOTUS Swainson, Zool. Illust. (2), 3, (22), 1833, p. 100. (*pinnatus* Swainson.)

angasi Crosse, *Typhis,* Journ. de Conch., 11, 1863, p. 86, pl. 1, f. 2.
triformis Reeve, *Murex,* Conch. Icon., 3, 1845, pl. 13, sp. 53.

MUREXSEL Iredale, Trans. New Zealand Instit., 47, 1915, p. 471. (*octogonus* Q. and G.)
brazieri Angas, *Murex,* Proc. Zool. Soc., 1877, p. 171, pl. 26, f. 3.
fimbriatus Lamarck, *Murex,* Anim. s. Vert., 7, 1822, p. 176.
umbilicatus T. Woods, *Trophon,* Proc. Roy. Soc. Tas., 1875, p. 135.

GALFRIDUS Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 271. (*speciosus* Angas.)
eburneus Petterd, *Trophon,* Journ. of Conch., 4, 1884, p. 142.
speciosus Angas, *Triton,* Proc. Zool. Soc., 1871, p. 13, pl. 1, f. 1.

TYPHIS Monfort, Syst. Conch., 2, 1810, p. 614. (*tubifer* Bruguiere.)
philippensis Watson, Journ. Linn. Soc., 16, 1883, p. 605.
yatesi Crosse, Journ. de Conch., 13, 1865, p. 54, pl. 2, f. 3.

CYPHONOCHELUS Jousseaume, Rev. Mag. Zool. (3), 7, 1881, p. 337. (*arcuatus* Hinds.)
syringianus Hedley, *Typhis,* Mem. Aust. Mus., 4, 1903, p. 381, f. 94.

LITOZAMIA Iredale, Rec. Aust. Mus., 17, 1929, p. 185. (*rudolphi* Brazier.)
brazieri T. Woods, *Trophon,* Proc. Roy. Soc. Tas., 1875, p. 136.
goldsteini T. Woods, *Trophon,* Proc. Roy. Soc. Tas., 1875, p. 136.

BENTHOXYSTUS Iredale, Rec. Aust. Mus., 17, 1929, p. 185. (*columnarius* Hedley and May.)
petterdi Crosse, *Trophon,* Journ. de Conch., 18, 1870, p. 303.
recurvatus Verco, *Trophon,* Trans. Roy. Soc. S.A., 1909, p. 336, pl. 24, f. 7-8.

ENATIMENE Iredale, Rec. Aust. Mus., 17, 1929, p. 185. (*simplex* Hedley.)
simplex Hedley, *Trophon,* Mem. Aust. Mus., 4, 1903, p. 380, f. 93.

BEDEVA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 273. (*hanleyi* Angas.)
assisi T. Woods, *Trophon,* Proc. Roy. Soc. Tas., 1876, p. 132.
hanleyi Angas, *Trophon,* Proc. Zool. Soc., 1867, p. 110, pl. 13, f. 1.
paivae Crosse, *Trophon,* Journ. de Conch., 12, 1864, p. 278, pl. 11, f. 7.

RAPANA Schumacher, Ess. Vers. Test., 65, 1817, p. 214. (*bezoar* Linne.)
mira Cotton and Godfrey, S. Aust. Nat., 13, 1932, p. 145, pl. 1, f. 16.
nodosa A. Adams, Proc. Zool. Soc., 1853, p. 98.

DRUPA Bolten, Mus. Bolt. (2), 1798, p. 55. (*grossularia* Bolten.)
aspera Lamarck, *Ricinula,* Anim. s. Vert., 7, 1822, p. 232.

Family THAIDIDAE

DICATHAIS Iredale, Rec. Aust. Mus., 19, 1936, p. 325. (*orbita* Gmelin.)
baileyana T. Woods, *Purpura,* Proc. Roy. Soc. Vic., 17, 1881, p. 80, f. 1-2.
orbita Gmelin, *Buccinum,* Syst. Nat., ed. 13, 1791, p. 3490.
textiliosa Lamarck, *Purpura,* Anim. s. Vert., 7, 1822, p. 242.

LEPSIELLA Iredale, Proc. Mal. Soc., 10, 1912, p. 223. (*scobina* Quoy and Gaim.)
adelaidensis Crosse and Fischer, *Ricinula,* Journ. de Conch., 1865, p. 50, pl. 2, f. 1.
reticulata Blainville, *Purpura,* Nouv. Ann. du Mus., 1, 1832, p. 229.
vinosa Lamarck, *Buccinum,* Anim. s. Vert, 7, 1822, p. 273.

TOLEMA Iredale, Rec. Aust. Mus., 17, 1929, p. 186. (*sertata* Hedley.)
sertata Hedley, *Purpura,* Aust. Mus. Mem., 4, 1902, p. 382, f. 95-96.

AGNEWIA T. Woods, Proc. Roy. Soc. Tas., 1877, p. 29. (*typica* Dunker.)
tritoniformis Blainville, *Purpura,* Nouv. Ann. Mus., 1, 1832, p. 221, pl. 10, f. 10.

Superfamily BUCCINACEA
Family PYRENIDAE

ZEMITRELLA Finlay, Trans. New Zealand Instit., 57, 1926, p. 431. (*sulcata* Hutton.)
austrina Gaskoin, *Columbella,* Proc. Zool. Soc., 1851, p. 9.
dictua T. Woods, *Columbella,* Proc. Roy. Soc. Tas., 1878, p. 34.
franklinensis Gatliff and Gabriel, *Columbella,* Proc. Roy. Soc. Vic., 23, 1910, p. 83, pl. 18, f. 3.
lincolnensis Reeve, *Columbella,* Conch. Icon., 11, 1859, pl. 29, sp. 184, a, b.
menkeana Reeve, *Columbella,* Conch. Icon., 11, 1859, pl. 14, sp. 69a, b.
nubeculata Reeve, *Columbella,* Conch. Icon., 11, 1859, pl. 37, sp. 234.
nux Reeve, *Columbella,* Conch. Icon., 11, 1859, pl. 35, f. 227.
pulla Gaskoin, *Columbella,* Proc. Zool. Soc., 1851, p. 6.
semiconvexa Lamarck, *Buccinum,* Anim. s. Vert., 7, 1822, p. 272.
vincta Tate, *Columbella,* Trans. Roy. Soc. S.A., 17, 1893, p. 190, pl. 1, f. 11.

ZELLA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 271. (*beddomei* Petterd.)
beddomei Petterd, *Terebra,* Journ. of Conch., 4, 1884, p. 142.

PSEUDAMYCLA Pace, Proc. Mal. Soc., 5, 1902, p. 255. (*dermestoidea* Lamarck.)
dermestoidea Lamarck, *Buccinum,* Anim. s. Vert., 7, 1822, p. 275.
miltostoma T. Woods, *Columbella,* Proc. Roy. Soc. Tas., 1876, p. 134.

TRUNCARIA Adams and Reeve, Voy. "Samarang," Zool., 6, 1850, p. 33. (*filosa* Ad. and Reeve.)
australis Angas, Proc. Zool. Soc., 1877, p. 172, pl. 26, f. 5.

MACROZAFRA Finlay, Trans. New Zealand Instit., 57, 1926, p. 431. (*subabnormis* Suter.)
atkinsoni T. Woods, *Mangelia,* Proc. Roy. Soc. Tas., 1875, p. 141.
calva Verco, *Pyrene,* Trans. Roy. Soc. S.A., 34, 1910, p. 143, pl. 29, f. 2-3.
cominelliformis Tate, *Columbella,* Trans. Roy. Soc. S.A., 15, 1892, p. 126, pl. 1, f. 8.
fulgida Reeve, *Columbella,* Conch. Icon., 11, 1859, pl. 28, sp. 178.
legrandi T. Woods, *Columbella,* Proc. Roy. Soc. Tas., 1875, p. 152.
lurida Hedley, *Pyrene,* Proc. Linn. Soc. N.S.W., 32, 1907, p. 510, pl. 17, f. 19.
remoensis Gatliff and Gabriel, *Columbella,* Proc. Roy. Soc. Vic., 23, 1910, p. 82, pl. 18, f. 1-2.
smithi Angas, *Columbella,* Proc. Zool. Soc., 1877, p. 172, pl. 26, f. 7.

RETIZAFRA Hedley, Proc. Linn. Soc. N.S.W., 38, 1913, p. 326. (*gemmulifera* Hedley.)
gemmulifera Hedley, *Pyrene,* Proc. Linn. Soc. N.S.W., 32, 1907, p. 510, pl. 19, f. 44.

ANTIZAFRA Finlay, Trans. New Zealand Instit., 57, 1926, p. 431. (*pisaniopsis* Hutton.)
plexa Hedley, *Columbella,* Proc. Linn. Soc. N.S.W., 26, 1901, p. 702, f. 25.

AESOPUS Gould, Proc. Boston Soc. Nat. Hist., 7, 1860, p. 383. (*japonicus* Gould.)
cassandra Hedley, *Daphnella,* Proc. Linn. Soc. N.S.W., 29, 1904, p. 187, pl. 8, f. 17.
gatliffi Verco, *Mangilia,* Trans. Roy. Soc. S.A., 33, 1909, p. 312, pl. 28, f. 9.
pallidulus Hedley, *Mitromorpha,* Proc. Linn. Soc. N.S.W., 30, 1905, p. 534, pl. 32, f. 26.
plurisulcatus Reeve, *Columbella,* Conch. Icon., 11, 1859, pl. 36, sp. 233.

Family BUCCINIDAE

COMINELLA Gray, Figs. Moll. Anim., 4, 1850, p. 72. (*testudinea* Martyn.)
acutinodosa Reeve, *Buccinum,* Conch. Icon., 3, 1846, pl. 4, sp. 21.

eburnea Reeve, *Buccinum,* Conch. Icon., 3, 1846, pl. 12, sp. 93.
lineolata Lamarck, *Buccinum,* Encycl. Meth., 1809, pl. 400, f. 8.

TASMEUTHRIA Iredale, Rec. Aust. Mus., 14, 1925, p. 262. (*clarkei* T. Woods.)
clarkei T. Woods, *Siphonalia,* Proc. Roy. Soc. Tas., 1875, p. 138.

PHOS Monfort, Conch. Syst., 2, 1810, p. 494. (*textum* Gmelin.)
senticosus Linne, *Murex,* Syst. Nat., ed. 10, 1758, p. 751.

FAX Iredale, Rec. Aust. Mus., 14, 1925, p. 262. (*tabidus* Hedley.)
tabida Hedley, *Phos,* Proc. Linn. Soc. N.S.W., 29, 1904, p. 191, pl. 8, f. 18.

Family AUSTROSIPHONIDAE

AUSTROSIPHO Cossmann, Essaid Paleoconch., 7, 1906, p. 229. (*roblini* Tate.)
grandis Gray, *Fusus,* Zool. Beechey's Voyage, 1839, p. 116.
maxima Tryon, *Siphonalia,* Man. Conch., 3, 1881, p. 135, pl. 54, f. 355.
oligostira Tate, *Siphonalia,* Trans. Roy. Soc. S.A., 14, 1891, p. 258, pl. 11, f. 6.
waitei Hedley, *Fusus,* Mem. Aust. Mus., 4, 1903, p. 373, pl. 37.

Family NASSARIIDAE

NASSARIUS Dumeril, Zool. Analyt., 1806, p. 166. (*mutabile* Linne.)
particeps Hedley, *Arcularia,* Proc. Linn. Soc. N.S.W., 39, 1915, p. 738.

TAVANIOTHA Iredale, Rec. Aust. Mus., 19, 1936, p. 321. (*optata* Gould.)
munieriana Crosse, *Nassa,* Journ. de Conch., 12, 1864, p. 345, pl. 13, f. 6.

PARCANASSA Iredale, Rec. Aust. Mus., 19, 1936, p. 322. (*ellana* Iredale.)
burchardi Philippi, *Buccinum,* Abbild. Beschr. Conch., 3, 1851, p. 69, pl. 2, f. 14.
jonasi Dunker, *Buccinum,* Zeit. Malak., 3, 1846, p. 171.
pauperata Lamarck, *Buccinum,* Anim. s. Vert., 7, 1822, p. 278.

RETICUNASSA Iredale, Rec. Aust. Mus., 19, 1936, p. 322. (*paupera* Gould.)
paupera Gould, *Nassa,* Proc. Boston Nat. Hist. Soc., 3, 1850, p. 155.

NIOTHA H. and A. Adams, Gen. Moll., 1, 1853, p. 117. (*cumingi* A. Adams.)
pyrrhus Menke, *Buccinum,* Moll. Nov. Holl., 1843, p. 21, No. 93.

Family FASCIOLARIIDAE

FASCIOLARIA Lamarck, Mem. Soc. N.H., Paris, 1799, p. 73. (*tulipa* Linne.)
australasia Perry, *Pyrula,* Conch., 1811, pl. 54, f. 4.
coronata Lamarck, Anim. s. Vert., 7, 1822, p. 120.

DOLICHOLATHYRUS Bellardi, Mem. Acas. Sci. Torina (2), 37, 1886, p. 38. (*lancea* Gmelin.)
spiceri T. Woods, *Fusus,* Proc. Roy. Soc. Tas., 1876, p. 137.

Family COLIDAE

COLUS Humphrey, Museum Calonnianum, 1797, p. 34. (*colus* Linne.)
australis Quoy and Gaimard, *Fusus,* Voy. "Astrolabe," Zool., 2, 1833, p. 495, pl. 34, f. 9-14.
novaehollandiae Reeve, *Fusus,* Conch. Icon., 4, 1848, pl. 18, sp. 70.

PROPEFUSUS Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 268. (*pyrulatus* Reeve.)
pyrulatus Reeve, *Fusus,* Conch. Icon., 4, 1847, pl. 13, sp. 50.
undulatus Perry, *Pyrula,* Conch., 1811, pl. 54, f. 1.

MICROCOLUS Cotton and Godfrey, S.A. Nat., 13, 1932, p. 72. (*dunkeri* Jonas.)
dunkeri Jonas, *Fusus,* Malak. Beitrog., 1844, p. 129.

Superfamily VOLUTACEA

Family ZEMIRIDAE

ZEMIRA H. and A. Adams, Gen. Rec. Moll., 1, 1858, p. 110. (*australis* Sowerby.)
australis Sowerby, *Eburna,* Conch. Illust., 1841, pt. 20, f. 5.

Family OLIVIDAE

OLIVA Burgiere, Ency. Meth. (Vers), (1), 1789, p. 15. (*porphyria* Linne.)
australis Duclos, Monog. du Genre, 1835, sp. 56, pl. 8, f. 3-4.
BELLOLIVA Peile, Proc. Mal. Soc., 15, 1922, p. 18. (*brazieri* Angas.)
leucozona A. Ad. and Angas, *Olivella,* Proc. Zool. Soc., 1863, p. 422, pl. 37, f. 23.
pardalis A. Ad. and Angas, *Oliva,* Proc. Zool. Soc., 1863, p. 422, pl. 37, f. 3.
BARYSPIRA Fischer, Man. Conch., 1883, p. 600. (*australis* Sowerby.)
dyspetes Iredale, Aust. Zool., 5, 1929, p. 341, pl. 38, f. 12.
edithae Pritchard and Gatliff, *Ancilla,* Proc. Roy. Soc. Vic., 11 (n.s.), 1898, p. 181, pl. 20, f. 5.
fusiformis Petterd, *Ancillaria,* Proc. Roy. Soc. Tas., 1885, p. 342.
monilifera Reeve, *Ancillaria,* Conch. Icon., 15, 1864, pl. 10, sp. 36a, b.
oblonga Sowerby, *Ancillaria,* Species Conch., pt. 1, 1830, p. 7, f. 38, 39.
petterdi Tate, *Ancillaria,* Proc. Roy. Soc. S.A., 17, 1893, p. 199.
tasmanica T. Woods, *Ancillaria,* Proc. Roy. Soc. Tas., 1876, p. 135.
CUPIDOLIVA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 259. (*nympha* Ad. and Ang.)
nympha Adams and Angas, *Olivella,* Proc. Zool. Soc., 1863, p. 422.

Family MITRIDAE

MITRA Bolten, Mus. Bolteneanum, 2, 1798, p. 135. (*episcopalis* Linne.)
australis Swainson, Zool. Illust., 1, 1822, 1st series, pl. 18.
carbonaria Swainson, Bligh. Cat. Append., 1822, p. 10.
glabra Swainson, Exot. Conch., 1, 1821, pl. 24.
rhodia Reeve, Conch. Icon., 2, 1845, pl. 28, sp. 225.
rosettae Angas, Proc. Zool. Soc., 1865, p. 55, pl. 2, f. 6.
vincentiana Verco, Trans. Roy. Soc. S.A., 1896, p. 223, pl. 8, f. 3.
AUSTROMITRA Finlay, Trans. New Zealand Instit., 57, 1926, p. 410. (*rubiginosa* Hutton.)
acromialis Hedley, *Mitra,* Proc. Linn. Soc. N.S.W., 39, 1914, p. 730, pl. 84, f. 85.
analogica Reeve, *Mitra,* Conch. Icon., 2, 1845, pl. 35, sp. 293.
cinnamonea A. Adams, *Volutomitra,* Proc. Zool. Soc., 1854, p. 134.
legrandi T. Woods, Proc. Roy. Soc. Tas., 1875, p. 140.
pumilio May, *Vexillum,* Proc. Roy. Soc. Tas., 1915, p. 85, pl. 1, f. 5.
retrocurvata Verco, *Mitra,* Trans. Roy. Soc. S.A., 33, 1909, p. 338, pl. 24, f. 4 and 5.
scalariformis T. Woods, *Mitra,* Proc. Roy. Soc. Tas., 1875, p. 140.
schomburgki Angas, *Mitra,* Proc. Zool. Soc., 1878, p. 313, pl. 18, f. 12-13.
stadialis Hedley, *Mitra,* Zool. F.I.S. "Endeavour," pt. 1, 1911, p. 112, pl. 20, f. 37.
tatei Angas, *Mitra,* Proc. Zool. Soc., 1878, p. 861, pl. 54, f. 8.
PROXIMITRA Finlay, Trans. New Zealand Instit., 57, 1926, p. 410. (*rutidolomum* Suter.)
pica Reeve, *Mitra,* Conch. Icon., 2, 1845, pl. 31, sp. 247.
PECULATOR Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 269. (*verconis* Iredale.)

porphyria Verco, *Imbricaria,* Trans. Roy. Soc. S.A., 1897, p. 227, pl. 8, f. 5, 5a.

CANCILLA Swainson, Treat. Malacol., 1840, p. 320. (*sulcata* Swainson.)
strangei Angas, *Mitra,* Proc. Zool. Soc., 1867, p. 110, pl. 13, f. 4.

MITROIDEA Pease, Proc. Zool. Soc., 1865, p. 514. (*ancillides* Swainson.)
pellucida Tate, *Mitra,* Trans. Roy. Soc. S.A., 9, 1886, p. 63, pl. 4, f. 13.

Family VOLUTIDAE

AMORENA Iredale, Rec. Aust. Mus., 17, 1929, p. 180. (*undulata* Lamarck.)
undulata Lamarck, *Voluta,* Ann. du Mus., 5, 1804, p. 157, pl. 12, f. 1a, b.
zebra Leach, *Voluta,* Zool. Misc., 1, 1814, p. 31, pl. 12, f. 1.

CYMBIOLA Swainson, Zool. Illust., 2, 1832, pl. 33. (*ancilla* Solander.)
magnifica Perry, *Voluta,* Conchology, 1811, pl. 18, f. 1.

ERICUSA H. and A. Adams, Genera Rec. Moll., 2, 1858, p. 619. (*papillosa* Swainson.)
papillosa Swainson, *Voluta,* Append. Bligh Cat., 1821.
sowerbyi Kiener, *Voluta,* Coq. Viv., 1839, p. 47, pl. 50.

LIVONIA Gray, Brit. Mus. Cat. Volut., 1855, p. 8. (*dubia* Broderip.)
mamilla Gray, *Voluta,* in Sowerby's Thes. Conch., 1844, 1, p. 207, pl. 50, f. 57, 58.
roadnightae McCoy, *Voluta,* Ann. Mag. Nat. His., ser. 5, 8, 1881, p. 89, pl. 7, f. 1-2.

LYRIA Gray, Proc. Zool. Soc., 1847, p. 141. (*nucleus* Lamarck.)
mitraeformis Lamarck, *Voluta,* Anim. s. Vert., 7, 1822, p. 347.

Family CANCELLARIIDAE

SYDAPHERA Iredale, Aust. Zool., 5, 1929, p. 341. (*renovata* Iredale.)
granosa Sowerby, *Cancellaria,* Conch. Illust., 1832, p. 2, No. 15, f. 16-17.
lactea Deshayes, *Cancellaria,* Enclyc. Meth., 2, 1830, p. 180.
purpuraeformis Kuster, *Cancellaria,* Coq. Viv., Canal, 2, 1841, p. 37, pl. 7, f. 4.
undulata Sowerby, *Cancellaria,* Conch. Illust., 1832, pl. 10, f. 16.

NEVIA Jousseaume, Le Naturaliste (2), 1, 1887, p. 222. (*excavata* Sowerby = *spirata* Lamarck.)
spirata Lamarck, *Cancellaria,* Anim. s. Vert., 7, 1822, p. 115.

PEPTA Iredale, Rec. Aust. Mus., 14, 1925, p. 266. (*stricta* Hedley.)
stricta Hedley, *Admete,* Rec. Aust. Mus., 6, 1907, p. 295, pl. 54, f. 10.

Family MARGINELLIDAE

MARGINELLA Lamarck, Mem. Soc. N.H., Paris, 1799, p. 70. (*glabella* Linne.)
agapeta Watson, Chall. Zool., 15, 1886, p. 266, pl. 16, f. 9.
allporti T. Woods, Proc. Roy. Soc. Tas., 1875, p. 28.
alternans Pritchard and Gatliff, Proc. Roy. Soc. Vic., 11 (n.s.), 1898, p. 180, pl. 20, f. 3.
angasi Brazier, Journ. de Conch., 18, 1870, p. 304.
caducocincta May, Proc. Roy. Soc. Tas., 1915, p. 88, pl. 2, f.11.
columnaria Hedley and May, Rec. Aust. Mus., 7, 1908, p. 120, pl. 23, f. 19.
connectans May, Proc. Roy. Soc. Tas., 1910, p. 387, pl. 14, f. 11.
cratericula Tate and May, Trans. Roy. Soc. S.A., 24, 1900, p. 91.
cymbalum Tate, Trans. Roy. Soc. S.A., 1, 1878, p. 86.
flindersi Pritchard and Gatliff, Proc. Roy. Soc. Vic., 11 (n.s.), 1898, p. 180,
formicula Lamarck, Anim. s. Vert., 7, 1822, p. 359, No. 14.
freycineti May, Proc. Roy. Soc. Tas., 1915, p. 86, pl. 2, f. 9.
gabrieli May, Proc. Roy. Soc. Tas., 1910, p. 386, pl. 13, f. 9.

gatliffi May, Proc. Roy. Soc. Tas., 1910, p. 385, pl. 13, f. 8.
geminata Hedley, Rec. Aust. Mus., 8, 1912, p. 145, pl. 42, f. 28.
halli Pritchard and Gatliff, Proc. Roy. Soc. Vic., 11 (n.s.), 1898, p. 179, pl. 20, f. 1.
inconspicua Sowerby, Thes. Conch., 1, 1846, p. 387, pl. 75, f. 80.
johnstoni Petterd, Journ. of Conch., 4, 1884, p. 143.
laevigata Brazier, Proc. Linn. Soc. N.S.W., 1876, p. 225.
muscaria Lamarck, Anim. s. Vert., 7, 1822, p. 359, No. 14.
mustelina Angas, *Hyalina,* Proc. Zool. Soc., 1871, p. 14, pl. 1, f. 5.
nympha Brazier, Proc. Linn. Soc. N.S.W., 19, 1894, p. 168, pl. 14, f. 2.
ovulum Sowerby, Thes. Conch., 1, 1846, p. 401, pl. 78, f. 188.
pisum Reeve, Conch. Icon., 15, 1865, pl. 27, sp. 156a, b.
problematica Gatliff and Gabriel, Proc. Roy. Soc. Vic., 29 (n.s.), 1916, p. 104, pl. 7, f. 1.
pulchella Kiener, Coq. Viv., 1830, p. 27, pl. 9, f. 41.
pumilio Tate and May, Proc. Linn. Soc. N.S.W., 1901, p. 363, pl. 26, f. 79.
pygmaeoides Singleton, Proc. Roy. Soc. Vic., 49, 1937, p. 393, pl. 23, f. 2.
schoutanica May, Proc. Roy. Soc. Tas., 1912, p. 45, pl. 2, f. 2.
shorehami Pritchard and Gatliff, Proc. Roy. Soc. Vic., 11 (n.s.), 1898, p. 179, pl. 20, f. 2.
simsoni Tate and May, Trans. Roy. Soc. S.A., 24, 1900, p. 92.
stanislas T. Woods, Proc. Roy. Soc. Tas., 1876, p. 133.
stilla Hedley, Mem. Aust. Mus., 4, 1903, p. 367, f. 90 (text).
strangei Angas, Proc. Zool. Soc., 1877, p. 172, pl. 26, f. 8.
subauriculata May, Proc. Roy. Soc. Tas., 1915, p. 86, pl. 2, f. 7.
subbulbosa Tate, Trans. Roy. Soc. S.A., 1878, p. 86.
tasmanica T. Woods, Proc. Roy. Soc. Tas., 1875, p. 28, No. 5.
tridentata Tate, Trans. Roy. Soc. S.A., 1878, p. 87.
turbinata Sowerby, Thes. Conch., 1, 1846, p. 385, pl. 75, f. 70, 71.
victoriae Gatliff and Gabriel, Proc. Roy. Soc. Vic., 21 (n.s.), 1908, p. 365, pl. 21, f. 5.
whani Pritchard and Gatliff, Proc. Roy. Soc. Vic., 13, 1900, p. 137, pl. 21, f. 5-6.

Superfamily TOXOGLOSSA

Family TURRIDAE

EPIDIRONA Iredale, Rec. Aust. Mus., 18, 1931, p. 225. (*hedleyi* Iredale.)
gabensis Hedley, *Epideira,* Rec. Aust. Mus., 13, 1922, p. 228, pl. 43, f. 16.
philipineri T. Woods, *Pleurotoma,* Proc. Roy. Soc. Tas., 1876, p. 136.
quoyi Reeve, *Pleurotoma,* Conch. Icon., 1, 1843, pl. 16, sp. 137.
EPIDEIRA Hedley, Journ. Linn. Soc. N.S.W., 51, 1917, p. 79. (*striata* Gray.)
schoutanica May, *Drillia,* Proc. Roy. Soc. Tas., 1910, p. 391, pl. 14, f. 17.
FENESTROSYRINX Finlay, Trans. New Zealand Instit., 56, 1926, p. 254. (*bicarinatus* Suter.)
mayi Verco, *Hemipleurotoma,* Trans. Roy. Soc. S.A., 33, 1909, p. 295, pl. 25, f. 2.
VEXITOMINA Powell, Bull. Auckland Instit. and Mus., No. 2, 1942, p. 77. (*metcalfei* Angas.)
radulaeformis Weinkauff, *Pleurotoma,* Conch. Cab., 1876, p. 91, pl. 19, f. 7 and 8.
INQUISITOR Hedley, Journ. Roy. Soc. N.S.W., 51, 1917, p. M79. (*sterrha* Watson.)
aemula Angas, *Drillia,* Proc. Zool. Soc., 1877, p. 36, pl. 5, f. 9.

coxi Angas, *Drillia,* Proc. Zool. Soc., 1867, p. 113, pl. 13, f. 15.
immaculatus T. Woods, *Mangelia,* Proc. Roy. Soc. Tas., 1875, p. 142.
sauvis Smith, *Pleurotoma,* Ann. Mag. Nat. Hist., ser. 6, 2, 1888, p. 305.
spadix Watson, *Pleurotoma,* Chall. Zool., 15, 1886, p. 310, pl. 26, f. 6.

AUSTRODRILLIA Hedley, Journ. Roy. Soc. N.S.W., 2, 1917, p. M79. (*angasi* Crosse.)
angasi Crosse, *Pleurotoma,* Journ. de Conch., 11, 1863, p. 37, pl. 1, f. 5.
beraudiana Crosse, *Pleurotoma,* Journ. de Conch., 11, 1863, p. 88, pl. 1, f. 6.
nenia Hedley, *Drillia,* Mem. Aust. Mus., 4, 1903, p. 387, text. fig. 101.
saxea Sowerby, *Drillia,* Proc. Mal. Soc., 2, 1896, p. 25, pl. 3, f. 4.

SPLENDRILLIA Hedley, Rec. Aust. Mus., 13, 1922, p. 250. (*woodsi* Beddome.)
eburnea Hedley, *Melatoma,* Rec. Aust. Mus., 13, 1922, p. 251, pl. 45, f. 43.
woodsi Beddome, *Drillia,* Proc. Roy. Soc. Tas., 1882, p. 167.

ANTIMELATOMA Powell, Bull. Auckland Instit. and Mus., No. 2, 1942, p. 97. (*maorum* Smith.)
harpularia Desmonlins, *Pleurotoma,* Act. Soc. Linn., Bordeaux, 12, 1842, p. 162.
subviridis May, *Drillia,* Proc. Roy. Soc. Tas., 1910, p. 392, pl. 14, f. 18.

AUSTROCLAVUS Powell, Bull. Auckland Instit. and Mus., No. 2, 1942, p. 118. (*tenuispiralis* Marshall.)
lygdinus Hedley, *Melatoma,* Rec. Aust. Mus., 13, 1922, p. 252, pl. 45, f. 44.

MITRATHARA Hedley, Rec. Aust. Mus., 13, 1922, p. 233. (*alba* Petterd.)
alba Petterd, *Columbella,* Journ. of Conch., 2, 1879, p. 104.
incerta Pritchard and Gatliff, *Mangilia,* Proc. Roy. Soc. Vic., 14, 1902, p. 180, pl. 9, f. 1.
proles Hedley, Rec. Aust. Mus., 13, 1922, p. 236, pl. 43, f. 24.

SCRINIUM Hedley, Rec. Aust. Mus., 13, 1922, p. 258. (*brazieri* Smith.)
furtivum Hedley, Rec. Aust. Mus., 13, 1922, p. 259, pl. 45, f. 53.
gatliffi Verco, *Drillia,* Trans. Roy. Soc. S.A., 33, 1909, p. 312, pl. 28, f. 9.

GURALEUS Hedley, Journ. Roy. Soc. N.S.W., 51, 1917, p. M79. (*picta* Adams and Angas.)
alucinans Sowerby, *Mangilia,* Proc. Mal. Soc., 2, 1896, p. 29, pl. 3, f. 12.
brazieri Angas, *Clathurella,* Proc. Zool. Soc., 1871, p. 18, pl. 1, f. 21.
cuspis Sowerby, *Mangilia,* Proc. Mal. Soc., 2, 1896, p. 31, pl. 3, f. 17.
delicatulus T. Woods, *Mangelia,* Proc. Roy. Soc. Tas., 1878, p. 37.
granulosissimus T. Woods, *Clathurella,* Proc. Roy. Soc. Tas., 1878, p. 37.
incrustus T. Woods, *Drillia,* Proc. Roy. Soc. Tas., 1876, p. 136.
meredithiæ T. Woods, *Mangelia,* Proc. Roy. Soc. Tas., 1875, p. 142.
morologus Hedley, Rec. Aust. Mus., 13, 1922, p. 319, pl. 52, f. 146.
pictus Adams and Angas, *Mangelia,* Proc. Zool. Soc., 1863, p. 419, pl. 37, f. 7.
varix T. Woods, *Daphnella,* Proc. Roy. Soc. Tas., 1876, p. 138.
vincentinus Crosse and Fischer, *Pleurotoma,* Journ. de Conch., 13, 1865, p. 422, pl. 11, f. 6.

EUGURALEUS Cotton, S. Aust. Nat., 24, 1947, p. 15. (*anisus* Cotton.)
australis Adams and Angas, *Bela,* Proc. Zool. Soc., 1863, p. 420.
lallemantianus Crosse and Fischer, *Pleurotoma,* Journ. de Conch., 13, 1865, p. 423, pl. 11, f. 5.
letourneuxianus Crosse and Fischer, *Pleurotoma,* Journ. de Conch., 13, 1865, p. 425, pl. 11, f. 7.
tasmanicus T. Woods, *Cithara,* Proc. Roy. Soc. Tas., 1875, p. 145.

MARITA Hedley, Rec. Aust. Mus., 13, 1922, p. 312. (*compta* Ad. and Ang.)
bella Adams and Angas, *Cithara,* Proc. Zool. Soc., 1863, p. 419, pl. 37, f. 6.

compta Adams and Angas, *Cithara*, Proc. Zool. Soc., 1863, p. 419, pl. 37, f. 5.
fallaciosa Sowerby, *Daphnella*, Proc. Mal. Soc., 1896, p. 26, pl. 3, f. 7.
flaccida Pritchard and Gatliff, *Mangilia*, Proc. Roy. Soc. Vic., 12, 1899, p. 102, pl. 8, f. 3-4.
insculpta Adams and Angas, *Mangelia*, Proc. Zool. Soc., 1863, p. 420, pl. 37, f. 8.
kingensis Petterd, *Daphnella*, Journ. of Conch., 2, 1879, p. 102.
mitralis Adams and Angas, *Bela*, Proc. Zool. Soc., 1863, p. 420.
schoutenensis May, *Mangilia*, Proc. Roy. Soc. Tas., 1910, p. 393, pl. 15, f. 19.

HETEROCITHARA Hedley, Rec. Aust. Mus., 13, 1922, p. 297. (*bilineata* Angas.)
bilineata Angas, *Clathurella*, Proc. Zool. Soc., 1871, p. 18, pl. 1, f. 23.

ETREMA Hedley, Journ. Roy. Soc. N.S.W., 51, 1917, p. M79. (*aliceae* Melv. and Strand.)
bicolor Angas, *Clathurella*, Proc. Zool. Soc., 1871, p. 18, pl. 1, f. 20.
crassina Angas, *Clathurella*, Proc. Zool. Soc., 1880, p. 416, pl. 40, f. 6.
denseplicata Dunker, *Drillia*, Mal. Blatt., 18, 1871, p. 159.
kymatoessa Watson, *Pleurotoma*, Chall. Zool., 15, 1886, p. 309, pl. 26, f. 5.
nassoides Reeve, *Pleurotoma*, Conch. Icon., 1, 1845, pl. 29, sp. 259.

FILLODRILLIA Hedley, Rec. Aust. Mus., 13, 1922, p. 220. (*tricarinata* T. Woods.)
columnaria Hedley, Rec. Aust. Mus., 13, 1922, p. 221, pl. 42, f. 7.
hilum Hedley, *Mangelia*, Proc. Linn. Soc. N.S.W., 33, 1908, p. 471, pl. 9, f. 17.
lacteola Verco, *Drillia*, Trans. Roy. Soc. S.A., 33, 1909, p. 304, pl. 26, f. 5.
recta Hedley, *Leucosyrinx*, Mem. Aust. Mus., 4, 1903, p. 386, f. 99.
steira Hedley, Rec. Aust. Mus., 13, 1922, p. 224, pl. 42, f. 11.
tricarinata T. Woods, *Drillia*, Proc. Linn. Soc. N.S.W., 2, 1878, p. 265.

MACTEOLA Hedley, Journ. Roy. Soc. N.S.W., 51, 1917, p. M.79. (*anomala* Angas.)
anomala Angas, *Purpura*, Proc. Zool. Soc., 1877, p. 34, pl. 5, f. 1.

DAPHNELLA Hinds, Voy. "Sulphur," Zool., 1844, p. 25. (*lymneiformis* Kiener.)
botanica Hedley, Journ. Roy. Soc. N.S.W., 51, 1917, p. M.83.

ASPERDAPHNE Hedley, Rec. Aust. Mus., 13, 1922, p. 338. (*versivestita* Hedley.)
albocincta Angas, *Clathurella*, Proc. Zool. Soc., 1871, p. 18, pl. 1, f. 22.
bastowi Gatliff and Gabriel, *Daphnella*, Proc. Roy. Soc. Vic., 21, 1908, p. 365, pl. 21, f. 1-4.
bitorquata Sowerby, *Daphnella*, Proc. Mal. Soc., 2, 1896, p. 27, pl. 3, f. 9.
desalesii T. Woods, *Mangelia*, Proc. Roy. Soc. Tas., 1876, p. 138.
sculptilis Angas, *Clathurella*, Proc. Zool. Soc., 1871, p. 17, pl. 1, f. 19.
tasmanica, T. Woods, *Daphnella*, Proc. Roy. Soc. Tas., 1876, p. 138.
vestalis Hedley, *Daphnella*, Mem. Aust. Mus., 4, 1903, p. 390, f. 105.
walcotae Sowerby, *Drillia*, Proc. Zool. Soc., 1893, p. 487, pl. 38, f. 7-8.

ASPERTILLA Powell, Rec. Auckland Instit. and Mus., 3, 1944, p. 60. (*legrandi* Beddome.)
legrandi Beddome, *Drillia*, Proc. Roy. Soc. Tas., 1882, p. 167.

EXOMILUS Hedley, Journ. Roy. Soc. N.S.W., 51, 1917, p. M.79. (*lutraria* Hedley.)
telescopialis Verco, *Drillia*, Trans. Roy. Soc. S.A., 20, 1896, p. 222, pl. 7, f. 1, a, b.

GATLIFFENA Iredale, Rec. Aust. Mus., 17, 1929, p. 189. (*fenestrata* Tate and May.)
fenestrata Tate and May, *Donovania*, Trans. Roy. Soc. S.A., 24, 1900, p. 94.

NEPOTILLA Hedley, Journ. Roy. Soc. N.S.W., 51, 1917, p. M.79. (*bathentoma* Verco.)
excavata Gatliff, *Daphnella*, Proc. Roy. Soc. Vic., 19, 1906, p. 1, pl. 1, f. 1-2.
lamellosa Sowerby, *Clathurella*, Proc. Mal. Soc., 2, 1896, p. 28, pl. 3, f. 11.

microscopica May, *Taranis,* Proc. Roy. Soc. Tas., 1915, p. 84, pl. 1, f. 2.
mimica Sowerby, *Daphnella,* Proc. Mal. Soc., 2, 1896, p. 27, pl. 3, f. 10.
minuta T. Woods, *Drillia,* Proc. Roy. Soc. Tas., 1876, p. 136.
triseriata Verco, *Daphnella,* Trans. Roy. Soc. S.A., 33, 1909, p. 325, pl. 28, f. 8.

PSEUDODAPHNELLA Boettger, Nachr. Malak. Gosell., 27, 1895, p. 58. (*philippinensis* Reeve.)
modesta Angas, *Clathurella,* Proc. Zool. Soc., 1877, p. 38, pl. 5, f. 15.
tincta Reeve, *Pleurotoma,* Conch. Icon., 1, 1846, pl. 38, sp. 347.
trachys T. Woods, *Mangelia,* Trans. Roy. Soc. Vic., 14, 1879, p. 57.

BENTHOFASCIS Iredale, Rec. Aust. Mus., 19, 1936, p. 319. (*biconica* Hedley.)
sarcinula Hedley, *Bathytoma,* Rec. Aust. Mus., 6, 1905, p. 53, f. 21.

TELEOCHILUS Harris, Cat. Tert. Moll. Brit. Mus., 1, 1897, p. 64. (*gracillima* T. Woods.)
royanus Iredale, *Radulphus,* Proc. Linn. Soc. N.S.W., 49, 1924, p. 270, pl. 34, f. 8.

Family CONIDAE

FLORACONUS Iredale, Mem. Queens. Mus., 10, 1930, p. 80. (*anemone* Lamarck.)
anemone Lamarck, *Conus,* Ann. du Mus., 15, 1810, p. 272.
segravei Gatliff, *Conus,* Vic. Nat., 7, 1890, p. 179.

PARVICONUS Cotton and Godfrey, S. Aust. Nat., 13, 1932, p. 68. (*rutilus* Menke.)
rutilus Menke, *Conus,* Moll. Nov. Holl., 1843, p. 27, No. 133.

Family TEREBRIDAE

TEREBRA Bruguiere, Enclycl. Meth. (Vers), (1), 15, 1789, p. 15. (*sublata* Linne.)
albida Gray, Proc. Zool. Soc., 1834, p. 63.

PERVICACIA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 262. (*ustulata* Deshayes.)
bicolor Angas, *Acus,* Proc. Zool. Soc., 1867, p. 111, pl. 13, f. 7.
fictilis Hinds, Thes. Conch., 1, 1844, p. 183, pl. 45, f. 109-110.
kieneri Deshayes, *Terebra,* Proc. Zool. Soc., 1859, p. 294.
ustulata Deshayes, *Terebra,* Journ. de Conch., 1857, p. 97, pl. 3, f. 12 .

ACUMINIA Dall, Nautilus, 21, 1908, p. 124. (*lanceata* Linne.)
brazieri Angas, *Terebra,* Proc. Zool. Soc., 1871, p. 16, pl. 1, f. 15.

EUTEREBRA Cotton and Godfrey, S. Aust. Nat., 13, 1932, p. 65. (*inconspicua* Pritchard and Gatliff.)
inconspicua Pritchard and Gatliff, *Terebra,* Proc. Roy. Soc. Vic., 14, 1902, p. 181, pl. 9, f. 2.

PARVITEREBRA Pilsbry, Proc. Acad. Nat. Sci. Philad., 56, 1904, p. 5. (*paucivolvis* Pilsbry.)
brazieri Angas, *Euryta,* Proc. Zool. Soc., 1875, p. 390, pl. 45, f. 5, 5a.

Subclass EUTHYNEURA
Order OPISTHOBRANCHIA
Suborder PLEUROCOELA
Section BULLOMORPHA
Superfamily CEPHALASPIDEA
Family ACTAEONIDAE

ACTEON Montfort, Conch., 2, 1810, p. 314. (*tornatilis* Linne.)
fructuosus Iredale, Rec. Aust. Mus., 19, 1936, p. 330.
subroseus Iredale, Rec. Aust. Mus., 19, 1936, p. 330, pl. 24, f. 25.

PUGNUS Hedley, Rec. Aust. Mus., 2, 1896, p. 106. (*parvus* Hedley.)
parvus Hedley, Rec. Aust. Mus., 2, 1896, p. 106, pl. 23, f. 1.

Family RINGICULIDAE

RINGICULADDA Iredale, Rec. Aust. Mus., 19, 1936, p. 332. (*semisculpta* Hedley.)
australis Hinds, *Ringicula,* Proc. Zool. Soc., 1844, p. 97.
grandinosa Hinds, *Ringicula,* Proc. Zool. Soc., 1844, p. 96.

Family BULLARIIDAE

BULLARIA Rafinesque, Anal. Nat., 1815, p. 142. (*ampulla* Linne.)
tenuissima Reeve, *Bulla,* Conch. Icon., 16, 1868, pl. 2, sp. 4.
HAMINOEA Turton, Nat. Hist. Teignmouth, 2, 1830, sign. F. 8. (*hydatis* Linne.)
brevis Quoy and Gaimard, *Bulla,* Voy. "Astrolabe," Zool., 2, p. 358, pl. 26, f. 36-37.
cuticulifera Smith, *Haminea,* Ann. Mag. Nat. Hist., ser. 4, 9, 1872, p. 350.
tenera A. Adams, *Bulla,* Thes. Conch., 2, 1850, p. 583, pl. 124, f. 103.
CYLINDROBULLA Fischer, Journ. de Conch., 5, 1856, p. 275. (*beauii* Fischer.)
fischeri Adams and Angas, Proc. Zool. Soc., 1864, p. 37.
LOBIGER Krohn, Ann. Sci. Nat. (3), Zool., 7, 1847, p. 52. (*philippi* Krohn.)
wilsoni Tate, Trans. Roy. Soc. S.A., 11, 1889, p. 66, pl. 11, f. 12.

Family AKERIDAE

AKERA Muller, Zool. Dan. Prod. 29, 1776, p. 242. (*bullata* Muller.)
soluta Gmelin, *Bulla,* Syst. Nat., 13, 1791, p. 3434.
tasmanica Beddome, Proc. Roy. Soc. Tas., 1882, p. 169.

Family RETUSIDAE

RETUSA Brown, Illustr. Conch. Gt. Brit., 1, 1827, Expl. pl. 38, f. 1. (*truncatula* Bruguiere.)
amphizosta Watson, *Utriculus,* Chall. Zool., 15, 1886, p. 652, pl. 48, f. 11.
apicina Gould, *Tornatina,* Proc. Bost. Soc. Nat. Hist., 7, 1859, p. 139.
apiculata Tate, *Utriculus,* Trans. Phil. Soc. S.A., 2, 1879, p. 138, pl. 5, f. 3.
eumicra Crosse and Fischer, *Bulla,* Journ. de Conch., 1865, p. 40, pl. 2, f. 7.
fusiformis A. Adams, *Bulla,* Thes. Conch., 2, 1854, p. 570, pl. 121, f. 37.
hofmani Angas, *Tornatina,* Proc. Zool. Soc., 1877, p. 39, pl. 5, f. 19.
CYLICHNINA Monterosata, Nom. Gen. Spec. Medit., 1884, p. 143. (*umbilicata* Montagu.)
atkinsoni T. Woods, *Cylichna,* Proc. Roy. Soc. Tas., 1875, p. 156.
pygmaea A. Adams, *Bulla,* Thes. Conch., 2, 1854, p. 595, pl. 125, f. 150.
sculpta Gatliff and Gabriel, *Bullinella,* Proc. Roy. Soc. Vic., 26, 1913, p. 69, pl. 8, f. 7.
VOLVULELLA Newton, Syst. List. Brist. Olig. Eoc. Moll., 1891, p. 268. (*rostrata* A. Adams.)
rostrata A. Adams, *Bulla,* Thes. Conch., 2, 1850, p. 596, pl. 125, f. 154.

Family SCAPHANDRIDAE

CYLICHNELLA Gabb, Proc. Ac. Nat. Sci. Philad., 1872, p. 273. (*bidentata* d'Orbigny.)
arachis Quoy and Gaimard, *Bulla,* Voy. "Astrolabe," Zool., 2, 1833, p. 361, pl. 26, f. 28-30.
protumida Hedley, *Cylichna,* Mem. Aust. Mus., 4, 1903, p. 396, f. 112.
tenuis Hedley, *Cylichna,* Rec. Aust. Mus., 6, 1905, p. 54, f. 22.
DAMONIELLA Iredale, Proc. Mal. Soc., 13, 1918, p. 37. (*cranchii* Fleming.)
exigua A. Adams, *Atys.,* Thes. Conch., 2, 1854, p. 589, pl. 125, f. 129.

Family PHILINIDAE

PHILINE Ascanius, K. Vet. Ak. Handl., 33, 1772, p. 331. (*aperta* Linne.)
angasi Crosse and Fischer, *Bullaea,* Journ. de Conch., 13, 1865, p. 38, pl. 2, f. 8.
columnaria Hedley and May, Rec. Aust. Mus., 7, 1908, p. 123, pl. 24, f. 25-26.

Order PTEROPODA

Suborder THECOSOMATA

Superfamily EUTHECOSOMATA

Family CAVOLINIIDAE

CAVOLINIA Abildgaard, Skr. Nat. Selsk., 1, 1791, p. 175. (*tridentata* Forskal.)
gibbosa Rang, *Hyalaea,* Voy. d. l'Amer. Merid., 5, 1836, p. 95, pl. 5, f. 16-20.
longirostris Lesueur, *Hyalaea,* M.S. in de Blainville, Dict. Sci. Nat., 22, 1821, p. 81.
DIACRIA Gray, Proc. Zool. Soc., 1847, p. 203. (*trispinosa* Lesueur.)
trispinosa Lesueur, *Hyalaea,* M.S. in de Blainville, Dict. Sci. Nat., 22, 1821, p. 82.
CLIO Linne, Syst. Nat., 12, 1767, p. 1094. (*pyramidata* Linne.)
pyramidata Linne, Syst. Nat., ed. 12, 1767, p. 1094.
CRESEIS Rang, Ann. Sci. Nat., 13, 1828, p. 305. (*virgula* Rang.)
virgula Rang, Ann. Sci. Nat., 13, 1829, p. 316, pl. 17, f. 2.
STYLIOLA Lesueur, Man. Malc.., 1827, p. 655. (*recta* Lesueur.)
recta Lesueur, in de Blainville, Man. de Malac., 1827, p. 655.
subula Quoy and Gaimard, *Cleodora,* Ann. de Sci. Nat., ser. 1, 10, 1827, p. 233, pl. 8D, f. 1-3.

Family SPIRATELLIDAE

SPIRATELLA Blainville, Dict. Sci. Nat., 9, 1817, p. 407. (*helcina* Philps.)
bulimoides d'Orbigny, *Atlanta,* Voy. d. l'Amer. Merid., 5, 1836, p. 179, pl. 12, f. 36, 38.
inflata d'Orbigny, *Atlanta,* Voy. d. l'Amer. Merid., 5, 1836, p. 174, pl. 12, f. 16-19.
lesueuri d'Orbigny, *Atlanta,* Voy. d. l'Amer. Merid., 5, 1836, p. 177, pl. 20, f. 12-15.
retroversa Fleming, Mem. Wern. Nat. Hist. Soc., 4, 1823, p. 498, pl. 15, f. 2.

Suborder ACOELA

Section NOTASPIDEA

Family UMBRACULIDAE

UMBRACULUM Schumacher, Essai. Nouv. Test., 1817, p. 55. (*sinicum* Gmelin.)
corticalis Tate, *Umbrella,* Trans. Roy. Soc. S.A., 11, 1889, p. 65, pl. 11, f. 11.

Suborder NUDIBRANCHIA

Superfamily DORIDACEA

Family DORIDIGITATIDAE

CERATOSOMA Adams and Reeve, Voy. "Samarang," Zool. (7), 1850, Moll., p. 67. (*cornigerum* Ad. and Reeve.)
brevicaudatum Abraham, Ann. Mag. Nat. Hist., ser. 4, 18, 1876, p. 142, pl. 7, f. 6.

ALLOIODORIS Bergh, in Semper, Reis. Philippi, 2, 9, 6, 1904, p. 41. (*marmorata* Beigh.)
marmorata Beigh, Reis. Arch. der Phil., 2, 9, 1904, p. 42, pl. 3, f. 12-19.
ARCHIDORIS Beigh, in Semper, Reise Arch. Philippi, 2, 2, 14, 1878, p. 616. (*tuberculata* Alder and Hancock.)
varia Abrahams, *Doris,* Proc. Zool. Soc., 1877, p. 209.
STAURODORIS Bergh, in Semper, Reis. Arch. Philippi 2, 2, 13, 1878, p. 578. (*verrucosa* Cuvier.)
pustulata Abrahams, *Doris,* Proc. Zool. Soc., 1877, p. 205, pl. 29, f. 18, 19.

Family DENDRODORIDAE

DENDRODORIS Ehrenberg, Sym. Phys., Moll., 1831, sign. g. (pl. 1828). (*granulosa* Pease.)
carneola Angas, *Doris,* Journ. de Conch., 12, 1864, p. 48, pl. 4, f. 7.
melaena Allan, Aust. Zool., 7, 1932, p. 98, pl. 5, f. 11.

Superfamily AEOLIDIACEA

Family ARMINIDAE

ARMINA Rafinesque, Precis Som., 1814, p. 30. (*tigrina* Rafinesque.)
cygnea Bergh, Malakol Blatter, 23, 1876, p. 9, pl. 1, f. 1-7.

Family SCYLLAEIDAE

SCYLLAEA Linne, Syst. Nat., ed. 10, 1758, p. 656. (*pelagica* Linne.)
pelagica Linne, Syst. Nat., ed. 10, 1758, p. 656.

Family TETHYIDAE

TETHYS Linne, Syst. Nat., 10, 1758, p. 653. (*leporina* Linne.)
norfolkensis Sowerby, *Aplysia,* Conch. Icon., 17, 1869, pl. 10, sp. 42.
tigrina Rang, *Aplysia,* Hist. Nat. Apl., 1828, p. 57, pl. 11.

Family PLEUROBRANCHAEIDAE

PLEUROBRANCHUS Cuvier, Ann. Mus. Hist. Nat., 5, 1804, p. 275. (*peronii* Cuvier.)
angasi Smith, "Alert" Zool., 1884, p. 88, pl. 6, f. k.
maculatus Quoy and Gaimard, *Pleurobranchidium,* Voy. "Astrolabe," Zool., 2, 1883, p. 301, pl. 22, f. 11, 14.

Order PULMONATA

Suborder BASOMMATOPHORA

Superfamily ACTOPHILA

Family ELLOBIIDAE

MARINULA King, Zool. Journ., 5, 1835, p. 343. (*pepita* King.)
meridionalis Brazier, *Alexia,* Proc. Linn. Soc. N.S.W., 1877, 2, p. 26.
xanthostoma H. and A. Adams, Proc. Zool. Soc., 1854, p. 35.
OPHICARDELUS Beck, Index. Moll. Mus. Ch. Fred. (2), 1837, p. 108. (*australis* Quoy and Gaimard.)
ornatus Ferussac, *Auricula,* Tab. Syst., 1821, p. 103.
LEUCONOPSIS Hutton, Trans. New Zealand Instit., 16, 1883, p. 213. (*obsoleta* Hutton.)
pellucida Cooper, *Auricula,* Micro. Journ. 1841, p. 16.

Family ONCHIDIIDAE

ONCHIDELLA Gray, Figs. Moll. Anim., 4, 1850, p. 117. (*granulosa* Lesson.)
patelloides Quoy and Gaimard, *Onchidium,* Voy. "Astrolabe," Zool., 2, 1832, p. 212, pl. 15, f. 21-23.
ONCHIDINA Semper, Reis. Arch. Philipp., Bd. 3, (6), 1882, p. 287. (*australis* Semper.)
australis Semper, Reis. Arch. Philipp., 3, Landmoll., 6, 1882, p. 287, pl. 19, f. 14-15; pl. 21, f. 27; pl. 23, f. 10.

Superfamily AMPHIBOLACEA

Family AMPHIBOLIDAE

SALINATOR Hedley, Proc. Linn. Soc. N.S.W., 25, 1900, p. 511. (*fragilis* Lamarck.)
fragilis Lamarck, *Ampullaria,* Anim. s. Vert., 6, 1822, p. 179.
solida von Martens, *Amphibola,* Jahr. Deutsch. Malak. Ges., 1878, p. 2.

Superfamily PATELLIFORMIA

Family GADINIIDAE

GADINIA Gray, Philos. Mag., 63, 1824, p. 274. (*afra* Gmelin.)
conica Angas, Proc. Zool. Soc., 1867, p. 115, pl. 13, f. 27.

Family SIPHONARIIDAE

SIPHONARIA Sowerby, Genera Shells, 1823, fasc. 21. (*sipho* Sowerby.)
baconi Reeve, Conch. Icon., 9, 1856, pl. 6, sp. 30.
diemenensis Quoy and Gaimard, Voy. "Astrolabe," Zool., 2, 1833, p. 327, pl. 25, f. 1-12.
tasmanica T. Woods, Proc. Roy. Soc. Tas., 1876, p. 54.
virgulata Hedley, Proc. Linn. Soc. N.S.W., 39, 1915, p. 751, pl. 85, f. 96-98.
PUGILLARIA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 277. (*stowae* Verco.)
stowae Verco, *Siphonaria,* Trans. Roy. Soc. S.A., 30, 1906, p. 223, pl. 8, f. 3-8.

Class SCAPHOPODA

Family DENTALIIDAE

DENTALIUM Linne, Syst. Nat., ed. 10, 1758, p. 785. (*elephantinum* Linne.)
lubricatum Sowerby, Thes. Conch., 3, p. 97, pl. 3, f. 56.
platyceras Sharp and Pilsbry, Man. Conch., 17, 1898, p. 126, pl. 22, f. 58-60.
tasmaniensis T. Woods, Proc. Roy. Soc. Tas., 1876, p. 140.
virgula Hedley, Mem. Aust. Mus., 4, 1903, p. 328, f. 62.

Family SIPHONODENTALIIDAE

CADULUS Philippi, Moll. Sicil., 2, 1844, p. 208. (*ovulum* Philippi.)
angustior Verco, Trans. Roy. Soc. S. Aust., 35, 1911, p. 211, pl. 26, f. 5, 5a, b.
gibbosus Verco, Trans. Roy. Soc. S. Aust., 35, 1911, p. 213, pl. 26, f. 6.
spretus Tate and May, Trans. Roy. Soc. S.A., 24, 1900, p. 102.
vincentianus Cotton and Godfrey, Moll. S. Aust., pt. 2, 1940, p. 338, f. 360.

Class PELECYPODA

Order PRIODESMACEA

Suborder PALAEOCONCHA

Family SOLEMYIDAE

SOLEMYA Lamarck, Anim. s. Vert., 5, 1818, p. 488. (*australis* Lamarck.)
australis Lamarck, Anim. s. Vert., 5, 1818, p. 489.

Suborder TAXODONTA

Superfamily NUCULACEA

Family NUCULIDAE

PRONUCULA Hedley, Mem. Aust. Mus., 4, 1902, p. 290. (*decorosa* Hedley.)
hedleyi Pritchard and Gatliff, *Nucula,* Proc. Roy. Soc. Vic., 17, 1904, p. 237.
micans Angas, *Nucula,* Proc. Zool. Soc., 1878, p. 864, pl. 54, f. 16.
ENNUCULA Iredale, Rec. Aust. Mus., 18, 1931, p. 202. (*obliqua* Lamarck.)
beachportensis Verco, *Nucula,* Trans. Roy. Soc. S.A., 31, 1907, p. 216, pl. 27, f. 3.
obliqua Lamarck, *Nucula,* Anim. s. Vert., 6, 1819, p. 59.

Family LEDIDAE

SCAEOLEDA Iredale, Rec. Aust. Mus., 17, 1929, p. 158. (*crassa* Hinds.)
crassa Hinds, *Nucula,* Proc. Zool. Soc., 1843, p. 99.
dohrni Hanley, *Leda,* Proc. Zool. Soc., 1861, p. 242.
LEDELLA Verrill and Bush., Amer. Journ. Sci. (4), 3, 1897, p. 54. (*messanensis* Verrill and Bush.)
miliacea Hedley, *Leda,* Mem. Aust. Mus., 4, 1902, p. 295, f. 43.
TERETILEDA Iredale, Rec. Aust. Mus., 17, 1929, p. 158. (*oculata* Iredale.)
fortis Hedley, *Leda,* Rec. Aust. Mus., 6, 1907, p. 362, pl. 66, f. 2, 3.
POROLEDA Hutton, Macleay, Mem. Linn. Soc. N.S.W., 1893, p. 86. (*lanceolata* Hutton.)
spathula Hedley, Proc. Linn. Soc. N.S.W., 39, 1915, p. 696, pl. 78, f. 17, 18.
PROPELEDA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 186. (*ensicula* Angas.)
ensicula Angas, *Leda,* Proc. Zool. Soc., 1877, p. 177, pl. 26, f. 27.

Superfamily ARCACEA

Family ARCIDAE

ANADARA Deshayes, Encly. Meth. (Vers), 2 (1), 1830, p. 37. (*antiquata* Linn.)
trapezia Deshayes, Mag. Zool., 1840, pl. 21.
ARCA Linne, Syst. Nat., 10, 1758, p. 693. (*barbata* Linne.)
pistachia Lamarck, Anim. s. Vert., 6, 1819, p. 41.
squamosa Lamarck, Anim. s. Vert., 6, 1819, p. 45.

Family LIMOPSIDAE

LIMOPSIS Sasso, Giorn. Ligust. Scien., 1, 1827, p. 476. (*aurita* Brocchi.)
tenisoni T. Woods, Proc. Roy. Soc. Tas., 1877, p. 56.
CYRILLONA Iredale, Rec. Aust. Mus., 17, 1929, p. 160. (*dalli* Hedley.)
dalli Hedley, *Cyrilla,* Mem. Aust. Mus., 4, 1902, p. 296, f. 44.
LISSARCA Smith, Phil. Trans., 168, 1877, p. 185. (*rubrofusca* Smith.)
rhomboidalis Verco, Trans. Roy. Soc. S.A., 31, 1907, p. 221, pl. 27, f. 7.
rubricata Tate, *Limopsis,* Trans. Roy. Soc. S.A., 9, 1886, p. 71, pl. 5, f. 6.

Family GLYCYMERIDAE

GLYCYMERIS Da Costa, Brit. Conch., 1778, p. 168. (*glycymeris* Linne.)
flabellatus T. Woods, Proc. Roy. Soc. Vic., 14, 1877, p. 61.
flammeus Reeve, *Pectunculus,* Conch. Icon., 1, 1843, pl. 2, f. 7.
radians Lamarck, *Pectunculus,* Anim. s. Vert., 6, 1819, p. 54.
sordidus Tate, *Pectunculus,* Trans. Roy. Soc. S.A., 14, 1891, p. 264, pl. 11, f. 8.

striatularis Lamarck, *Pectunculus,* Anim. s. Vert., 6, 1819, p. 52.
tenuicostatus Reeve, *Pectunculus,* Conch. Icon., 1, 1843, pl. 6, f. 35.

Family PHILOBRYIDAE

PHILOBRYA Carpenter, Smithson, Miscel. Coll., No. 252, 1872, Index p. 21. (*setosa* Carpenter.)
fimbriata Tate, Trans. Roy. Soc. S.A., 22, 1898, p. 87, pl. 4, f. 8.
pectinata Hedley, Mem. Aust. Mus., 4, 1902, p. 299, f. 46.

NOTOMYTILUS Hedley, Austral. Antarct. Exped. Moll., 1916, p. 20. (*ruber* Hedley.)
ruber Hedley, *Philippiella,* Proc. Linn. Soc., N.S.W., 29, 1904, p. 207, pl. 10, f. 44-47.

MICROMYTILUS Cotton, Rec. S. Aust. Mus., 4, 1931, p. 335. (*crenatuliferus* Tate.)
crenatuliferus Tate, *Myrina,* Trans. Roy. Soc. S.A., 15, 1892, p. 131, pl. 1, f. 11 and 11a.

Suborder SCHIZODONTA

Superfamily PTERIACEA

Family PERNIDAE

FORAMELINA Hedley, Biol. Results "Endeavour," 2, 1914, p. 70. (*exempla* Hedley.)
exempla Hedley, Biol. Results "Endeavour," 2, 1914, p. 71, pl. 11, 12, f. 6, 7, 8.

Family VULSELLIDAE

VULSELLA Bolton, Mus. Bolt., 1798, p. 156. (*lingulata* Lamarck.)
spongiarum Lamarck, Anim. s. Vert., 6, 1819, p. 222.

MALLEUS Lamarck, Mem. Soc. N.H. Paris, 1799, p. 82. (*vulgaris* Lamarck.)
albus Lamarck, Anim. s. Vert., 6, 1819, p. 144.

Family PTERIIDAE

ELECTROMA Stolickza, Pal. Indica. (6), fasc. 8, 1871, p. 391. (*smaragdina* Reeve.)
georgiana Quoy and Gaimard, *Avicula,* Voy. "Astrolabe," Zool., 3, 1835, p. 457, pl. 77, f. 10, 11.

PINCTADA Bolton, Mus. Bolt., 1798, p. 166. (*margaritifera* Lamarck.)
margaritifera Lamarck, *Meleagrina,* Anim. s. Vert., 6, 1819, p. 151.

Family PINNIDAE

ATRINA Gray, Proc. Zool. Soc., 1847, p. 199. (*nigra* Chemnitz.)
tasmanica T. Woods, *Pinna,* Proc. Roy. Soc. Tas., 1875, p. 161.

Superfamily OSTRACEA

Family OSTREIDAE

OSTREA Linne, Syst. Nat., 10, 1758, p. 696. (*edulis* Linne.)
sinuata Lamarck, Anim. s. Vert., 6, 1819, p. 208.

SAXOSTREA Iredale, Rec. Aust. Mus., 19, 1936, p. 269. (*commercialis* Iredale and Roughly.)
commercialis Iredale and Roughly, *Ostrea,* Proc. Linn. Soc. N.S.W., 58, 1933, p. 278.

Superfamily TRIGONICEA

Family TRIGONIIDAE

NEOTRIGONIA Cossman, Ann. Paleont., 7, 1912, p. 81. (*pectinata* Lamarck.)
margaritacea Lamarck, *Trigonia,* Ann. Mus., 4, 1804, p. 355, pl. 67, f. 2.

Suborder ISODONTA

Superfamily PECTINACEA

Family PECTINIDAE

NOTOVOLA Finlay, Trans. New. Zeal. Inst., 57, 1926, p. 451. (*novae-zealandiae* Reeve.)
alba Tate, *Pecten,* Proc. Roy. Soc. Tas., 1886, p. 114.
fumata Reeve, *Pecten,* Conch. Icon., 8, 1852, pl. 7, sp. 32.
EQUICHLAMYS Iredale, Rec. Aust. Mus., 17, 1929, p. 162. (*bifrons* Lamarck.)
bifrons Lamarck, *Pecten,* Anim. s. Vert., 6, 1819, p. 164.
NOTOCHLAMYS Cotton, Rec. Mus. S.A., 4, 1930, p. 233. (*anguineus* Finlay.)
anguineus Finlay, *Chlamys,* Trans. New Zeal. Inst., 57, 1926, p. 527.
SCAEOCHLAMYS Iredale, Rec. Aust. Mus., 17, 1929, p. 162. (*lividus* Lamarck.)
atkinos Petterd, *Pecten,* Proc. Roy. Soc. Tas., 1886, p. 329.
CTENAMUSIUM Iredale, Rec. Aust. Mus., 17, 1929, p. 164. (*thetidis* Hedley.)
thetidis Hedley, *Amusium,* Mem. Aust. Mus., 4, 1902, p. 304, f. 49.
CHLAMYDELLA Iredale, Rec. Aust. Mus., 17, 1929, p. 164. (*favus* Hedley.)
favus Hedley, *Cyclopecten,* Mem. Aust. Mus., 4, 1902, p. 305, f. 50.
MIMACHLAMYS Iredale, Rec. Aust. Mus., 17, 1929, p. 162. (*asperrimus* Lamarck.)
asperrimus Lamarck, *Pecten,* Anim. s. Vert., 6, 1819, p. 174.
famigerator Iredale, *Chlamys,* Rec. Aust. Mus., 14, 1925, p. 252, pl. 41, f. 1, 2.
perillustris Iredale, *Chlamys,* Rec. Aust. Mus., 14, 1925, p. 254, pl. 41, f. 3, 4.

Family SPONDYLIDAE

SPONDYLUS Linne, Syst. Nat., 10, 1758, p. 690. (*gaederopus* Linne.)
tenellus Reeve, Conch. Icon., 9, 1856, pl. 18, sp. 67.

Family LIMIDAE

AUSTROLIMA Iredale, Rec. Aust. Mus., 17, 1929, p. 165. (*nimbifer* Iredale.)
nimbifer Iredale, *Lima,* Proc. Linn. Soc. N.S.W., 49, 1924, p. 195, pl. 34, f. 1-4.
MANTELLUM Bolton, Mus. Bolt., 2, 1798, p. 160. (*inflata* Chemnitz.)
orientalis Adams and Reeve, *Lima,* Voy. "Samarang," 1850, p. 75, pl. 11, f. 33.
ESCALIMA Iredale, Rec. Aust. Mus., 17, 1929, p. 165. (*murrayi* Smith = *acclinis* Hedley.)
murrayi Smith, *Lima,* Proc. Zool. Soc., 1891, p. 444, pl. 35, f. 26.
LIMATULA Wood, Mag. Nat. Hist., n.s., 3, 1839, p. 235. (*subauriculata* Montagu.)
strangei Sowerby, *Lima,* Conch. Icon., 18, 1872, pl. 3, sp. 15.

Superfamily ANOMIACEA

Family ANOMIIDAE

MONIA Gray, Proc. Zool. Soc., 1849, p. 121. (*zelandica* Gray.)
ione Gray, Proc. Zool. Soc., 1849, p. 123.

Suborder DYSODONTA

Superfamily MYTILACEA

Family MYTILIDAE

MYTILUS Linne, Syst. Nat., 10, 1758, p. 704. (*edulis* Linne.)
planulatus Lamarck, Anim. s. Vert., 6, 1819, p. 125.
MODIOLUS Lamarck, Mem. Soc. N.H. Paris, 1799, p. 87. (*modiolus* Linne.)

albicostus Lamarck, *Modiola,* Anim. s. Vert., 6, 1819, p. 111.
australis Gray, *Modiola,* King Survey Aust., 2, 1827, p. 477.
inconstans Dunker, *Volsella,* Proc. Zool. Soc., 1856, p. 363.
lineus Hedley, *Modiola,* Rec. Aust. Mus., 6, 1906, p. 300, pl. 56, f. 23-25.
pulex Lamarck, *Modiola,* Anim. s. Vert., 6, 1819, p. 112.
vexillum Reeve, Conch. Icon., 10, 1857, pl. 8, sp. 10.
victoriae Pritchard and Gatliff, *Modiola,* Proc. Roy. Soc. Vic., 16, 1903, p. 93, pl. 15, f. 1, 2.

AMYGDALUM Megerle, Ges. Nat. Fr. Berlin Mag., 5 (1), 1811, p. 69. (*arborescens* Chemnitz = *dendriticum* Muhlfeld.)
beddomei Iredale, Proc. Linn. Soc., 49, 1924, p. 197, pl. 35, f. 21.

BRACHYODONTES Swainson, Malac., 1840, p. 384. (*sulcatus* Lamarck.)
erosus Lamarck, *Mytilus,* Anim. s. Vert., 6, 1819, p. 120.
hirsutus Lamarck, *Mytilus,* Anim. s. Vert., 6, 1819, p. 120.
rostratus Dunker, *Mytilus,* Proc. Zool. Soc., 1856, p. 358.

EXOSIPERNA Iredale, Rec. Aust. Mus., 17, 1929, p. 166. (*scapha* Verco.)
scapha Verco, *Acroperna,* Trans. Roy. Soc. S.A., 1908, p. 196, pl. 12, f. 1-5.

SOLAMEN Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 198. (*rex* Iredale.)
recens Tate, *Acroperna,* Proc. Malc. Soc., 2, 1897, p. 181, text figs.

MUSCULUS Bolton, Mus. Bolt., 1798, p. 156. (*discors* Linne.)
barbatus Reeve, *Lithodomus,* Conch. Icon., 10, 1858, pl. 5, sp. 27.
impactus Herman, *Modiolaria,* Naturforscher, 17, 1782, pl. 3, f. 5-8.
paulucciae Crosse, *Crenella,* Journ. de Conch., 11, 1863, p. 89, pl. 1, f. 8.
rhyllensis Gatliff and Gabriel, *Modiolaria,* Proc. Roy. Soc. Vic., 25, N.S., 1912, p. 167, pl. 9, f. 9, 10.
ulmus Iredale, Rec. Aust. Mus., 19, 1936, p. 271, pl. 21, f. 10.

Superfamily GAIMARDIACEA

Family GAIMARDIIDAE

NEOGAIMARDIA Odhner, Videns Meddel. Nat. For. Kjobenhavn., 77, 1924, p. 69. (*rostellata* Tate.)
rostellata Tate, *Kellia,* Trans. Roy. Soc. S.A., 11, 1888, p. 63, pl. 11, f. 14.
tasmanica Beddome, *Modiolaria,* Proc. Roy. Soc. Tas., 1882, p. 168.

Family JULIIDAE

EDENTTELLINA Gatliff and Gabriel, Proc. Roy. Soc. Vic., 24, 1911, p. 190. (*typica* Gatliff and Gabriel.)
typica Gatliff and Gabriel, Proc. Roy. Soc. Vic., 24, 1911, p. 190, pl. 46, f. 5, 6.

Order ANOMALODESMACEA

Superfamily LATERNULACEA

Section EUSIPHONIA

Family LATERNULIDAE

LATERNULA Bolton, Mus. Bolt., 1798, p. 155. (*anatina* Linne.)
creccina Reeve, *Anatina,* Conch. Icon., 14, 1860, pl. 2, sp. 12.
tasmanica Reeve, *Anatina,* Conch. Icon., 14, 1863, pl. 3, sp. 20.

Family PERIPLOMIDAE

OFFADESMA Iredale, Rec. Aust. Mus., 17, 1930, p. 387. (*angasi* Crosse and Fischer.)
angasi Crosse and Fischer, *Periploma,* Journ. de Conch., 12, 1864, p. 349.

Family THRACIIDAE

EXIMIOTHRACIA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 199. (*speciosa* Angas.)
lincolnensis Verco, *Thracia,* Trans. Roy. Soc. S.A., 31, 1907, p. 229, pl. 28, f. 19-21.
modesta Angas, *Thracia,* Proc. Zool. Soc., 1867, p. 908, pl. 44, f. 3.
myodoroides Smith, *Thracia,* Chall. Zool., 13, 1885, p. 70, pl. 6, f. 6, 6b.
speciosa Angas, *Thracia,* Proc. Zool. Soc., 1869, p. 48, pl. 2, f. 12.
subalata Gatliff and Gabriel, *Saxicava,* Proc. Roy. Soc. Vic., 23, 1910, p. 85, pl. 19, f. 10, 12.
THRACIOPSIS Tate and May, Trans. Roy. Soc. S.A., 24, 1900, p. 103. (*angustata* Angas.)
angustata Angas, *Alicia,* Proc. Zool. Soc., 1867, p. 908, pl. 44, f. 1.
elongata Stutchbury, *Anatina,* Zool. Journ., 5, 1835, p. 100, Tab. Suppl., pl. 43, f. 9, 10.
THRACIDORA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 200. (*arenosa* Hedley.)
arenosa Hedley, *Thraciopsis,* Proc. Linn. Soc. N.S.W., 29, 1904, p. 197, pl. 9, f. 26-27.
PHRAGMORISMA Tate, Proc. Roy. Soc. N.S.W., 27, 1893, p. 189. (*watsoni* Smith.)
watsoni Smith, *Thracia,* Chall. Zool., 13, 1885, p. 69, pl. 6, f. 5-5b.

Family MYOCHAMIDAE

MYOCHAMA Stutchbury, Zool. Journ., 5, 1830, p. 96. (*anomioides* Stutchbury.)
anomioides Stutchbury, Zool. Journ., 5, 1830, p. 97, suppl. pl. 42, f. 1-4.
keppelliana A. Adams, Proc. Zool. Soc., 1852, p. 90, pl. 15, f. 1.
MYADORA Gray, Ann. Nat. Hist., 1840, p. 306. (*brevis* Stutchbury.)
albida T. Woods, Proc. Roy. Soc. Tas., 1875, p. 160.
antipodum Smith, Proc. Zool. Soc., 1880, p. 585, pl. 53, f. 7, 7a.
brevis Sowerby, *Pandora,* App. Stutchbury's Cat., 1829, p. 3, f. 2.
complexa Iredale, Proc. Linn. Soc. N.S.W., 24, 1824, p. 201, pl. 33, f. 9, 10.
gabrieli Macpherson, Mem. Aust. Mus. Vic., 17, 1951, p. 81.
pandoriformis Stutchbury, *Anatina,* Zool. Journ., 5, 1830, p. 99, pl. suppl. 43, f. 3-4.
subalbida Gatliff and Gabriel, Proc. Roy. Soc. Vic., 27, 1914, p. 96, pl. 15, f. 14.

Section ADELOSIPHONIA
Family PANDORIDAE

CLEIDOTHAERUS Stutchbury, Zool. Journ., 5 (17), 1830, p. 97. (*albidus* Lamk.)
albidus Lamarck, *Chama,* Anim. s. Vert., 6, 1819, p. 96.

Superfamily CLAVAGELLACEA
Family CLAVAGELLIDAE

CLAVAGELLA Blainville, Dict. Sci. Nat., 9, 1817, p. 366. (*echinata* Lamarck.)
australis Sowerby, Append. Stutchbury's Cat., 1829, pl. 1, f. 1.
HUMPHREYIA Gray, Ann. Mag. Nat. Hist. (3), 2, 1858, p. 16. (*strangei* Adams.)
strangei Adams, *Aspergillum,* Proc. Zool. Soc., 1852, p. 91, pl. 15, f. 5.

Superfamily POROMYACEA

Family VERTICORDIIDAE

VERTICORDIA Sowerby, Min. Conch., 7 (112), 1844, p. 67. (*verticordia* Wood.)
tasmanica May, Proc. Roy. Soc. Tas., 1915, p. 99, pl. 8, f. 41.

Family POROMYIDAE

ECTORISMA Tate, Trans. Roy. Soc. S.A., 15, 1892, p. 127. (*granulata* Tate.)
granulata Tate, Trans. Roy. Soc. S.A., 1892, p. 127, pl. 1, f. 3, 3a.

Family CUSPIDARIIDAE

CUSPIDARIA Nardo, Atti. Ruin. Sci. Ital., 1, 1839, p. 175. (*cuspidata* Olivi.)
alta Verco, Trans. Roy. Soc. S.A., 32, 1908, p. 198,, pl. 13, f. 8-11.
brazieri Smith, *Neaera,* Chall. Zool., 13, 1885, p. 51, pl. 9, f. 3-3b.
tasmanica T. Woods, *Neaera,* Proc. Roy. Soc. Tas., 1875, p. 27.

Order TELEODESMACEA

Suborder DIOGENODONTA

Superfamily ASTARTACEA

Family CRASSATELLIDAE

EUCRASSATELLA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 202. (*kingicola* Lamarck.)
kingicola Lamarck, *Crassatella,* Ann. du Mus., 5, 1804, p. 408.
TALBRICA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 204. (*aurora* A. Adams and Angas.)
aurora Adams and Angas, *Crassatella,* Proc. Zool. Soc., 1863, p. 426, pl. 37, f. 15.
SALAPUTIUM Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 204. (*fulvidum* Angas.)
micrum Verco, *Crassatella,* Trans. Roy. Soc. S.A., 1895, p. 93, pl. 1, f. 3.
CUNA Hedley, Mem. Aust. Mus., 4, 1902, p. 314. (*concentrica* Hedley.)
atkinsoni T. Woods, *Kellia,* Proc. Roy. Soc. Tas., 1876, p. 158 .
comma Verco, Trans. Roy. Soc. S.A., 32, 1908, p. 357, pl. 17, f. 29-31.
concentrica Hedley, Mem. Aust. Mus., 4, 1902, p. 315, f. 55.
edentata Verco, Trans. Roy. Soc. S.A., 32, 1908, p. 357, pl. 14, f. 1-3.
planilirata Gatliff and Gabriel, Proc. Roy. Soc. Vic., 24, 1911, p. 191, pl. 47, f. 13-17.
VOLUPICUNA Iredale, Rec. Aust. Mus., 19, 1936, p. 272. (*delta* Tate and May.)
delta Tate and May, *Carditella,* Trans. Roy. Soc. S.A., 24, 1900, p. 102.
SALTOCUNA Iredale, Rec. Aust. Mus., 19, 1936, p. 272. (*particula* Hedley.)
particula Hedley, *Cuna,* Mem. Aust. Mus., 4, 1902, p. 316, f. 56.

Superfamily CYAMIACEA

Family CYAMIIDAE

CYAMIOMACTRA Bernard, Bull. Mus. Hist. Nat., 3, 1897, p. 311. (*problematica* Bernard.)
balanistina Gould, *Kellia,* Proc. Bost. Soc. Nat. Hist. (5), 8, 1861, p. 33.
communis Hedley, Proc. Linn. Soc. N.S.W., 30, 1905, p. 541, pl. 31, f. 11-13.
mactroides Tate and May, *Cyamium,* Trans. Roy. Soc. S.A., 24, 1900, p. 102.

Superfamily CARDITACEA

Family CARDITIDAE

CARDITA Bruguire, Ency. Meth. Vers, 2, 1792, p. 401. (*sulcata* Bruguire.)
calyculata Linne, *Chama*, Syst. Nat., 10, 1758, p. 692.
crassicosta Lamarck, Anim. s. Vert., 6, 1819, p. 24.

VENERICARDIA Lamarck, Syst. Anim., 1801, p. 123. (*imbricata* Lamarck.)
amabilis Deshayes, *Cardita*, Proc. Zool. Soc., 1852, p. 102, pl. 17, f. 8-9.
bimaculata Deshayes, *Cardita*, Proc. Zool. Soc., 1852, p. 102, pl. 17, f. 4-5.
cavatica Hedley, *Cardita*, Mem. Aust. Mus., 4, 1902, p. 318, f. 58.
columnaria Hedley and May, Rec. Aust. Mus., 7, 1908, p. 125, pl. 25, f. 37-40.
rosulenta Tate, *Cardita*, Trans. Roy. Soc. S.A., 1886, p. 69, pl. 5, f. 3.

VIMENTUM Iredale, Rec. Aust. Mus., 14, 1925, p. 254. (*dilectum* Smith.)
delicatum Verco, *Venericardia*, Trans. Roy. Soc. S.A., 32, 1908, p. 351, pl. 16, f. 18, 19.
dilectum Smith, *Cardita*, Chall. Zool., 13, 1885, p. 213, pl. 15, f. 4, 4a.

CARDITELLONA Iredale, Rec. Aust. Mus., 19, 1936, p. 272. (*angasi* Smith.)
angasi Smith, *Carditella*, Chall. Zool., 13, 1885, p. 217, pl. 15, f. 9, 9a.

CARDITELLOPSIS Iredale, Rec. Aust. Mus., 19, 1936, p. 272. (*elegantula* Tate and May.)
elegantula Tate and May, *Carditella*, Proc. Linn. Soc. N.S.W., 26, 1901, p. 464, f. 14.

Family CONDYLOCARDIIDAE

CARDITELLA Smith, Proc. Zool. Soc., 1881, p. 42. (*pallida* E. A. Smith.)
exulata Smith, Chall. Zool., 13, 1885, p. 215, pl. 15, f. 6, 6a.
vincentensis Verco, Trans. Roy. Soc. S.A., 32, 1908, p. 354, pl. 16, f. 20, 21.

CONDYLOCARDIA Bernard, Bull. Mus. Hist. Nat., Paris, 2, 1896, p. 193. (*sanctipauli* Bernard.)
adelaideana Cotton and Godfrey, Moll. S.A., pt. 1, Pelecypoda, 1938, p. 194, f. 195.
australis Bernard, Journ. de Conch., 36, 1896, p. 176, pl. 6, f. 4.
chapmani Gatliff and Gabriel, Proc. Roy. Soc. Vic., 25, 1912, p. 167, pl. 11, f. 5-8.
ovata Hedley, Proc. Linn. Soc. N.S.W., 30, 1905, p. 539, pl. 31, f. 5, 6.
pectinata Tate and May, *Carditella*, Trans. Roy. Soc. S.A., 24, 1900, p. 103.
porrecta Hedley, Proc. Linn. Soc. N.S.W., 31, 1906, p. 475, pl. 38, f. 24.
projecta Hedley, Mem. Aust. Mus., 4, 1902, p. 317, f. 57.
subradiata Tate, *Carditella*, Trans. Roy. Soc. S.A., 11, 1888, p. 62, pl. 11, f. 7.

Superfamily LUCINACEA

Family LUCINIDAE

CAVATIDENS Iredale, Rec. Aust. Mus., 17, 1930, p. 391. (*omissa* Iredale.)
perplexa Cotton and Godfrey, Moll. S.A., pt. 1, 1938, p. 199, f. 208.

NOTOMYRTEA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 206. (*botanica* Hedley.)
botanica Hedley, *Lucina*, Supp. Journ. Roy. Soc. N.S.W., 51, 1917, p. 18.
mayi Gatliff and Gabriel, *Lucina*, Proc. Roy. Soc. Vic., 24 (n.s.), 1911, p. 189, pl. 47, f. 8-12.

DIVALUCINA Iredale, Rec. Aust. Mus., 19, 1936, p. 273. (*cumingi* Adams and Angas.)
cumingi Adams and Angas, *Lucina*, Proc. Zool. Soc., 1863, p. 426, pl. 37, f. 20.

WALLUCINA Iredale, Rec. Aust. Mus., 17, 1930, p. 390. (*jacksoniensis* Smith.)
assimilis Angas, *Loripes,* Proc. Zool. Soc., 1867, p. 910, pl. 44, f. 8.
icterica Reeve, *Lucina,* Conch. Icon., 6, 1850, pl. 10, f. 60a, 60b.
MONITILORA Iredale, Rec. Aust. Mus., 17, 1930, p. 390. (*ramsayi* Smith.)
paupera Tate, *Lucina,* Trans. Roy. Soc. S.A., 15, 1892, p. 129, pl. 1, f. 6.
CODAKIA Scopoli, Intr. Hist. Nat., 1777, p. 398. (*orbicularis* Linne.)
crassilirata Tate, *Lucina,* Trans. Roy. Soc. S.A., 9, 1886, p. 67, pl. 14, f. 2.
lacteola Tate, *Lucina,* Trans. Roy. Soc. S.A., 1897, p. 48.
minima T. Woods, *Lucina,* Proc. Roy. Soc. Tas., 1875, p. 162.
perobliqua Tate, *Lucina,* Trans. Roy. Soc. S.A., 15, 1892, p. 128, pl. 1, f. 10.
tatei Angas, *Lucina,* Proc. Zool. Soc., 1878, p. 863, pl. 54, f. 15.

Family UNGULINIDAE

ZEMYSIA Finlay, Trans. and Proc. New Zeal. Inst., N.S. 57, 1926, p. 462. (*zelandica* Gray.)
globularis Lamarck, *Lucina,* Anim. s. Vert., 5, 1818, p. 544.
globulosa A. Adams, *Diplodonta,* Proc. Zool. Soc., 1855, p. 226.
sphaericula Deshayes, *Cyrenella,* Proc. Zool. Soc., 1854, p. 340.
sublateralis Smith, *Diplodonta,* Zool. "Alert," 1884, p. 104, pl. 7, f. K.
tasmanica T. Woods, *Gouldia,* Proc. Roy. Soc. Tas., 1876, p. 158.
NUMELLA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 206. (*adamsi* Angas.)
adamsi Angas, *Mysia,* Proc. Zool. Soc., 1867, p. 910, pl. 44, f. 9.
jacksoniensis Angas, *Mysia,* Proc. Zool. Soc., 1867, p. 910, pl. 44, f. 10.

Family THYASIRIDAE

THYASIRA Lamarck, Anim. s. Vert., 5, 1818, p. 492. (*flexuosa* Montagu.)
adelaideana Iredale, *Prothyasira,* Rec. Aust. Mus., 17, 1930, p. 393, pl. 63, f. 6, 7.

Superfamily ERYCINACEA

Family ERYCINIDAE

MELLITERYX Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 207. (*acupunctum* Hedley.)
acupuncta Hedley, *Erycina,* Mem. Aust. Mus., 4, 1902, p. 321, f. 60.
helmsi Hedley, *Erycina,* Proc. Linn. Soc. N.S.W., 39, 1915, p. 701, pl. 80, f. 37-39.
BORNIOLA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 207. (*lepida* Hedley.)
lepida Hedley, *Bornia,* Proc. Linn. Soc. N.S.W., 30, 1905, p. 543, pl. 32, f. 22, 23.
KELLIA Turton, Conch. Insul. Brit., 19, 1822, p. 56. (*rubra* Montagu.)
angasiana Tate, Trans. Roy. Soc. S.A., 9, 1886, p. 68, pl. 5, f. 7.
australis Lamarck, *Cyclas,* Anim. s. Vert., 5, 1818, p. 560.
MARIKELLIA Iredale, Rec. Aust. Mus., 21, 1936, p. 274. (*solida* Angas.)
jacksoniana Smith, *Kellia,* Zool. "Alert," 1884, p. 105, pl. 7, f. F. and F1.
rotunda Deshayes, *Erycina,* Proc. Zool. Soc., 1855, p. 181.
vincentensis Cotton and Godfrey, Moll. S.A., pt. 1, Pelecypoda, 1938, p. 215, f. 231.
LEPTON Turton, Conch. Insul. Brit., 19, 1822. (*squamosum* Montagu.)
australis Angas, Proc. Zool. Soc., 1878, p. 863, pl. 54, f. 14.
frenchiensis Gatliff and Gabriel, Proc. Roy. Soc. Vic., 29, N.S., 1916, p. 105, pl. 7, f. 3 and 4.
ovatum Tate, Trans. Roy. Soc. S.A., 9, 1886, p. 68, pl. 5, f. 11.
trigonale Tate, Trans. Roy. Soc. S.A., 2, 1879, p. 131, pl. 5, f. 5.

NEOLEPTON Monterosato, Atti. Acad. Sci. Lett. Art. Palermo, N.S. 5, 1875, p. 12. (*sulcatulum* Jeffreys.)
antipodium Filhol, *Kellia,* Compt. Rend. Acad. Sci., 91, 1880, p. 1095.
novaecambrica Hedley, Proc. Linn. Soc. N.S.W., 39, 1915, p. 701, pl. 79, f. 29-32.
sanguineum Hutton, *Kellia,* Trans. New Zeal. Inst., 16, 1884, p. 215.
MYLITTA d'Orbigny and Recluz, Journ. de Conch., 1850, p. 288. (*deshayesi* d'Orbigny and Recluz.)
auriculata Smith, Ann. Mag. Nat. Hist. (6), 8, 1891, p. 236, pl. 13a, f. A-C.
deshayesi d'Orbigny and Recluz, Journ. de Conch., 1, 1850, p. 292, pl. 11, f. 12-13, pl. 14.
tasmanica T. Woods, *Pythina,* Proc. Roy. Soc. Tas., 1875, p. 162.
LEGRANDINA Tate and May, Proc. Linn. Soc. N.S.W., 1901, p. 463. (*bernardi* Tate and May.)
bernardi Tate and May, Proc. Linn. Soc. N.S.W., 1901, p. 463, pl. 27, f. 98-99.

Family MONTACUTIDAE

MONTACUTA Turton, Conch. Insul. Brit., 18, 1822, p. 58. (*substriata* Montagu.)
nitens Gatliff and Gabriel, Proc. Roy. Soc. Vic., 14, N.S., 1911, p. 191, pl. 47, f. 7.
semiradiata Tate, Trans. Roy. Soc. S.A., 11, 1889, p. 63, pl. 40, f. 2.
BENTHOQUETIA Iredale, Rec. Aust. Mus., 17, 1930, p. 403. (*integra* Hedley.)
integra Hedley, *Turquetia,* Rec. Aust. Mus., 6, 1907, p. 364, pl. 66, f. 7-10.
MYSELLA Angas, Proc. Zool. Soc., 1877, p. 176. (*anomala* Angas.)
anomala Angas, Proc. Zool. Soc., 1877, p. 176, pl. 26, f. 22.
donaciformis Angas, Proc. Zool. Soc., 1878, p. 863, pl. 54, f. 13.
dromanaensis Gatliff and Gabriel, *Montacuta,* Proc. Roy. Soc. Vic., 25, 1912, p. 167, pl. 9, f. 1-4.
lactea Hedley, *Rochfortia,* Mem. Aust. Mus., 4, 1902, p. 320, f. 59.

Suborder CYCLODONTA

Superfamily CARDIACEA

Family CARDIIDAE

CARDIUM Linne, Syst. Nat., 10, 1758, p. 678. (*costatum* Linne.)
cygnorum Deshayes, Proc. Zool. Soc., 1854, p. 331.
pulchellum Gray, In Dieffenbach New Zeal., 2, 1844, p. 252.
racketti Donovan, Nat. Repos., 4, 1826, p. 124.
PRATULUM Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 207. (*thetidis* Hedley.)
thetidis Hedley, *Cardium,* Mem. Aust. Mus., 4, 1902, p. 322.

Suborder TELEODONTA

Superfamily VENERACEA

Family VENERIDAE

Subfamily DOSINIINAE

DOSINIA Scopoli, Intr. Hist. Nat., 1777, p. 399. (*africana* Gray.)
caerulea Reeve, *Artemis,* Conch. Icon., 6, 1850, pl. 4, sp. 25.
crocea Deshayes, Cat. Conch. Brit. Mus., 1853, p. 8.
grata Deshayes, Cat. Conch. Brit. Mus., 1852, p. 8.
victoriae Gatliff and Gabriel, Proc. Roy. Soc. Vic., 27, 1914, p. 96, pl. 16, f. 17-19.

Subfamily MERETRICINAE

PARADIONE Dall, Proc. Mal. Soc., 8, 1909, p. 197. (*ovalina* Lamarck.)
diemenensis Hanley, *Cytherea,* Proc. Zool. Soc., 1844, p. 110.
kingii Gray, *Cytherea,* King's Survey Aust., 2, 1827, p. 476.
regularis Smith, *Cythera,* Chall. Zool., 13, 1885, p. 140, pl. 1, f. 8-8b.
SUNEMEROE Iredale, Rec. Aust. Mus., 17, 1930, p. 395. (*adelinae* Angas.)
aliciae Adams and Angas, *Sunetta,* Proc. Zool. Soc., 1863, p. 425, pl. 37, f. 18.

Subfamily VENERINAE

BASSINA Jukes-Brown, Proc. Mal. Soc., 11, 1914, p. 81. (*pachyphylla* Jonas.)
disrupta Sowerby, *Cytherea,* Thes. Conch., 2, 1853, p. 743, pl. 163, f. 208, 209.
pachyphylla Jonas, *Venus,* Archiv. fur Naturgeschichte, 5, 1839, Zool., p. 344, pl. 9, f. 6, 7.
CALLANAITIS Iredale, Proc. Mal. Soc., 12, 1917, p. 329. (*yatei* Gray.)
disjecta Perry, *Venus,* Conchology, 1811, pl. 58, f. 3.
PLACAMEN Iredale, Rec. Aust. Mus., 14, 1925, p. 255. (*placidus* Philippi.)
placidus Philippi, *Venus,* Abbild. Besegr. Conch., 1, 1844, p. 128, pl. 2, f. 2.
TAWERA Marwick, Trans. New Zeal. Inst., 57, 1927, p. 613. (*spissa* Deshayes.)
gallinula Lamarck, *Venus,* Anim. s. Vert., 5, 1818, p. 592.
lagopus Lamarck, *Venus,* Anim. s. Vert., 5, 1818, p. 591.
CHIONERYX Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 210. (*cardioides* Lamarck.)
cardioides Lamarck, *Erycina,* Anim. s. Vert., 5, 1818, p. 486.
KATELYSIA Roemer, Krit. Unters Venus, 1857, p. 17. (*scalarina* Lamarck.)
peronii Lamarck, *Chione,* Anim. s. Vert., 5, 1818, p. 606.
scalarina Lamarck, *Chione,* Anim. s. Vert., 5, 1818, p. 599.
strigosa Lamarck, *Chione,* Anim. s. Vert., 5, 1818, p. 605.
EUMARCIA Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 211. (*fumigata* Sowerby.)
fumigata Sowerby, *Venus,* Thes. Conch., 2, 1853, p. 737, pl. 159, f. 152-155.
GOMPHINA Moerch, Yoldi Cat. Conch., 2, 1853, p. 9. (*donacina* Chemnitz.)
undulosa Lamarck, *Venus,* Anim. s. Vert., 5, 1818, p. 606.
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australis Angas, *Gouldia,* Proc. Zool. Soc., 1865, p. 459.
FLUCTIGER Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 209. (*royanus* Iredale.)
royanus Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 209.
VENERUPIS Lamarck, Anim. s. Vert., 5, 1818, p. 506. (*perforans* Montagu.)
crenata Lamarck, Anim. s. Vert., 5, 1818, p. 508.
exotica Lamarck, Anim. s. Vert., 5, 1818, p. 507.
fabagella Deshayes, *Tapes,* Cat. Conch. Brit. Mus., 1853, p. 182.
galactites Lamarck, *Venus,* Anim. s. Vert., 5, 1818, p. 599.
iridescens Tate, Proc. Zool. Soc. S.A., 10, 1889, p. 61, pl. 11, f. 10.
mitis Deshayes, Proc. Zool. Soc., 1853, p. 5.
obesa Deshayes, Proc. Zool. Soc., 1853, p. 5.
CLAUDICONCHA Fischer, Man. Conch., 1887, p. 1087. (*monstrosa* Chemnitz.)
cumingi Deshayes, *Venerupis,* Proc. Zool. Soc., 1853, p. 4.

Family PETRICOLIDAE

VELARGILLA Iredale, Rec. Aust. Mus., 18, 1931, p. 207. (*rubiginosa* Ad. and Ang.)
rubiginosa Adams and Angas, *Naranio,* Proc. Zool. Soc., 1863, p. 425, pl. 37, f. 17.

NARANIO Gray, Ann. Mag. Nat. Hist. (2), 11, 1853, p. 38. (*divaricata* Gray.)
lucinalis Lamarck, *Petricola,* Anim. s. Vert. (2nd ed. Desh.), 6, 1835, p. 157.

Superfamily TELLINACEA

Family TELLINIDAE

TELLINA Linne, Syst. Nat., ed. 10, 1758, p. 674. (*virgata* Linne.)
albinella Lamarck, Anim. s. Vert., 5, 1818, p. 524.
ensiformis Reeve, Conch. Icon., 17, 1868, pl. 49, sp. 289a, b.
SEMELANGULUS Iredale, Proc. Linn. Soc. N.S.W., 49, 1924, p. 212. (*tenuiliratus* Sowerby.)
dilutus Smith, *Tellina,* Chall. Zool., 13, 1885, p. 108, pl. 4, f. 7-7b.
subdilutus Tate, *Tellina,* Proc. Roy. Soc. S.A., 9, 1887, p. 65, pl. 4, f. 9.
tenuiliratus Sowerby, *Tellina,* Conch. Icon., 17, 1867, pl. 39, sp. 219, a, b.
MACOMA Leach, Ross Voyage, Append. 2, 1819, pl. 12. (*tenera* Leach.)
deltoidalis Lamarck, *Tellina,* Anim. s. Vert., 5, 1818, p. 532.
diemenensis Deshayes, *Tellina,* Proc. Zool. Soc., 1854, p. 361.
mariae T. Woods, *Tellina,* Proc. Roy. Soc. Tas., 1875, p. 162.
PSEUDARCOPAGIA Bertin, Nouv. Arch. Mus. Paris (2), 1, 1878, p. 264. (*victoriae* Gatliff and Gabriel.)
victoriae Gatliff and Gabriel, *Tellina,* Vic. Nat., 31, 1914, p. 83.

Family SEMELIDAE

SEMELE Schumacher, Essai, Vers. Test., 53, 1817, p. 165. (*proficua* Pulteney.)
exigua A. Adams, Proc. Zool. Soc., 1861, p. 385.

Family PSAMMOBIIDAE

PSAMMOBIA Lamarck, Anim. s. Vert., 5, 1818, p. 511. (*feroensis* Gmelin.)
kenyoniana Pritchard and Gatliff, *Tellina,* Proc. Zool. Soc. Vic., 17, 1904, p. 339, pl. 20, f. 1-4.
livida Lamarck, Anim. s. Vert., 1818, p. 515.
menkeana Reeve, Conch. Icon., 10, 1856, pl. 6, sp. 43.
FLAVOMALA Iredale, Rec. Aust. Mus., 19, 1936, p. 283. (*biradiata* Wood.)
biradiata Wood, *Solen,* General Conch., 1815, p. 135, pl. 33, f. 1.
donacioides Reeve, *Soletellina,* Conch. Icon., 10, 1857, pl. 3, sp. 11.

Family DONACIDAE

PLEBIDONAX Iredale, Rec. Aust. Mus., 17, 1930, p. 398. (*deltoides* Lamarck.)
deltoides Lamarck, *Donax,* Anim. s. Vert., 5, 1818, p. 547.
DELTACHION Iredale, Rec. Aust. Mus., 17, 1930, p. 398. (*virilis* Iredale.)
brazieri Smith, *Donax,* Proc. Zool. Soc., 1891, p. 491, pl. 40, f. 10, 10a.
chapmani Gatliff and Gabriel, *Hemidonax,* Vic. Nat., 40, 1923, p. 10, pl. 2.

Superfamily SOLENACEA

Family SOLENIDAE

SOLEN Linne, Syst. Nat., 10, 1758, p. 672. (*marginatus* Pulteney.)
vaginoides Lamarck, Anim. s. Vert., 5, 1818, p. 451.

Superfamily MACTRACEA

Family MACTRIDAE

MACTRA Linne, Syst. Nat., ed. 12, 1767, p. 1125. (*stultorum* Linne.)
australis Lamarck, Anim. s. Vert., 5, 1818, p. 475.

pura Deshayes, Proc. Zool. Soc., 1853, p. 15.
rufescens Lamarck, Anim. s. Vert., 5, 1818, p. 476.

NANNOMACTRA Iredale, Rec. Aust. Mus., 17, 1930, p. 400. (*jacksonensis* Smith.)
jacksonensis Smith, *Mactra,* Chall. Zool., 13, 1885, p. 62, pl. 5, f. 9-9b.
pusilla Adams, *Mactra,* Proc. Zool. Soc., 1855, p. 226.

ELECTROMACTRA Iredale, Rec. Aust. Mus., 17, 1930, p. 400. (*parkesiana* Hedley.)
antecedens Iredale, Rec. Aust. Mus., 17, 1930, p. 401, pl. 54, f. 1-3.

NOTOSPISULA Iredale, Rec. Aust. Mus., 17, 1930, p. 400. (*parva* Petit.)
cretacea Angas, *Spisula,* Proc. Zool. Soc., 1867, p. 909, pl. 44, f. 6.
parva Petit, *Gnathodon,* Journ. de Conch., 4, 1853, p. 358, pl. 13, f. 9, 10.

ANAPELLA Dall, Proc. Malac. Soc., 1, 1895, p. 213. (*triquetra* Hanley.)
cycladea Lamarck, *Crassatella,* Anim. s. Vert., 5, 1818, p. 483.
triquetra Hanley, *Mesodesma,* Proc. Zool. Soc., 1843, p. 101.

LUTRARIA Lamarck, Mem. Soc. Nat. Hist., Paris, 1799, p. 85. (*lutraria* Linne.)
rhynchaena Jonas, Zeit f. Malak., 1, 1844, p. 34.

ZENATIA Gray, Ann. Mag. Nat. Hist. (2), 11, 1853, p. 43. (*acinaces* Q. and G.)
victoriae Pritchard and Gatliff, Proc. Roy. Soc. Vic., 16, 1903, p. 92, pl. 15, f. 3.

Family AMPHIDESMATIDAE

AMPHIDESMA Lamarck, Anim s. Vert., 5, 1818, p. 489. (*donacilla* Lamarck.)
angusta Reeve, *Mesodesma,* Conch. Icon., 8, 1854, pl. 1, sp. 3.
cuneata Lamarck, *Crassatella,* Anim. s. Vert., 5, 1818, p. 483.
erycinaea Lamarck, *Crassatella,* Anim. s. Vert., 5, 1818, p. 483.
glabrella Lamarck, Anim. s. Vert., 5, 1818, p. 493.
nitida Deshayes, *Mesodesma,* Proc. Zool. Soc., 1854, p. 338.

Suborder ASTHENODONTA

Superfamily MYACEA

Family ALOIDIDAE

ALOIDIS Megerle, Ges. Nat. Fr. Berl. Mag., 5, 1811, p. 67. (*sulcata* Lamarck.)
flindersi Cotton, *Corbula,* Rec. S. Aust. Mus., 4, 1930, p. 240, f. 15.
iredalei Cotton, *Corbula,* Rec. S. Aust. Mus., 4, 1930, p. 239, f. 14.
stolata Iredale, *Notocorbula,* Rec. Aust. Mus., 17, 1930, p. 405, pl. 75, f. 1, 2, 7.

Family HIATELLIDAE

HIATELLA Daudin, Bosc. Suite a Deterville ed. Buffon, Moll., 3, 1801, p. 120. (*arctica* Linne.)
angasi Angas, *Saxicava,* Proc. Zool. Soc., 1865, p. 643.
australis Lamarck, *Corbula,* Anim. s. Vert., 5, 1818, p. 495.

PANOPEA Menard, Ann. Mus. Hist. Nat., Paris, 9, 1807, p. 135. (*glycimeris* Gmelin.)
australis Sowerby, Genera Shells, 1833, pl. 40, f. 2.

Family GASTROCHAENIDAE

GASTROCHAENA Spengler, Nye. Saml. K. Dansk. Skrifter, 2, 1783, p. 179. (*cuneiformis* Spengler.)
tasmanica T. Woods, Proc. Roy. Soc. Tas., 1876, p. 159.

Superfamily ADESMACEA

Family PHOLADIDAE

PHOLAS Linne, Syst. Nat., 10, 1758, p. 669. (*dactylus* Linne.)
australasiae Sowerby, Thes. Conch., 2, 1849, p. 488, pl. 106, f. 73.
obturamentum Hedley, Rec. Aust. Mus., 2, 1893, p. 55, pl. 14, f. 1-3.

Family TEREDIDAE

TEREDO Linne, Syst. Nat., 10th ed., 1758, p. 651. (*navalis* Linne.)
austini Iredale, "Destruction of Timber by Marine Organisms in the Port of Sydney," 1932, p. 29, pl. 1, f. 1-4.
fragilis Tate, Trans. Roy. Soc. S.A., 11, 1888, p. 60, pl. 11, f. 13-13c.
NOTOTEREDO Bartsch, Proc. Biol. Soc. Wash., 36, 1923, p. 100. (*edax* Hedley.)
edax Hedley, *Teredo,* Proc. Linn. Soc. N.S.W. (2), 9, 1894, p. 501, pl. 32, f. 1-5.
remifer Iredale, "Destruction of Timber by Marine Organisms in the Port of Sydney," 1932, p. 32, pl. 3, f. 1-4.
BANKIA Gray, Synops. Brit. Mus., ed. 44, 1842, p. 76. (*bipalmulata* Lamarck.)
rosenthali Iredale, "Destruction of Timber by Marine Organisms in the Port of Sydney," 1932, p. 35, pl. 3, f. 9-12.

Class CEPHALOPODA

Subclass DIBRANCHIA

Order DECAPODA

Suborder OEGOPSIDA

Family SPIRULIDAE

SPIRULA Lamarck, Mem. Soc. Nat. Hist., Paris, 1799, p. 80. (*spirula* Linne.)
spirula Linne, *Nautilus,* Syst. Nat., ed. 10, 1758, p. 710.

Family ARCHITEUTHIDAE

ARCHITEUTHIS Steenstrup, Skand. Natur. Forhandl., 7, 1856, p. 182. (*dux* Steenstrup.)
kirkii Robson, Trans. New Zeal. Instit., 19, 1887, p. 155.

Family ENOPLOTEUTHIDAE

ENOPLOTEUTHIS d'Orbigny, in Ferassuc and d'Orbigny, Hist. Nat. gen. Ceph. acetab., 1839. (*smithsii* Leach.)
galaxias Berry, Biol. Results F.I.S. "Endeavour," 4, 1918, p. 211, pl. 59-60.

Family HISTIOTEUTHIDAE

CALLITEUTHIS Verrill, Amer. Journ. Sci. (3), 20, 1880, p. 393. (*reversa* Verrill.)
miranda Berry, Biol. Results F.I.S. "Endeavour," 4, 1918, p. 221, pl. 61-62.

Family OMMASTREPHIDAE

NOTOTODARUS Pfeffer, Ergel. Plankton Exped., 2, 1912, F.a., p. 434. (*insignis* Gould.)
gouldi McCoy, *Ommastrephes,* Prod. Zool. Vic., Dec. 17, 1888, p. 255, pl. 169 and 170.

Family SEPIOLIDAE

AUSTROROSSIA Berry, Biol. Results F.I.S. "Endeavour," 4, 1918, p. 252. (*australis* Berry.)
australis Berry, *Rossia,* Biol. Results F.I.S. "Endeavour," 4, 1918, p. 253, text fig. 43-47, pl. 69, f. 3, 4; pl. 70.

EUPRYMNA Steenstrup, Overs. Danske Selsk. Kjob., 1887, p. 43. (*morsei* Verrill.)
tasmanica Pfeffer, Ceph. Hamb. Mus., 1884, p. 6, f. 7.

Family LOLIGINIDAE

LOLIGO Schneider, Samml. Vern. Abh., 1784, p. 110. (*loligo* Linne.)
etheridgei Berry, Biol. Results F.I.S. "Endeavour," 4, 1918, p. 243, text. fig. 28-38, pl. 67-68; pl. 69, f. 1-2.

SEPIOTEUTHIS Blainville, Dict. Sci. Nat., 32, 1824, p. 175. (*sepiacea* Blainv. = *sepioidae* Blainv.)
australis Quoy and Gaimard, *Sepia,* Voy. "Astrolabe," Zool., 2, 1832, p. 70, pl. 5, f. 3-7.
bilineata Quoy and Gaimard, *Sepia,* Voy. "Astrolabe," Zool., 2, 1832, p. 66, pl. 2, f. 1.

Family SEPIIDAE

SEPIA Linne, Syst. Nat., ed. 10, 1758, p. 658. (*officinalis* Linne.)
apama Gray, Ceph. Antep. B.M., 1849, p. 103.
hedleyi Berry, Biol. Results F.I.S. "Endeavour," 4, 1918, p. 258, text fig. 48-50, pl. 71, 72.
novaehollandiae Hoyle, Proc. Roy. Phys. Soc. Edin., 17, 1909, p. 266.
rex Iredale, *Decorisepia,* Aust. Zool., 4, 1926, p. 193, pl. 22, f. 9-10.

ARCTOSEPIA Iredale, Aust. Zool., 4, 1926, p. 193. (*limata* Iredale.)
braggi Verco, *Sepia,* Trans. Roy. Soc. S.A., 31, 1907, p. 213, pl. 27, f. 6, 6a, b.
limata Iredale, Aust. Zool., 4, 1926, p. 193, pl. 23, f. 7-8.

Order OCTOPODA

Family OCTOPODIDAE

OCTOPUS Lamarck, Bull. Sci. Soc. Philom., 17, 1798, p. 130. (*vulgaris* Lamarck.)
australis Hoyle, Ann. Mag. Nat. Hist., ser. 5, 15, 1885, p. 224 .
duplex Hoyle, Ann. Mag. Nat. Hist., ser. 5, 15, 1885, p. 226.
pallida Hoyle, Ann. Mag. Nat. Hist. (5), 15, 1885, p. 223.
superciliosus Quoy and Gaimard, Voy. "Astrolabe," Zool., 2, 1832, p. 88, pl. 6, f. 4.
variolatus Blainville, Dict. Sci. Nat., 43, 1826, p. 186.

Family CIRROTEUTHIDAE

TEUTHIDISCUS Berry, Biol. Results F.I.S. "Endeavour," 4, 1918, p. 284. (*pluto* Berry.)
persephone Berry, *Opisthoteuthis,* Biol. Results F.I.S. "Endeavour," 4, 1918, p. 290, text fig. 66, 67, pl. 81; f. 6, 7, pl. 82; f. 9, 10, pl. 85-88.

Family ARGONAUTIDAE

ARGONAUTA Linne, Syst. Nat., ed. 10, 1758, p. 708. (*argo* Linne.)
argo Linne, Syst. Nat., ed. 10, p. 708.
nodosa Solander, Cat. Portland Mus., 1786, p. 96.

INDEX TO GENERA AND SPECIES

TWO NEW BRACHIOPOD GENERA FROM DEVONIAN ROCKS IN VICTORIA

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Summary

Notoconchidium and *Notoleptaena,* new brachiopod genera, are described from Lower Devonian strata in Victoria. New species are *Notoconchidium thomasi, Notoleptaena linguifera,* and *Notoleptaena otophera.* As known at present, the former genus belongs to a sandy facies, while the latter has species in both sandy and muddy facies. The adaptation of these forms to their respective environments is discussed.

Introduction

While describing fossils of Upper Silurian and Lower Devonian age collected by Dr. D. E. Thomas from the Heathcote district of Victoria (Thomas 1937), the writer encountered unusual brachiopods which are now presented as new genera, viz., *Notoconchidium* and *Notoleptaena.* Search in other collections showed that the latter genus also occurs elsewhere in the State. The basement rocks of the Heathcote district consist of Cambrian, Ordovician, Silurian, and Devonian sediments. The Silurian and Devonian beds, on the whole, are of inshore or Rhenish facies, sandstones predominating. The sequence is of interest in that (1) it spans the Silurian - Devonian boundary, and (2) the Devonian rocks contain a fauna of inshore or Rhenish facies, contrasting with the contemporary offshore or Bohemian facies described from Lilydale and Killara (Gill 1939-1949).

Notoconchidium and *Notoleptaena* both appear in typical sandy facies horizons. The former is limited to the Heathcote area, as far as is known at present, but the latter has been found also in the Lilydale and Killara districts of Victoria. Different species of *Notoleptaena* occur in the two facies, and it is instructive to note the special features which suited these contemporaneous forms to their respective ecological settings.

Family PENTAMERIDAE McCoy

NOTOCONCHIDIUM gen. nov.

Genotype *Notoconchidium thomasi,* gen. et sp. nov.

Diagnosis. Multicostellate, rectimarginate, pentamerid brachiopods, in which both valves are of more or less equal convexity;

there is an angular deflection of the lateral margins of the dorsal valve, and often also of those of the ventral valve. The septal plates of the dorsal valve diverge slightly, then converge, and laterally to them thick callists develop with age. In the ventral valve a small spondylium is present and a median septum one quarter to one half of the valve in length. In adult shells, small tooth-like processes develop on the spondylial plates.

Taxonomy. The new genus is a typical pentamerid, allied to *Conchidium* in its external appearance, in having a spondylium and median septum in the ventral valve, and in the triple set of plates in the dorsal valve. On the other hand, the converging septal plates and lateral callists of the dorsal valve are conspicuous and taxonomically important variations from the genus *Conchidium* as at present understood. The dorsal steinkerns with their projecting septal areas are a conspicuous feature in the field, where these fossils occur in great numbers.

Etymology. The name of the genus is derived from the Greek word *notos* = south (to denote its description from Australia), and the name of the closely allied genus *Conchidium*.

Notoconchidium thomasi, gen. et sp. nov.

Pl. I, Figs. 1-15.

Conchidium knightii Chapman 1913, pp. 105-106, Pl. XI, fig. 11.

Type Material. 1. *Holotype,* consisting of the steinkern of a dorsal valve preserved in light greyish quartzitic sandstone stained in places with ferruginous infiltrations (M.D.V.* 46315), from locality F52, Parish of Redcastle (see maps published by Mines Department), i.e., in the Mt. Ida Beds.

2. *Paratype,* consisting of the steinkern of a ventral valve in a mottled (light grey and maroon) quartzitic sandstone (M.D.V. 39094) from loc. 6D, Parish of Dargile, also in the Mt. Ida Beds.

3. *Hypotypes,* consisting of two dorsal valves which show progressive thickening of the internal structures: (a) external mould (M.D.V. 46289A) and steinkern (46289B) preserved in brownish quartzitic sandstone; and (b) steinkern preserved in light greyish quartzitic sandstone (M.D.V. 46293). Two ventral valve steinkerns (M.D.V. 46252, 46284) are also included to illustrate growth stages. All hypotypes are from loc. F52, Parish of Redcastle, i.e., in the Mt. Ida Beds.

*Numbers in parentheses are registered numbers in the palaeontological collections of the following institutions: M.D.V. = Mines Department, Victoria; N.M.V. = National Museum of Victoria.

DESCRIPTIONS. 1. *Holotype.* Dorsal valve sub-triangular, strongly convex, the median longitudinal profile rising about 7 m.m. above the plane joining the anterior and posterior margins. Length in plan, i.e., not following the profile, 2·1 cm.; maximum width, 1·7 cm. Hingeline narrow. Beak obtuse. Anterior commissure rectimarginate. Shell very thick in posterior region. Lateral margins of the shell deflected at right angles, and the resultant flange is costate. Umbo comparatively smooth, but rest of shell multicostate, there being 9 costae per cm. at the anterior margin.

Septal plates diverge slightly at first, then converge; they reach 1·6 cm. down the length of the shell, i.e., three-quarters of the length. The septal plates are thickest in the middle. The spaces between the septa and the lateral walls of the valve are filled with callists some 3 mm. thick. At the posterior end of the shell there is a bulbous swelling on each side of the central septa; at the posterior end of each swelling there is a ridge which is interpreted as a brachial support.

There is a low median septum between the septal plates, but it is not very well preserved in the holotype. Specimens in which this structure is well preserved show that it gradually gets deeper and wider posteriorly.

2. *Paratype.* Ventral valve strongly convex, the median longitudinal profile rising 7 mm. above the plane joining the anterior and posterior margins. The valve is evenly arched transversely, the lateral margins not being deflected at right angles as in the holotype dorsal valve. Length in plan 2·5 cm., and maximum width about 1·7 cm. Outline sub-triangular, but the lateral margins are not distinct in this specimen. Spondylium small, narrow, being 1 mm. wide at greatest breadth and 5 mm. long (outside measurements).

A narrow median septum extending anteriorly from the spondylium reaches 12·5 mm. along the profile of the valve, or 10 mm. in flat measurement. Specimens M.D.V. 46284 and 39222 show that the septum becomes higher in the middle; in the latter it is 4 mm. high. The costae commence fine and thin on the umbo, and gradually increase in size anteriorly, no intercalations or bifurcations being observed. This means that the young shell has quite a different appearance from that of the adult shell as far as ornamentation is concerned.

3. *Hypotypes.* Full description of the two dorsal valves is not necessary, they being included to illustrate growth stages. In specimen M.D.V. 46289B the septal plates are comparatively

thin and there are no callists. In the steinkern, the central part between the septa is on the same level as the impression of the shell floor. In M.D.V. 46293, however, the septa are thicker, and the callists have just begun to form. This stage is intermediate between that of the foregoing hypotype and that seen in the holotype. The three specimens are all about the same size, but there is a great difference in the character of the septa, and the degree of formation of callists. Specimen M.D.V. 46289A shows the nature of the external ornament.

On the specimen numbered M.D.V. 46252 there are the steinkerns of three ventral valves which provide three stages in the thickening of the internal plates, but the one chosen for illustration is marked with a black circle. The spondylial plates are thickened, and the median septum, instead of being a fine plate as in the paratype, is posteriorly 1·5 mm. thick at its base, and 1·5 cm. long. Specimen M.D.V. 46284 is the steinkern of a gerontic ventral valve showing an extreme of thickening of the spondylial and septal plates, and also markings on the ovarian areas consisting of elongate pustules. Two small teeth-like projections are present on the spondylial plates near where they unite with the median septum. They are apparently only developed to a recognizable degree in the older shells.

Comment. Chapman (1913) described a damaged steinkern of a dorsal valve (N.M.V. 12407) of this species as a ventral valve of *Conchidium knightii,* interpreting the septal plates as parts of a spondylium.

Notoconchidium thomasi is an index fossil in the Mt. Ida Beds, and was so used by Thomas (1937) to define the "*Pentamerus* (*Conchidium*) Beds."

The new species is a typical *Conchidium* in so far that it has a strongly multicostate exterior, strongly biconvex valves, and a thick shell in the posterior region, but it contrasts with the genotype of that genus (*vide* Schuchert and Cooper 1932) in that—

1. The septal plates of the dorsal valve are not simply divergent as in *Conchidium*; they diverge then converge. It was this characteristic which caused Chapman to interpret them as part of a spondylium.
2. The postero-lateral callists of the dorsal valve are so strongly developed as to give a characteristic appearance to the steinkerns.
3. The spondylium is very short.
4. The valves are more or less equally convex.

5. The angular deflection of the lateral margins of the dorsal valve is a notable feature, being present even in comparatively young specimens. The younger ventral valves are arched fairly evenly in cross-section, but a degree of deflection is developed in older specimens.

Palaeoecology. The heavy shells and costate surface are features characteristic of inshore (Rhenish) facies brachiopods. The extra weight and the friction of the costae with the sediments helped to hold them in place on the sea floor in an area where water currents were rife. The thick quartzitic sandstones in which the fossils are found are formed from sediments likewise characteristic of that facies. The shells contrast with those of *Conchidium polymitum* recently described from an offshore (Bohemian) facies of Lower Devonian rocks in another part of Victoria (Gill 1949e). The nature and extent of the Tasman Geosyncline, in which these strata were laid down, have recently been discussed (Brown 1942, Gill 1949d).

Notoconchidium thomasi was a very successful brachiopod, judging by its prolific occurrence in the specimens of rock sent for examination.

Family RAFINESQUINIDAE Caster

NOTOLEPTAENA gen. nov.

Diagnosis. Convexi-concave rafinesquid brachiopods with valves geniculated anteriorly and laterally, the dorsal valve being the more strongly geniculated. Ventral valve with tongue on anterior margin, and dorsal valve with accommodating recess. Ornamentation radially multistriate with concentric wrinkles on both the posterior and the geniculated parts of the valves. Ventral valve with high, smooth palintrope, while that of the dorsal valve is linear. Ventral and dorsal muscle fields of leptaenid type, with associated marginal ridges. Large bilobed cardinal process.

The new genus is readily recognized by the presence of the tongue (*die Zunge* of the German literature).

Taxonomy. Although *Notoleptaena* has the cardinalia, musculature, "ornamentation" and other features like those in *Leptaena,* it is convexi-concave and not concavo-convex like *Leptaena.* If Schuchert's (1913) classification of the Strophomenacea, which made the form of the valves rather fundamental, be followed closely, then the convexi-concavity of the new genus is a matter of some taxonomic importance. But there is some doubt as to whether this feature is taxonomically quite so fundamental. For instance, Caster (1939, p. 26) writes: "It appears after a rather

careful study of the better part of the entire group as developed in the Western Hemisphere that, in this stock at least, the character of resupination is not so important as former classifications would imply. Schuchert and LeVene, 1929, for example, dissociated the strophonellids from the stropheodontids mainly on resupination, it would seem, and referred the former to the Orthotetinae, with which they seem to show, omitting reversed convexity, no major classifactory correlation. It seems to express relationship much better to place both groups in a common family and recognize the resupination as principally a subfamily, or even less significant characteristic in this stock. In the stropheodontids *Douvillina* and *Douvillinella,* the latter being resupinate, the character is apparently not of more than generic value."

Secondly, the tongue is a feature of taxonomic interest. This character appeared in a number of different evolutionary lines of Palaeozoic brachiopoda, and this frequent appearance and continuance must surely be evidence of its biological worth. It is further discussed in the section on palaeoecology. *Notoleptaena* is founded as a new genus largely, although not completely, on the presence of this tongue.

Etymology. The name of the new genus is compounded from the Greek word *notos* = south, and the well-known generic name *Leptaena.* The latter element is included because *Notoleptaena* shares so many features with *Leptaena,* and the former word is to indicate its connection with Australia. It is considered better than the prefix *austral,* since this term has been used for a palaeogeographical province, which does not include Australia.

The trivial name of the genotype is intended to draw attention to the biocharacter which is taxonomically important and probably was biologically important—the tongue (Latin *lingua* = tongue, *fero* = I carry).

Notoleptaena linguifera, gen. et sp. nov.

Pl. I, Figs. 16-23.

Material. 1. *Holotype,* consisting of the steinkern of a ventral valve in whitish or light-greyish sandstone with tinges of ferruginous stain (M.D.V. 39470) from locality 3, Parish of Dargile, in the Mt. Ida Beds (*Pleurodictyum* Beds). Pl. I, figs. 16-17.

2. *Paratype,* consisting of the steinkern of a dorsal valve (M.D.V. 39477) in the same matrix and from the same locality. Pl. I, figs. 20-21.

3. *Hypotypes* as follows: (a) External mould and steinkern (M.D.V. 39480A and 39480B respectively) of a ventral valve to

show the nature of the "ornamentation." Only the former is figured (Pl. I, fig. 18). Same locality and matrix. (b) Steinkerns of two dorsal valves (M.D.V. 39469B) from the same locality and in the same matrix to show cardinalia and muscle field (Pl. I, figs. 19, 22-23).

Descriptions. 1. *Holotype.* Ventral valve large, sub-quadrate in outline, measuring 3·4 cm. wide and 2·5 cm. long. Hingeline straight; palintrope smooth (as far as can be judged from the impression in the sandstone matrix) and a little over 1 mm. high in the middle as preserved, but this is not the full height, part having broken away. Another specimen of about the same size and on the same slab indicates that the palintrope would be about 2 mm. high when complete, narrowing towards the cardinal extremities. The plane of the palintrope makes an angle of about 45° (judged by eye only) with the plane of the valve. Projections of the hingeline and lateral margins of the valve would make right angles, but the actual cardinal extremities are well rounded.

The anterior margin possesses a tongue which is at right angles to the postero-central part of the valve. The lateral margins are deflected ventrally, i.e., the opposite direction from that of the tongue.

On the interior of the valve the lateral margins are differentiated by a border half a centimetre wide which is delimited on the inner edge by a strong ridge or diaphragm such as has often been described for the ubiquitous "*Leptaena rhomboidalis.*" From the cardinal angles, the lateral margins begin to rise slowly in a ventral direction, then at about 1·3 cm. from the hingeline they rise suddenly so that in about half a centimetre the differentiated border stands at right angles to the general plane of the valve. At the front, the border is deflected dorsally to follow round the margin of the tongue.

The muscle field is of the typical leptaenid type, being deeply excavated, flabellate, and surrounded by a high and sharp ridge. Posteriorly this ridge merges with the teeth bases, but becomes less defined before doing so. The field is 1·3 cm. long and the same wide, including the ridges. The outline is broadly V-shaped posteriorly and rounded anteriorly. The umbo is well defined but not pronounced. On each side of it are the teeth, which are strong, divergent, and with bases of triangular outline.

A median septum divides the muscle field. About a third of its length from the umbo, the septum suddenly thickens, then thins out comparatively slowly towards the anterior margin of the field. This specialization in the septum was no doubt connected with

the attachment of the adductor muscles. Where the septum crosses the ridge bounding the muscle field, there is a localized thickening. The septum continues less strongly towards the anterior end of the valve, fading out where the valve is geniculated. This continuation of the median septum beyond the muscle field does not appear in all specimens, and is probably a gerontic feature.

Faint traces of the radial striae and concentric rugae of the exterior surface show on the steinkern.

2. *Paratype.* Dorsal valve 3·6 cm. wide and 2 cm. long; the geniculated part of the valve is about 1.4 cm. deep. The nature of the recess for the tongue in the anterior margin is shown by Pl. I, fig. 20; it is about 1·5 cm. wide. There is a differentiated lateral border marked by a ridge on diaphragm as in the ventral valve, but it is not quite complete in this specimen (M.D.V. 39477).

The musculature is of the leptaenid type. The muscle field is surrounded by a callosity consisting of a low broad ridge and not of a sharp ridge as in the ventral valve. The adductor muscle seats are excavated, though not as deeply as the diductors of the ventral valve. Anterior to these are two smaller scars. The median septum widens posteriorly to merge with the cardinalia. While in the field of the large adductors, the septum is relatively broad, but anterior to that it is narrow; it extends anteriorly as far as the point of geniculation.

Traces of the radiating striae and concentric rugae of the exterior surface appear in the steinkern both on the posterior part of the valve and on the geniculated part.

3. *Hypotype* (a). An external mould (M.D.V. 39480A), which has a counterpart steinkern (M.D.V. 39480B), is presented as a hypotype to demonstrate the nature of the prosopon. This is not well preserved owing to the coarse arenaceous type of matrix. However, there are radially disposed striae occurring 30-40 per cm., of rounded cross-section, and with interspaces of approximately the same width as the striae. Concentric rugae of low elevation occur both on the near-planate part of the valve and on the geniculated part.

The mould also reveals a slight flexure of the shell, consisting of a median fold with a faint sinus on each side. There is evidence of a corresponding flexure in the dorsal valve.

Yet another feature shown by this holotype is multitudinous minute pillars of secondary mineral, indicating the pseudopunctate character of the shell.

4. *Hypotype* (b). This is presented to show the nature of the cardinalia (M.D.V. 39469B). The median septum merges

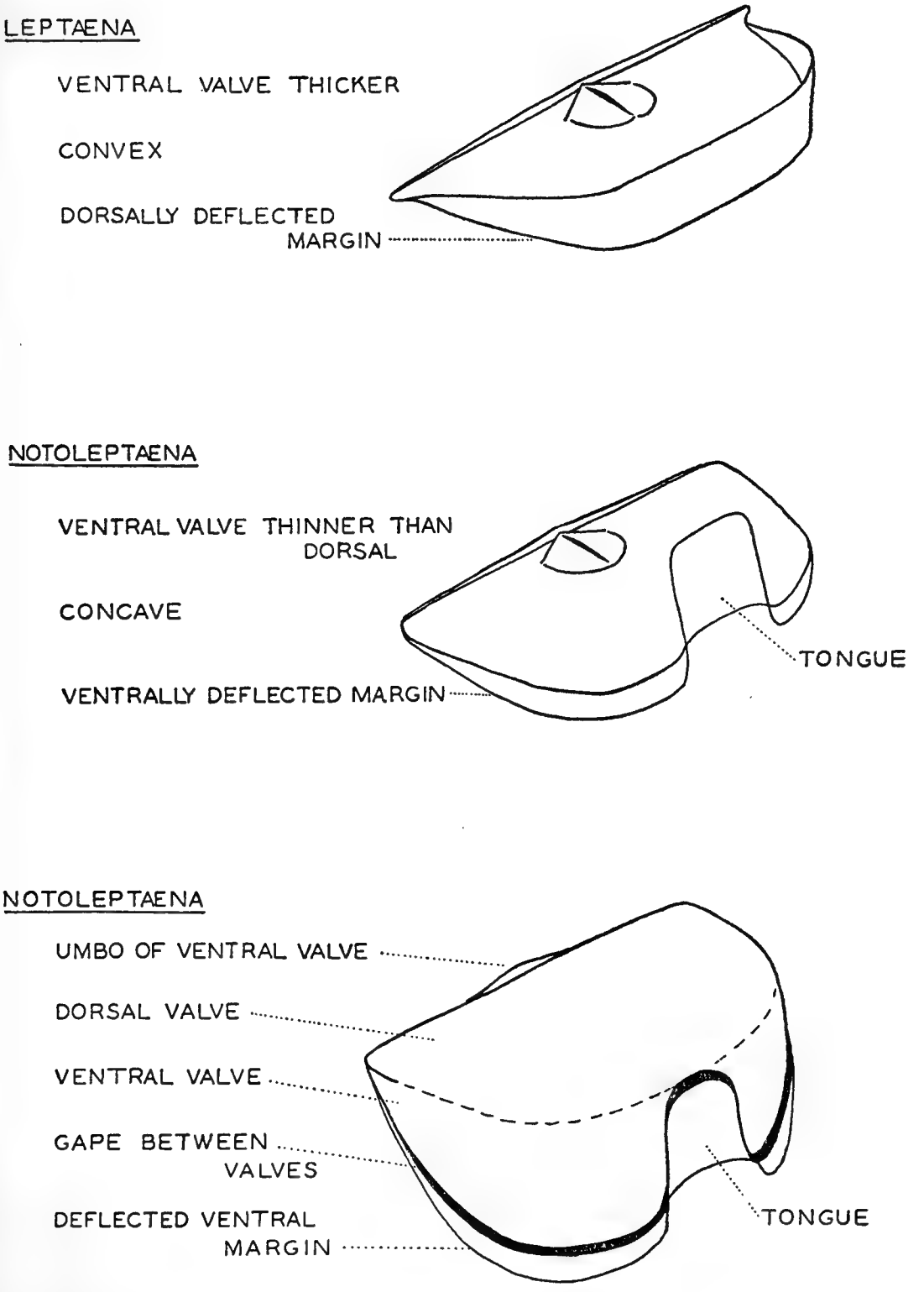

FIG. 1.

Diagrams showing nature and relationships of valves. (a) Ventral valve of *Leptaena*. (b) Ventral valve of *Notoleptaena*. (c) Ventral and dorsal valves together in *Notoleptaena*.

posteriorly into a large crural platform. Antero-lateral extensions thereof form an angle of about 90°, and outline the posterior edges of the sub-flabellate adductor scars. The large cardinal process is also merged with the crural platform, and it possesses two big prongs which jut ventrally more or less at right angles to the plane of the platform, and are very close together. The cardinal process extends a little beyond the hingeline. The palintrope is linear. Dental sockets occur on each side of the crural platform, and are of such size and shape as to accommodate the triangular teeth of the ventral valve.

The steinkern provides evidence of a low median sinus or flexure; this is to be seen also in specimen M.D.V. 39474.

On the same piece of rock as the hypotype just described is another dorsal valve in the form of a steinkern. It is a gerontic specimen with a recess for a large tongue, and with a high degree of secondary calcification of the diaphragm. The differentiated border is strongly developed. The external mould of this valve can be seen on specimen M.D.V. 39469A.

Palaeoecology. 1. *Relationship of Valves to each other.* In *Notoleptaena* the dorsal valve is the deep one, and the ventral the shallow one, a character in which it contrasts with *Leptaena.* The dorsal valve in *Leptaena* is like a lid to the ventral box, but the opposite is the case in *Notoleptaena* (contrast *b* and *c* in fig. I).

Moreover, the ventral valve is geniculated dorsally in *Leptaena,* but ventrally in *Notoleptaena* (leaving the tongue out of consideration, since this is a special structure). Thus instead of deflecting to meet the opposing valve, the edges of the ventral valve in the new genus turn towards the sea-floor. The edges therefore tend to lift the anterior part of the valve above the level of the sea-floor. It is said "tend," because the degree to which this elevation is effected will depend on the degree to which the edges sink into the sea-floor. In *Leptaena* the heavier valve is underneath, but in *Notoleptaena* the heavier valve is on top. This is assuming that the shells of both genera rested on their ventral valves.

2. *Relationship of Shell to Sea-floor. Leptaena rhomboidalis* was presumably so named because of its rhomboidal outline. Being without a functional pedicle (Arber 1939, 1940), the shell lived on the mud or sand of the sea-floor. The rugae would help hold the shell in position, as also would the rhomboidal outline of the shell. Lamont (1934, p. 167) observes: "If we take *L. rhomboidalis,* we find that the concentric folds on the ventral valve are most pronounced at points immediately behind the line of

geniculation. In this position no doubt they would help to maintain the stability of the shell on a muddy or sandy sea-floor. When the centre of gravity of the organism was changed and weight added posteriorly by the raising of the upper valve, these corrugations would be a means of preventing the ventral valve from sliding forward and sinking along the hinge-line. Such sinking, if it took place, might have allowed the ingress of foreign particles at the posterior angles. In some of the less transverse forms of *L. rhomboidalis* the rugae are particularly strong on the lateral parts of the shell. The writer correlates this with the fact that the more equi-dimensional shells would have a greater tendency to upset in a sideways fashion. From this argument it will be seen that, while rugae on the lower valve serve primarily to maintain stability, the final explanation lies in the principle of the exclusion of foreign material."

Notoleptaena linguifera shared with *Leptaena* the advantages of rhomboid outline and rugose shell, only the latter feature was more extensive in *Notoleptaena,* the rugae appearing on the geniculated parts of the valves as well as on the non-geniculated areas.

When the valves of a strophomenoid shell were parted to admit water for respiration and nourishment, they were in contact at the hingeline whence the valves were parted in progressively greater measure to the anterior margin, where the maximum gape occurred. It was important to protect the animal from foreign bodies, and the greatest danger from these was along the anterior margin where the gape was greatest. If the margin could be lifted from contact with the sea-floor, there was less danger because clearer water was drawn in. This was attained in various ways which may be grouped in two categories:

(a) *Means of attachment,* e.g., pedicle, cementation, spines (Gill 1949d);
(b) *Means of elevation from sea-floor,* e.g., thickening of a valve (*Richthofenia*), shape of the valves.

In the last group come *Leptaena* and *Notoleptaena.* The former achieved elevation of the anterior margin by geniculation of the ventral valve. The latter genus achieved the same end, to a less extent probably, by the ventrally directed flanges of the ventral valve.

It is assumed in the foregoing discussion that these brachiopods had their ventral valves on the sea-floor, but this is not necessarily so. Lamont (1934, p. 180) claims that "the Strophomenacea in general had the convex valve downwards; this is true of *Sower-*

byella, Leptelloidea, Leptaena, Rafinesquina, Stropheodonta, Christiania, Chonetes, etc., but *Strophomena* and *Schuchertella* rested upon the convex dorsal valve." However, even if *Notoleptaena* lived resting on its dorsal valve, the anterior margin would still be elevated above the sea-floor because of the strongly geniculate nature of the dorsal valve. But it should be remembered that the presence of the tongue in the anterior margin of *Notoleptaena* had the effect of lifting most of it above the sea-floor. This, combined with the effect of the downward turned ventral margins, leaves no need to postulate that *Notoleptaena* lived the other way from that of *Leptaena.*

3. *The Tongue.* A characteristic difference between *Leptaena* and *Notoleptaena,* and apparently a biologically significant one, is the presence of a tongue in the latter. Specimens of *Leptaena* have been described which have not a straight or evenly rounded anterior margin. For instance, Davidson (1865, Pl. XV) figures specimens of *L. rhomboidalis* with one (fig. 45) or more (fig. 46) shallow sinuses in the anterior margin. Other specimens, like the one figured in Zittel (1913, p. 384), show a slight fold.

It should be noted that a tongue is a different structure from the median fold and sinus, although the two are commonly associated. For example, some species of *Chonetes* (Gill 1945b) have median folds, but no tongue. Conversely, the tongue may be present but no fold and sinus structure, as Dr. Herta Schmidt (1937) has pointed out in her study of the morphogeny of the Rhynchonellidae. Dr. Schmidt also comments that the tongue structure is not yet fully understood. She says that the ecological significance of the tongue structure is clear in that in many cases the edge aperture is thereby increased in length. In a shell so equipped, a smaller gape will admit the same amount of water in unit time as a wider gape in a rectimarginate shell. The smaller gape will exclude foreign bodies which the wider gape would admit.

But as Schmidt indicates, this advantage does not accrue to the forms which have a tongue with sides at right angles to the general valve margin—in which class *Notoleptaena* falls. In such cases, the tongue slides up and down the sinus like a sleeve valve, so that when the shell valves part there is no aperture along the sides of tongue. The aperture then consists of three separated sections—the two lateral parts, and that at the tip of the tongue. The total length of these three secions is approximately the same as that of a shell without a tongue, i.e., rectimarginate. Schmidt therefore correctly infers that if there is an ecological significance in the tongue structure, it probably lies in its tripartite division

of the shell aperture. She suggests that incurrent streams flowed through the side openings and an excurrent stream through the middle opening, or *vice versa*. By such regulation, the streams are made stronger, and so the supply of food and oxygen enriched. The function of the tongue structure is thus somewhat analagous with that of the siphons in lamellibranchs. Where fold and sinus are present, they would support the function of the tongue structure as a stream regulator.

It appears to the writer that there is some ecological significance in the great length of the tongue as seen in *Notoleptaena*. Once a tongue is formed in such a way as to establish stream regulation, why should it be elongated until, as in *Notoleptaena* (Pl. I, fig. 26) it is over a centimetre long, i.e., more than half the length of the flat part of the valve? One would expect to find some ecological significance in the elongated tongues, since they appear and are maintained in different evolutionary lines. I suggest that there was a biological advantage in that the longer the tongue, the greater was the separation of the incurrent and excurrent streams, and so the less the danger of re-entry of ejected waters. If and when such re-entry occurred, it would mean—

(a) Reduction in amount of oxygen available per unit quantity of water, because oxygen had already been withdrawn from it. The effect would be analagous to our breathing "bad air" —our own or someone else's breath.
(b) Reduction in amount of food available per unit quantity of water, because food had already been gathered from that water.
(c) Increase in amount of any toxic excretory substances per unit quantity of water.

All these things would be biologically disadvantageous, and their avoidance a relative biological advantage.

4. *Gerontic Features.* There is but a limited amount of material from which to study the new genus, but what is present shows that with age—

(a) The shell becomes thicker through the deepening of the dorsal valve, and the accentuation of the ventrally directed flanges on the ventral valve.
(b) There is much secondary calcification, chiefly in the ridges bordering the muscle fields and the diaphragm. There is increased differentiation on the inside of the lateral and anterior border of the valves described above.

Occurrence. *Notoleptaena linguifera* has been noted in specimens from localities 3 (holotype) and 2D (M.D.V. 39190), Parish

of Dargile; also localities 32A (M.D.V. 47251) and 54 (M.D.V. 47197), Parish of Redcastle. Those from the latter parish are much smaller specimens and with better material may prove to be taxonomically distinct.

Age. Lower Devonian.

Notoleptaena otophera sp. nov.

Pl. I, Figs. 24-27.

Type Material. 1. *Holotype* consisting of the steinkern (N.M.V. 14687) and external mould (N.M.V. 14688) of a ventral valve in buff siltstone from Syme's Homestead, Killara, Victoria (for locality map see Gill 1945).

2. *Hypotype* consisting of the steinkern of another ventral valve (N.M.V. 14689) from the same locality.

Occurrence. Although a great deal of material from Syme's Homestead has been examined, only the figured specimens and some fragments of *Notoleptaena otophera* have been found. It is therefore not common. A smaller specimen referable to the same species has been collected from Syme's Tunnel, Killara (N.M.V. 14690). From Ruddock's Quarry in the Lilydale area (for locality map see Gill 1941) a specimen referable to the genus, but not specifically determinable at present, was collected by Mr. F. A. Cudmore (N.M.V. 14691). A ventral valve of *Notoleptaena* (counterparts N.M.V. 14708-9) was collected by the author from the limestone outcrop on Cemetery Hill Road, west of Whittlesea. It is notable in that radial costellae are absent.

Etymology. The trivial name of this species is derived from the Greek *ous, otos* = an ear, and *phero* = I carry, a reference to the auriculate nature of the cardinal extremities.

Descriptions. 1. *Holotype* ventral valve sub-semicircular in outline except for the auriculate cardinal extremities. Greatest width 4·5 cm. (calculated from the complete side), greatest length of planate part of valve 1·5 cm., and length along midline 1·4 cm. Hingeline long and straight, palintrope smooth and 1 mm. high as preserved on the external mould, but it was higher than this in the middle, probably about 2 mm. Palintrope narrows towards cardinal extremities. It is approximately at right angles to the planate part of the valve in the holotype, but sloping outwards slightly in the hypotype. Very fine growth lines are present on the palintrope parallel to the hingeline. The cardinal extremities are auriculate, and extend over half a centimetre beyond the semicircular part of the shell; their terminations are rounded.

The anterior margin possesses a tongue which is at right angles to the planate part of the valve. If the shell is viewed in plan, the line where the valve geniculates to form the tongue is incurved. A specimen of *"Leptaena rhomboidalis"* in the National Museum from Cooper's Creek, five miles S.W. of Walhalla (N.M.V. 671-2 counterparts) has a similar sinus in the geniculated part of the ventral valve, but without the formation of a tongue. The tongue in the holotype of the new species is 1·4 cm. wide and 1 cm. long. The sides are parallel, and the anterior margin only slightly curved.

The lateral margins of the valve are deflected nearly at right angles in the opposite direction to the tongue, i.e., ventrally, for a distance of about 3 mm. The "ornamentation" on the exterior of the valve consists of fine, somewhat irregular, concentric rugae, and of slightly sinuous radiating striae of a frequency of 25-30 per cm. Fine growth lines can also be seen. They suggest that the auriculations on the cardinal extremities were not present in youth, but developed with adult growth. There is a slight sinus down the middle of the valve.

The muscle field is of leptaenid type, deeply excavated, and with a strong bounding ridge. Anterior to the field is a very fine and faint median septum, but this cannot be seen in the hypotype. Fine radiating ridges occur on the diductor scars. Teeth strong, diverging, sub-triangular in cross-section, and vertically finely serrated on the outer edges, which are below the palintrope, but more or less in the same plane. The serrated area is 1·5 mm. long, and has about 18 serrations. The significance of this feature is discussed below.

Interior of valve finely papillate—closely in the area surrounding the muscle field and less so outside that.

2. *Hypotype* shows the full height of the palintrope. The ridges described for the holotype diductor field are almost absent in this specimen. The papillation of the interior of the valve is shown well, and some of the pallial sinuses can be recognized.

No dorsal valve of this species has yet been found.

Palaeoecology. In addition to the features already discussed relative to the genotype, there are specializations in *N. otophera* whereby it was adapted to the ecological conditions in which it lived. The general character of those conditions has been described elsewhere (Gill 1949a). The generally lighter build of *N. otophera,* compared with that of *N. linguifera,* matches its quieter environment. The auriculate cardinal extremities, on Lamont's (1934, p. 166) interpretation, are also an adaptation to a muddy sea-floor,

being "in response to the necessity of warding off silt from the lateral edges of the opening shell."

Relationships. In general structure, *N. otophera* is very close to that of *N. linguifera,* and so is included in the same genus. It possesses the tongue and the ventrally deflected margins which are so characteristic of the new genus. *N. otophera* differs in the generally lighter construction, presence of auriculate cardinal extremities, and teeth of slightly different shape and possessing a row of serrations. I regard the two species as isochronons occupying differing facial environments, *N. linguifera* belonging to the sandy facies and *N. otophera* to the muddy facies.

A taxonomic problem is posed by the presence of crenulations in the latter species. Of such I can find no evidence in *N. linguifera.* The matrix imposes limitations on the preservation of such fine structures, but they are seen on the margins of other strophomenids, and there was ample material for examination. *Amphistrophia* has small crenulated plates, but the shells are small, have a costellate-striate ornamentation without concentric rugae, and the ventral muscle field has no strong delimiting ridge as in *Leptaena* and *Notoleptaena. Cymostrophia* possesses rugae and a partly crenulated hinge, but the teeth files are longer and imposed on the palintrope (not limited to small plates below the hingelines as in *N. otophera*) ; also, the ornamentation is intercalated, and the rugae are interrupted to give a "seersucker" effect.

From Bohemia, Barrande described *Leptaena bouei* (Haidinger 1848, Barrande 1879) which, although different from *Notoleptaena* morphologically, shows ecological accommodations. Firstly, there are strong lateral flexures of the shell which are so pronounced that they would function like the reflexed ventral margins of *Notoleptaena* for holding the shell in place on the sea-floor. Secondly, the middle of the anterior margin is flexed strongly in a dorsal direction, i.e., in the opposite direction from the flexures just described, so that a tongue-like emargination is effected. The flexure would raise the anterior aperture above the sea-floor, and also increase the apertural length so that an opening smaller than otherwise necessary would suffice for respiration and feeding, but without admitting foreign bodies which could enter by the larger aperture. *Leptaena bouei* is found not only in Bohemia but also in the Lower Devonian of Western Europe (e.g., Haüsel and Richter 1936, Mailleux 1941).

Barrande (1879) also described *Strophomena emarginata,* a brachiopod possessing a tongue in its anterior margin. Kozlowski (1929, a work I have not been able to see) referred the species to *Leptaena,* though not without doubt. Kozlowski is quoted

in extenso in Northrop (1939), who refers Barrande's species to *Amphistrophia*. Northrop's comments were *à propos* his *Amphistrophia peroccidens*, which also has a tongue structure. Barrande stressed that *S. emarginata* developed its emargination only as a feature of the full-grown shell. He stated (p. 53): "L'échancrure du bord frontal est le principal charactère distinctif de cette espèce. Mais il faut remarquer qu'il n'est bien prononcé que dans les adultes. Il ne se manifeste pas dans les jeunes, ni dans les individus d'un âge moyen."

Kozlowski compared his *Leptaena emarginata* with *L. caudata* (Schnur 1854), which Reed (1908) referred to *Strophonella* and Mailleux (1941) to *Stropheodonta*.

Study of the above forms may reveal relationships with the new genus *Notoleptaena*.

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Description of Plate I

Fig. 1. *Notoconchidium thomasi,* gen. et sp. nov. Steinkern of ventral valve viewed from above. Paratype, M.D.V. 39094.
Fig. 2. Same specimen. Umbonal view to show spondylium.
Fig. 3. *N. thomasi.* Steinkern of ventral valve viewed from above. Hypotype M.D.V. 46252. Figures 1-7 illustrate the progressive thickening during growth of the spondylial walls and median septum. Figures 3-4 illustrate the intermediate stage.
Fig. 4. Same specimen. Latex impression.
Fig. 5. *N. thomasi.* Ventral view at gerontic stage showing maximum thickening of spondylial walls and median septum. Hypotype M.D.V. 46284 photographed from above.
Fig. 6. Same specimen. Umbonal view.
Fig. 7. Same specimen. Latex impression.
Fig. 8. *N. thomasi.* Steinkern of dorsal valve, viewed from above. Hypotype M.D.V. 46289B. Figures 8-15 illustrate the progressive thickening of septa during growth, and the accumulation of callus deposits laterally to them.
Fig. 9. Same specimen. Latex impression.

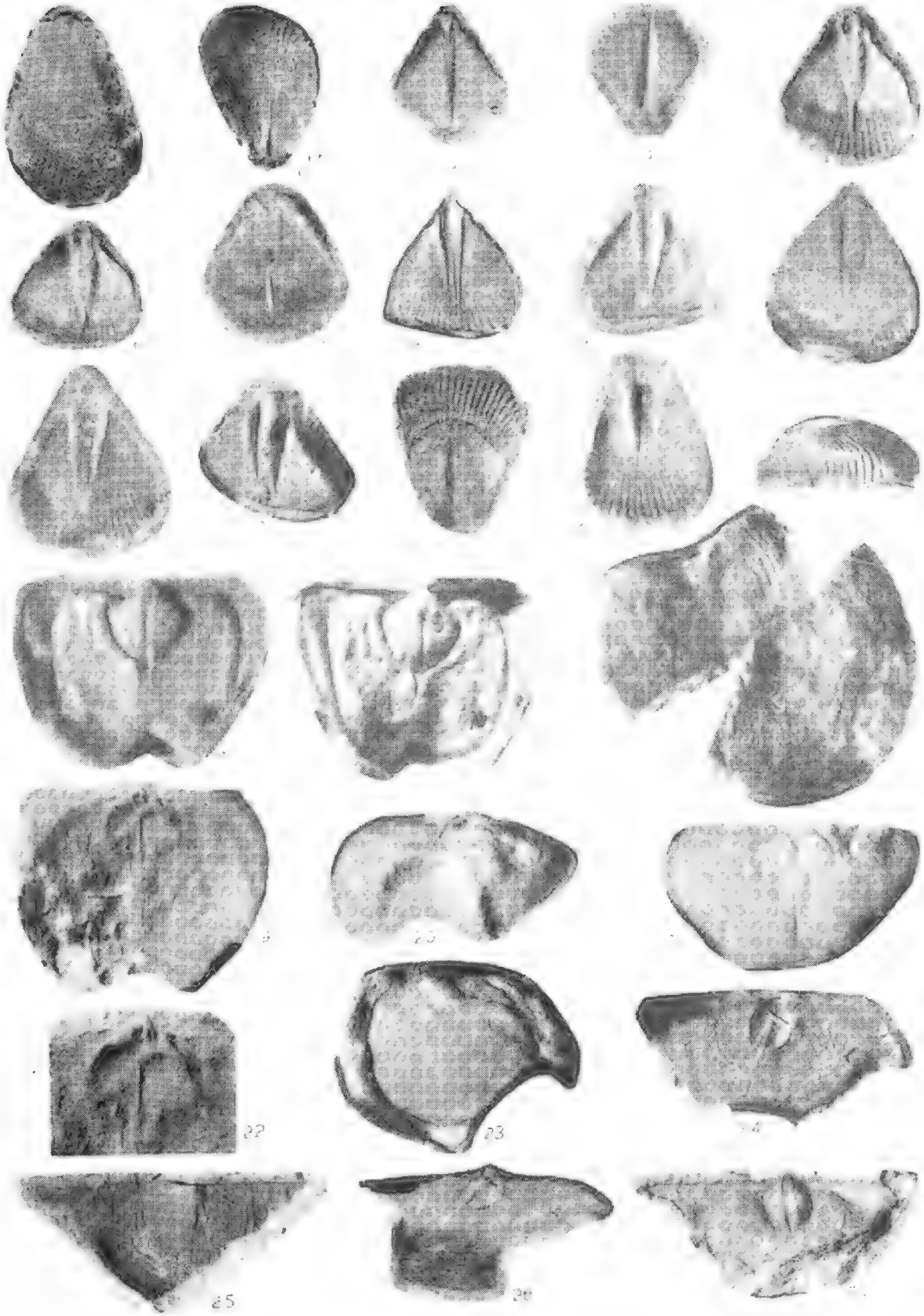
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Fig. 10. *N. thomasi.* Steinkern of dorsal valve viewed from above. Hypotype M.D.V. 46293.
Fig. 11. Same specimen. Latex impression.
Fig. 12. Same specimen. Umbonal view of steinkern.
Fig. 13. *N. thomasi.* Steinkern of dorsal valve viewed from above. Holotype M.D.V. 46315.
Fig. 14. Same specimen. Latex impression.
Fig. 15. Same specimen. View of steinkern from side.
Fig. 16. *Notoleptaena linguifera,* gen. et sp. nov. Steinkern of ventral valve viewed from above. Holotype M.D.V. 39470.
Fig. 17. Same specimen, viewed at an angle to show the deflected valve margin and the median sinus.
Fig. 18. *N. linguifera.* Hypotype 39480A. External moulds of two ventral valves to show fine costellation and rugae.
Fig. 19. *N. linguifera.* Steinkern of dorsal valve viewed from above. Hypotype M.D.V. 39469B.
Fig. 20. *N. linguifera.* Steinkern of dorsal valve, anterior view. Paratype M.D.V. 39477.
Fig. 21. Same specimen viewed from above.
Fig. 22. Enlargement of cardinalia of Fig. 19.
Fig. 23. *N. linguifera.* Side view of steinkern of dorsal valve on specimen 39469B. Note thickened margin, median sinus, median septum, and muscle field.
Fig. 24. *N. otophera,* sp. nov. Steinkern of ventral valve viewed from above. Holotype counterpart, N.M.V. 14687.
Fig. 25. *N. otophera.* External mould of ventral valve, and counterpart of Fig. 24. Holotype, N.M.V. 14688.
Fig. 26. *N. otophera.* Anterior view of holotype steinkern, N.M.V. 14687. Compare Fig. 24. Note anterior tongue.
Fig. 27. *N. otophera.* Steinkern of another ventral valve viewed from above. Hypotype, N.M.V. 14689.

Note. All figures are natural size except Fig. 22, which is enlarged one half.

VICTORIAN RECORDS OF *Sterna striata* Gm. AND *Sterna hirundo longipennis* Nordm.

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Formal Records

S. striata

Although there are several sight records of the White-fronted Tern (*Sterna striata*) for Victoria, there are, to our knowledge, only two skins in existence from that State, both in the National Museum of Victoria. Hindwood (1946: 183), in his exhaustive account of this species in Australia, referred to one of them (B2537, *infra*), but was unable to locate the specimen. It has since been found, and details of both skins follow.

Reg. No.	B2537	B2293
Sex	♂	♂
Plumage	winter; imm.	winter; sub-adult (see plate, A,B)
Locality	Mordialloc	Williamstown
Date	*c.* 1874	Aug. 6, 1948
Collector	W. Kershaw	J. A. McVeigh
Iris	—	dark brown
Bill	—	black, tipped whitish
Feet	—	reddish-brown, webs yellowish-brown
Stom. contents	—	blue sprats (*Stolephorus robustus*) lamprey (*Mordacia sp.*)

S. h. longipennis

In an earlier paper, Hindwood (1944: 41-43) drew attention to the fact that there were two formal records of *Sterna hirundo longipennis* (vernacular names: Black-billed or Eastern Common Tern, Nordmann's Tern and Long-tailed Tern), from Australian waters, viz., 'Warrior Reef,' Torres Strait, and Cape York, North Queensland. Both specimens had previously been identified as *S. striata,* a species which closely resembles *longipennis* in winter plumage. He also listed three examples from Lord Howe Island. Further, it was Hindwood's opinion that these occurrences 'may be considered, in the present state of our knowledge, abnormal.'

We now wish to record a Victorian specimen and hope to show that this race of the Common Tern can be regarded as a rare, but regular *summer* visitant in eastern Australia.

Particulars of specimen: N.M.V. no. B2650, ♂ (?), collected at Williamstown on March 2, 1949, by J. A. McVeigh. Iris brown, bill black (extreme tip of both mandibles whitish), feet reddish-brown, claws black. Stomach contents nil.

The bird appears to be in first-winter plumage, immaturity being indicated by the dark-grey lesser wing-coverts (see plate, C, D). The second (outer) and third primaries have the outer webs and inner portion of the inner webs dark-grey, with the characteristic 'wedge' of white on the third. The succeeding primaries are more silvery-grey on the outer webs, slightly darker on the inner, with white 'wedges.' Wings and tail are in moult, the fourth primary being 27 mm. shorter than the fifth. The outermost pair of rectrices are considerably shorter than the next pair.

Measurements

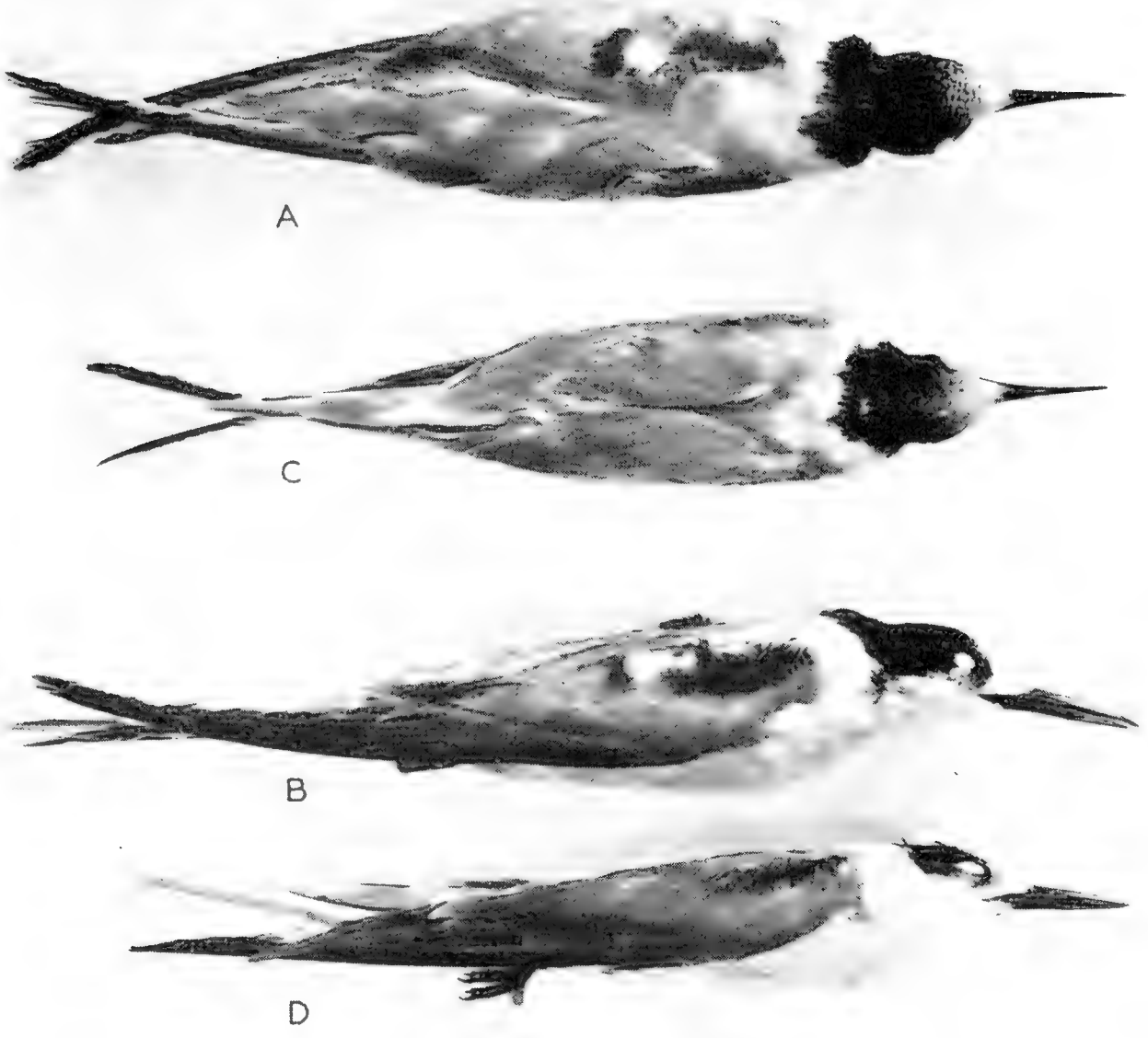
For ease of comparison, measurements of the above three skins are tabulated together. (Wing flattened; bill length, depth and width all taken from end of feathering.)

Reg. No.	Bill			Wing	Tarsus	Toe
	Length	Depth	Width			
B2293	40	8.5	6.5	272	21	26
B2537	37	9	7	265	21	25
B2650	35	9	7	258	20	21

Field Notes

We are indebted to Mr. J. A. McVeigh, a resident of Williamstown, and a keen observer, for the following summary of his extensive field notes on *striata* and *longipennis*. We make no apologies for quoting him at some length. It should be borne in mind that, during the entire period, he was not aware that there were two distinct species involved, although he obviously suspected as much. It was not until quite recently that a critical examination of the March skin revealed the truth.

Williamstown is situated on Port Phillip Bay, 4½ miles S.S.W. of Melbourne. As far as shipping is concerned, it is chiefly a grain export centre. The area under observation comprises a small boat haven, "The Gap," bounded, on one side, by Gellibrand Pier and, on the other, by Breakwater Pier. The "summer tern" was also noted on a nearby beach, "The Cockle Bed," where it occasionally rested in the daytime with Silver and Pacific Gulls and Crested Terns.



A., B. *Sterna striata* Gm. B2293, ♂, Williamstown, Vic., Aug. 6, 1948.
C., D. *S. hirundo longipennis* Nordm. B2650, ♂ (?), Williamstown, Vic., March 2, 1949.

The iron pipe, which the "summer tern" claimed as a perch, and from which it did a lot of fishing, is embedded in rocks at the entrance to the Gap. The depth of water around the pipe is 8-10 feet, shelving rapidly outside.

The winter of 1948 saw an abnormal number of blue sprats and "greybacks" around the piers and rocks, the close shelter of which they seem to prefer, as we never see them far from shore. Perhaps that accounts for the White-fronted Tern confining its attention to inshore fishing. Lampreys were also present in 1948, apparently in quantity, as they were brought into the boat when we were catching barracouta.

Following are relevant extracts from my diary.

1948

March 26: One small tern has been on pipe at Gap for last three or four months. It is about 11 inches long, grey on back; underparts, tail, back of neck and forehead white; crown, nape, bill and legs black. Seems to be the only one of its kind in the vicinity. Does all its fishing close to rocks (at Gap entrance), where it apparently camps. On one occasion I saw it dive straight down from the pipe, emerge with a pilchard (?) about 4 inches long, then fly to a height of 100 feet or more before swallowing it. This manoeuvre seemed to be a precaution against dropping the fish before its consumption was complete.

March 29: Little tern still on pipe at Gap.

April 3: Photographed small tern on pipe. Saw this bird attack other (Crested) terns between the two piers. It seems to be aggressive, especially towards other terns.

May 16: Small tern not seen for a few weeks now.

July 11: At Gap, on return from fishing trip, a White-fronted Tern flew slowly past shore end of our boat landing. It is very light on back now, almost white, instead of grey. Leading-edge of wings, close to body, is a darker grey. Beak and legs still black, also the cap; forehead white. Seems larger than the summer bird.

July 17: White-fronted Tern still at Gap.

July 31: Morning. At least two W.F. Terns seen at Gap. Strong N. wind. Seems they favour Gap on these days. Afternoon. Two W.F. Terns at Gap, one noticeably smaller, with a short tail. Could this be bird which stayed at Gap last summer? [latter probably *striata* in moult.—*W.B.H.*]

August 2: Evening. Single W.F. Tern fishing outside, near Gellibrand Pier.

August 6: Evening. Strong nor'-easter blowing; shot a W.F. Tern at Gap. [= *striata*, B2293, *W.B.H.*]

August 7: 2.30 p.m. One W.F. Tern at Gap; later in afternoon saw another half-way between Pt. Gellibrand and Breakwater.

August 21: Single W.F. Tern on jetty in Gap. Very tame.

August 29: Strong northerly. About a dozen terns fishing on leeward side of Breakwater Pier, two W.F. Terns among them; possibly after whitebait as Gannets diving further out. One W.F. Tern alighted on edge of breakwater. When at rest, dark grey patch on inner part of wing pronounced. The flight of this tern is more erratic than that of the Crested Tern, also its wing beat is quicker.

September 2: W.F. Tern visited Gap and flew over Breakwater Pier.

September 4: Two W.F. Terns seen outside breakwater.

December 12: Evening. A single black-billed tern at entrance to Gap sitting on rocks with Silver Gulls. Later perched on pipe and fished from there.

About same size as winter tern, possibly smaller, but lacks dark shoulder patch. Back is all pale grey and tail whiter.

1949

January 19: Little black-billed tern still perches on pipe. Last night a bird of the same species flew in and was promptly chased away by the pipe occupant.

March 1: Wounded the little tern, which flew off after disgorging stomach contents. These were examined and found to consist of a compact mass of moths covered with a slimy substance.

March 2: Evening. Collected a little tern at Gap. [= *longipennis,* B2650, *W.B.H.*]

April 9: Watched two summer terns fishing close alongside dry-dock. (Not seen again after this date.)

May-Dec.: Although weekly visits were paid to the Gap during this period, no White-fronted Terns were seen—probably due to the absence of blue sprats and "greybacks."

1950

January 1: Advised by Mr. E. McDonald that he saw a small black-billed tern on Cockle Bed, apparently in breeding plumage.

January 15: Small black-billed tern on Cockle Bed in company with Silver Gulls and Crested Terns. When first seen it was bathing with one of the latter, then stood with the other birds on the sand. Noted that black cap very distinct and clear-cut against white of neck and face. No white among black feathers on cap.

February 4: Single black-billed summer tern at Cockle Bed—my last record for this bird.

In view of the period and continuity of observation, supported by specimens, it seems reasonable to conclude the following from an analysis of the above data.

1. *Sterna striata* and *S. h. longipennis* may be considered, respectively, as regular winter and summer visitors to Victoria, at least in small numbers.
2. *S. striata* probably visits Victoria between July and September, *longipennis* between December and April, so that they would not normally occur there together.
3. The presence or absence of *striata* may be influenced by the movement of small fish, such as blue sprats, "greybacks" and lampreys. This would not affect *longipennis* to the same extent as it is not wholly piscivorous.
4. The lack of collecting and competent observers at suitable localities, plus the difficulty of distinguishing it from *striata* in the field, have been factors in the previous non-recognition of *longipennis* in Victoria and, for that matter, in Eastern Australia. However, the possibility that *longipennis* has ex-

tended its southern range in comparatively recent years cannot be overlooked.

5. It is more than likely that some of the late Sydney records for *striata,* mentioned by Hindwood (1946: 187), were, in fact, referable to *longipennis,* particularly the January "stragglers."

Ecology

There are differences in the feeding habits and ecological requirements of the two species. They are both shallow divers but, whereas *striata* feeds "exclusively on small fish" (Stead, 1932: 38) and has "the habit of fishing in broken water close to a rocky shore, or a reef, and in the surf zone" (Hindwood, *loc. cit.*: 180), *longipennis* has a more varied diet, confining its fishing to a relatively circumscribed area in rivers and estuaries. Writing of the latter tern in Malaya, Robinson and Chasen (1936: 95) remark: "In the Straits of Malacca it is largely an estuarine and shallow-water bird, frequenting the fishing stakes in large numbers." In Kamchatka, Bergman (1935: 138) observed it breeding along the Kamchatka River. He also found it plentiful around the estuaries of the Avatscha and Paratunka Rivers, but saw no examples on the rocky south-east coast. In brief, *striata* is essentially a marine species, both in habitat and food requirements, while *longipennis* shows a marked preference for a fluviatile and estuarine environment.

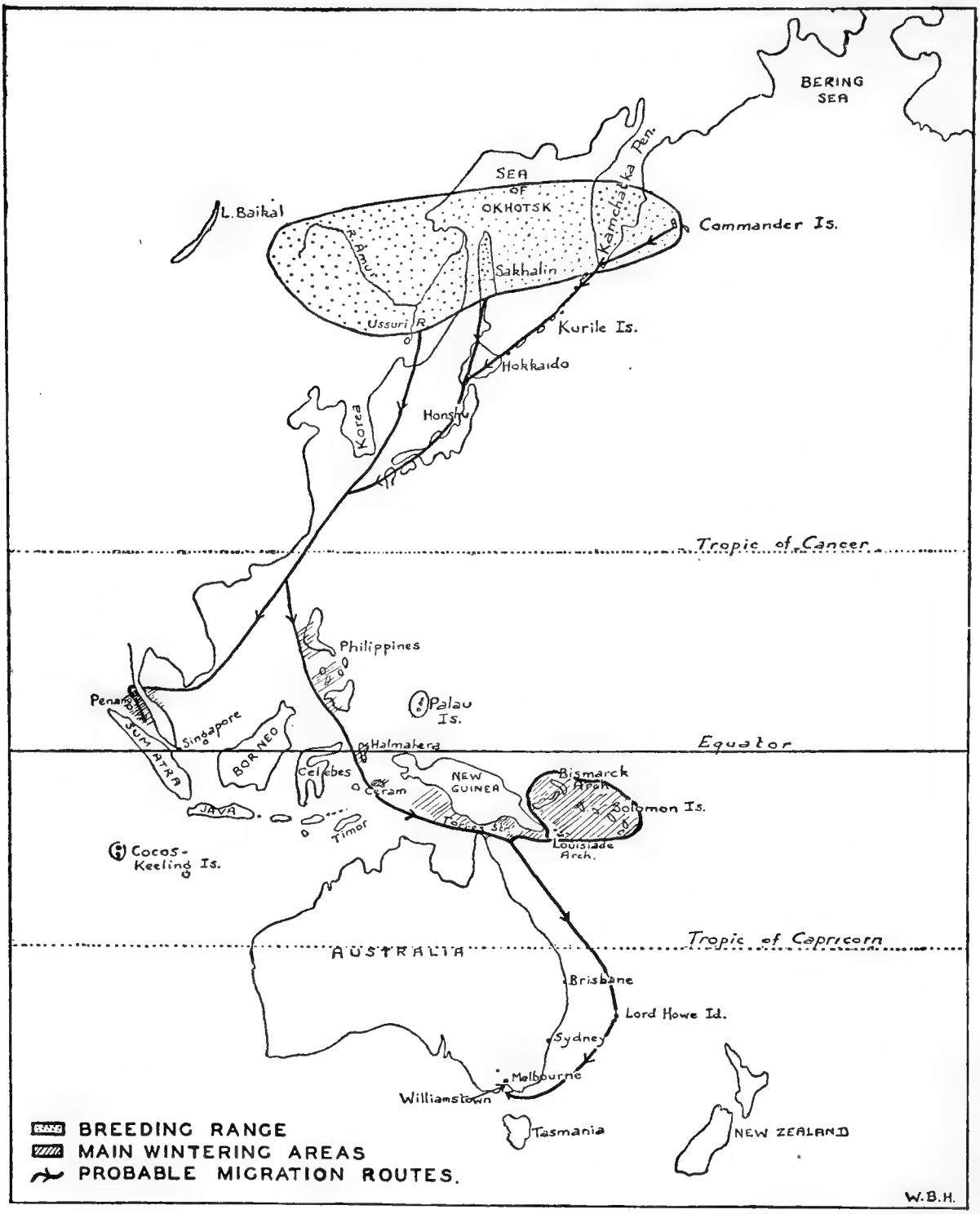
Field Diagnosis

For the benefit of Australian observers, who will normally see both species in non-breeding plumage only, the following summary of field characters is offered.

longipennis. *Summer* visitor. Length about 12 inches; bill relatively short and stout; back grey, contrasting with whiter tail; small black spot before eye; sedentary, favouring a single "fishing perch" (stake, pipe, etc.), takes insects (e.g. moths); aggressive, especially towards other terns.

striata. *Winter* visitor. Length 14-15 inches; bill relatively long and slender; back grey, but paler than tail; large black spot before eye; feeding range wider, takes fish only; not aggressive towards other birds.

In skins, the toes and claws of *striata* are noticeably longer and heavier than in *longipennis,* but this would scarcely be evident in the field.



Sketch map showing distribution of *S. hirundo longipennis.*

Distribution of *S. h. longipennis*

The accompanying sketch map is an attempt, based on the literature, to plot the known distribution of *longipennis.* The following comments on it are necessary.

Breeding Range

There are remarkably few references to authentic nesting records. Kamchatka and Sakhalin would appear to be the principal breeding grounds. Bergman (*ibid.*) states that it is particularly numerous along the Kamchatka River, where it breeds in colonies in several places. Kobayashi and Ishizawa (1932-40: 194) include the Kurile Islands in the breeding range and state that eggs were discovered from June to the beginning of August on the bank of Lake Taraika in Sakhalin by K. Shimomura. It possibly breeds, too, on Bering Island (the larger and more westerly of the Commanders), where Stejneger (1885: 85) collected two adult females in May and June. Hartert (1920: 132) also suggested this, basing his opinion on three adults collected there by Sokolnikoff in the same two months. Peters (1934: 333) includes Ussuriland and the upper Amur, while Kozlova (1932: 585) states that it "breeds occasionally in South-West Transbaikalia, where its range meets that of *minussensis*." This locality appears to be much too far west for *longipennis* and the record might be treated with reserve.

Winter Range

Some authors, e.g. Peters (*ibid.*), do not include the Malay States in the range of *longipennis*. However, Robinson and Chasen (*ibid.*) and Gibson-Hill (1949: 76) list it as a common autumn and winter visitor to the Straits of Malacca. There are formal records, too, from the east coast of Peninsular Siam: Nakon Sritamarat (Riley, 1938: 100). Gibson-Hill (1950: 265) records it as a vagrant, on the basis of one specimen and two sight records, in the Cocos-Keeling Islands. The status of *longipennis* in the remainder of Malaysia seems to be ill-defined. We have seen very few references to formal records from Sumatra, Java and Borneo and prefer to consider it only a vagrant to these islands. The principal southernmost wintering grounds are probably the Gulf of Papua, the Louisiade and Bismarck Archipelagos, and the Solomons. However, it undoubtedly winters in small numbers in the Philippines, Halmahera, Moluccas and Aru Islands.

Migration Routes

It is well known that the autumn and spring routes of migrants may be quite distinct, and it would be futile to try and map precise fly-lines without the supporting evidence of banding records. It is suggested, however, that the routes shown on the map indicate approximately the autumn migrations of *longipennis*. An alter-

native route for some individuals may be through Micronesia (Mayr, 1945: 25), as there are formal records from Palau.

Summary

1. Data of two Victorian specimens of *Sterna striata* Gm. and one of *Sterna hirundo longipennis* Nordm. are given. The latter constitutes the first Victorian record and extends its known range far south of Lord Howe Island.
2. Evidence, in the form of detailed field notes, is produced to show that both species may be considered regular visitors to Victoria in small numbers—*striata* in winter, *longipennis* in summer.
3. Some differences in the ecology of the two species are discussed.
4. A summary of certain field characters of *striata* and *longipennis* (in Australia) is submitted as a guide to their identification.
5. A sketch map, with explanatory notes, illustrates the breeding range, winter quarters and probable migration routes of *longipennis*.

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ON THE VICTORIAN SPECIES OF TUBERCULATED *DIPLODACTYLUS*

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The tuberculated geckos of the genus *Diplodactylus* have been the subject of some disagreement between herpetologists. Originally four species were described.

1839. *Phyllodactylus strophurus* Dumeril and Bibron, Erp. Gen., vol. 3, p. 397.
1842. *Diplodactylus spinigerus* Gray, Zool. Miscel., p. 53.
1885. *Diplodactylus ciliaris* Boulenger, Cat. Liz. Brit. Mus., vol. 1, p. 98.
1892. *Diplodactylus intermedius* Ogilby, Rec. Aust. Mus., vol. 2, p. 10.

In the British Museum Catalogue (1885), Boulenger assigned the three species then known to geographical regions, namely:

ciliaris — North Australia
spinigerus — West and North Australia
strophurus — South-east Australia.

Ogilby later described *intermedius* and localized it to "the interior of New South Wales."

Zietz (2), in 1920, admitted only one species, placing the other three names in its synonomy. In selecting *spinigerus* as the valid name he ignored the fact that *strophurus* was described earlier, and its name should therefore have been used.

Kinghorn (3), in 1929, resurrected *strophurus* from synonomy and reinstated it as a full species. He agreed to leave *ciliaris* and *intermedius* as synonomys of *spinigerus,* but suggested that they might be "geographical varieties or races." He suggested that Boulenger's record from Sydney is a mistake, "for it appears to be restricted to locations in the vicinity of the Murrumbidgee River and particularly south-western New South Wales."

Loveridge (4), in 1934, agreed with Kinghorn regarding *ciliaris,* which he made a subspecies of *spinigerus.*

In the National Museum collections are 31 specimens of tuberculated *Diplodactylus* from localities within Victoria, and 38 specimens from Central and Northern Australia. Any later mention of the Victorian or North Australian series in this paper refers to these specimens.

During the preparation of a list of Victorian reptiles for future publication, the present writer was confronted with the problem of the correct designation of the Victorian member of this group of geckos. No Victorian specimen possessed spines, so that

strophurus seemed to be indicated. However, both Kinghorn and Ogilby deny the presence of tubercules on the tail of *strophurus,* whereas the tails of Victorian specimens are ornamented with rows of tubercules. A perusal of the original descriptions of the four species was obviously desirable, but unfortunately it reveals a confused situation from which it is difficult to escape.

It seems best to set out this situation as follows:

1. Type Localities

strophurus

Dumeril and Bibron say, at the end of their type description, "Ce Phyllodactyle est une espèce Australasienne, que MM. Quoy et Gaimard ont trouvée à la baie des Chiens marins, à la Nouvelle-Hollande." The Bay of Chinese Sailors is near the mouth of the Wooramel River, in the inner part of what is now Shark's Bay, Western Australia. Without doubt the specimen was collected during the voyage of the corvettes L'Uranie and Physicienne, for which Quoy and Gaimard were first and second surgeons respectively. The landing is noted by Freycinet in the "Historique" (1).

Boulenger's relegation of this species to the diametrically opposite end of Australia, and his restriction of it to that eastern part, is difficult to understand unless he confused the above voyage with that of a later one made by Quoy and Gaimard on the "Astrolabe". The latter vessel did not touch the western coast of West Australia, but did spend a considerable time on the southern and eastern coasts of the continent.

Kinghorn perpetuated this apparent error when he still further restricted the specific range.

spinigerus

The earliest description of *spinigerus* is in Gray's "Zoological Miscellany" (1842), in which he gives the type locality as Van Diemen's Land. This is the old name for Tasmania, but other than this assumption by Gray, and one other doubtful record of an example of another genus (*Hoplodactylus*), geckos are unknown on this island. However, in his 1845 Catalogue of Lizards, he places *strophurus* D. and B. in the synonomy of *spinigerus* and gives the locality as Houtman's Abrollos. This is apparently correct, for Boulenger in the 1885 Brit. Mus. Catalogue notes the type as from this island group.

ciliaris

The type came from "Darwin, Northern Territory."

intermedius

Type from "Interior of New South Wales."

2. Dimensions

strophurus

Measurements of the type are given as follows:

Longueur totale	9″	1‴	Corps. Long.	2″	3‴
Tete. Long.	1″	2‴	Queue. Long.	2″	6‴
Cou. Long.		3‴			

It will be seen that when the length of the parts are added together the result is 27 mm. short of the given total length of 91 mm. If the error lies in the total measurement, then the specimen must have been but half-grown, and that this is so is suggested by the approximately correct ratio of the separate parts.

spinigerus

No dimensions are given for the type.

ciliaris

Total length 125 mm, head 22 mm., body 56 mm., tail 47 mm.

intermedius

Total length 100 mm., head 16 mm., body 47 mm., tail 37 mm.

The proportional length of snout to diameter of eye has been used as a diagnostic character by several authors:

strophurus. Kinghorn says "the head is shorter and deeper than that of *spinigerus.*" He gives no measurements, nor does Boulenger in the Cat. Liz.

spinigerus. Ogilby says when describing *intermedius,* "in *spinigerus* the snout is only a little longer than the diameter of the eye."

ciliaris. Boulenger says of the type, "snout rounded, longer than the distance between the eye and the ear opening, and than the orbit."

intermedius. The type description says, "Snout rounded, much longer than the eye and the ear opening, from once-and-three-fourths to twice the diameter of the eye."

It would appear from the above that there should be a progressive lengthening from the short-snouted *strophurus,* through *spinigerus* and *ciliaris* to *intermedius.* It should be remembered, however, that the comparisons were made, not from the original specimens, but from subsequent designations.

Variation in proportional snout length was checked by measuring the museum series (for accuracy this was done under a low-power microscope carrying a micrometer eyepiece, so that positive comparison could be obtained). The following figures were computed:

For 20 fully-grown specimens of the Victorian series,

snout length = $1{\cdot}93 \pm {}^{\cdot 42}_{\cdot 40}$ times diameter of eye.

For 20 fully-grown spiny specimens of the N. Australian series,

snout length = $1{\cdot}97 \pm {}^{\cdot 17}_{\cdot 21}$ times diameter of eye.

Thus the average of the Victorian series is very slightly less than that of the N. Australian series, but the variation is wider and its limits overlap those of the N. Australian series as well as the proportions quoted by Ogilby for *intermedius*.

3. Labials

Labial counts for the species are set out under authors.

strophurus				
Dumeril and Bibron	upper	12	lower	12
Boulenger	„	10-12	„	10-12
spinigerus				
Gray	„	—	„	—
Ogilby	„	13-15	„	13-15
Boulenger	„	13-15	„	13-15
ciliaris				
Boulenger	„	12	„	12
intermedius				
Ogilby	„	11-13	„	11-13
Victorian				
Museum series	upper	$12{\cdot}6 \pm {}^{1{\cdot}4}_{1{\cdot}6}$	lower	$11{\cdot}9 \pm {}^{2{\cdot}1}_{\cdot 9}$
N. Australian				
Museum series	„	$12{\cdot}1 \pm {}^{1{\cdot}9}_{1{\cdot}1}$	„	$11{\cdot}8 \pm {}^{2{\cdot}4}_{\cdot 8}$

4. Body Tubercules

strophurus

Dumeril and Bibron say of the body scales: "Celles du dessus et des côtés du corps sont plates, clairsémees de petits tubercules peu élevés, ou bien d'écailles circulaires d'un diamètre trois fois

plus grand que celui des autres." No pattern is suggested for the "thinly-sown" tubercules.

Kinghorn says "there are large and small tubercules scattered over the dorsal area but nothing to resemble spines."

spinigerus

The type description says "scales small, granular, with a series of black spines along each side of the back and tail."

Ogilby says "In *spinigerus* the tubercules are irregularly scattered over the dorsal surface."

ciliaris

Type description says "Upper surface covered with rather large granules intermixed on the back with enlarged conical tubercules forming two irregular, longitudinal series."

intermedius

Type description says "the dorsal tubercules form two regular longitudinal series."

Victorian. Museum series

No specimen has spines. In no specimen can the tubercules be called "scattered"; there is some irregularity and broken continuity, but no tubercules are found in the mid-dorsal area.

N. Australian. Museum series

Two specimens only have truly scattered tubercules. Five specimens have a few tubercules in the mid-dorsal area between two obvious lines; the remainder have tubercules or pointed spines in two more or less regular lines.

5. Tail Tubercules

strophurus

The original description says: "Sur le dessus de la queue, ou voit successivement, depuis sa racine jusqu'aux deux tiers de sa longueur, deux rangs transversaux de tubercules, et deux rangs de tres petit grains squammeux; mais a partir de cet endroit les rangs de grains augmentent de plus en plus jusqu'à la pointe caudale."

This I translate to mean: "On the upper side of the tail one sees in succession, from its root up to two-thirds of its length, two transverse rows of tubercules and two rows of very small granular scales; but from this point onwards the rows of small scales increase more and more towards the tip."

Kinghorn in resurrecting the species says: "The tail of the Leeton specimen is long and thin and without tubercules; in the two from Hillston, in which the tail is rejuvenated, the new part is very short and thin, suggesting to me that the originals were like the Leeton specimen."

Ogilby, in describing *intermedius,* says "From *strophurus* it (*intermedius*) is equally distinguished by the presence of tubercules on the tail."

spinigerus

Type description says "scales small, granular, with a series of black spines along each side of the back and tail, and a group of spines at the base of the latter."

ciliaris

Type description says "Tail short, cyclo-tetragonal, prehensile (?), covered with granular scales; on each side of its upper surface a series of long, curved spines."

intermedius

Ogilby says of the type tail, "short, sub-cylindrical, covered with small granules; seventeen more or less regular transverse bands of strong tubercules."

Victorian. Museum series

It has been mentioned earlier that no Victorian specimen has spines on the tail. All possessing their original tail have blunt, sub-conical tubercules which are arranged in from fifteen to seventeen transverse rows. The composition of the rows differs from that described for *strophurus* by Dumeril and Bibron in that the large tubercules are in single rows, and are separated from one another by four or five rows of granules.

N. Australian. Museum series

The original tail is preserved in less than half of the specimens of this series. Transverse rows of tubercules are not present on the tail of any specimen. On the mid-dorsal area of the tail of two specimens, a few enlarged scales, which bear little or no relation to raised, sub-conical tubercules, are scattered. In the remainder of the series the mid-dorsal area is clothed with small granular scales only.

6. Comment

From the confusion of quotations and comparisons noted above, several facts emerge which have not previously been stressed, but

which must be taken into account when considering the taxonomy of this group of geckos.

Regarding the group as a whole, the writer feels that a larger and more geographically comprehensive collection than is available to him is necessary before the situation can be satisfactorily clarified. Individual variability, added to the distortion so often a part of alcoholic specimens, makes measurement, direct or comparative, an impracticable basis for species diagnosis. Scalation, also, is very variable, but amongst the series examined there does seem to be a disjunction. The demarcation is between forms in which the tail is clothed with a succession of transverse rows of tubercules and granular scales, and those in which the tail is provided with two longitudinal lines of spines, between which there are no tubercules and therefore no transverse bars. However, whether or not the non-spiny forms should be separated, specifically, from the *spinigerus–ciliaris* group is not of consequence to the present question, for in any case *strophurus* would be the prior and valid name.

Two facts may be stressed. Firstly, the true *strophurus* is topotypically a western species and should not be confined, as by some authors, to south-eastern Australia. Secondly, the tail of this species originally was described as having successive, transverse rows of tubercles and granular scales, and is thus closely allied to the specimen later described by Ogilby as *intermedius*.

Victorian specimens are obviously within the *strophurus* group but, apart from their geographical remoteness from the type locality, they also disagree in some minor characters such as the scalation of the dorsal area and the constitution of the transverse scale rows on the tail. So, also, does Ogilby's *intermedius,* with which the Victorian specimens closely agree. Normal variation suggests that such differences are not sufficiently great to separate the forms into species, and the position may therefore be set out as follows:

Diplodactylus strophurus strophurus D. and B.

1839. *Phyllodactylus strophurus* Dumeril and Bibron, Erp. Gen., vol. 3, p. 397, baie des Chiens marins, W. Aust. (Quoy and Gaimard).

Range, Western Australia.

Diplodactylus strophurus intermedius Ogilby

1892. *Diplodactylus intermedius* Ogilby, Rec. Aust. Mus., vol. 2, p. 10, interior of New South Wales.

Represented in the National Museum collections by 31 specimens from North-Western Victoria and 4 specimens from Purnong, South Australia.

Range, Western New South Wales, N. W. Victoria, E. South Australia.

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2. 1920 Zietz, F. R., Rec. Sth. Aust. Mus., vol. 1, p. 185.
3. 1929 Kinghorn, J. R., Rec. Aust. Mus., vol. 17, p. 81.
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