RECORDS

OF THE

AUSTRALIAN MUSEUM

EDITED BY THE CURATOR

Vol. X.

PRINTED BY ORDER OF THE TRUSTEES

R. ETHERIDGE, Junr., J.P.

Curator.

SYDNEY, 1913-1915.

9240

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Published 10th October, 1913.

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Published 19th December, 1913.

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Published 15th August, 1914.

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Published 3rd October, 1914.

No. 10.

Published 31st, October, 1914.

No. 11

Published 5th November, 1915.

LIST OF THE CONTRIBUTORS.

With References and Catalogue Numbers.

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Note on the Occurrence of the Sand-Rock containing bones of Extinct Species of Marsupials (Emu, Kangaroo, Wombat, etc.) on King Island, Bass Strait, Tasmania.

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Rec. Austr. Mus., v., 8, 1914.

Rainbow, W. J.— **59.54 (935).**

Arachnida from the Solomon Islands.

Rec. Austr. Mus., v., 1, 1913.

CORRECTION.

Page 124, line 14, for figures 29-44, read 39-44.

ARACHNIDA FROM THE SOLOMON ISLANDS.

By W. J. Rainbow, F.L.S., F.E.S., Entomologist.

(Figs. 1-6.)

The present paper contains notes of previously recorded forms and descriptions of a new genus and new species from the Solomon Islands.

To the Museum Collection there has been accumulating for some time material collected by missionaries stationed in the Solomon Island group, as well as by occasional visitors. Recently Mr. W. W. Froggatt paid a flying visit to this interesting archipelago, and while there collected such Arachnida as came his way, and these specimens he has been good enough to present to the Trustees. Specimens collected by Mr. Froggatt had been carefully handled, but much of the old collection in our stores had been more or less roughly treated. Species, such as *Nephila maculata*, Walck., *Argiope leopardina*, Poc., *Gasteracantha signifer*, Poc., and *G. metallica*, Poc., are evidently very abundant on the islands.

It is remarkable how little is known of the Arachnid fauna of the Solomons. In 1898, Pocock published a list of the "Scorpions, Pedipalpi, and Spiders of the Solomon Islands" [1] in which he recorded two Scorpions, one Pedipalp, and twenty-eight species of Araneidæ. Some of the species recorded by Pocock are not included in our collection, but most of them are, and to these I now add twenty-three additional forms. Since Pocock's paper, just quoted *(supra)* the same author published another:—"Scorpions, Pedipalpi, and Spiders collected by Dr. Willey in New Britain, the Solomon Islands, Loyalty Islands, etc." [2] and in this he includes two Scorpions recorded in his previous contribution, and one other (*Archisometrus perfidus*, Keys.), one Pedipalp (then new to science) and one Spider which was also new. Thus we now know of fifty-six Arachnids from the Solomons. Doubtless when the fauna of these islands shall have been more thoroughly collected the number of species recorded will be much greater. Those species marked with an asterisk are now recorded for the first time.

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[1] Pocock—Ann. Mag. Nat Hist., (7), i, 1898, p. 457, pl. xix.

[2] Pocock—Willey's Zool. Results, 1898, p. 95.

Sub-Order SCORPIONS.

Family SCORPIONIDÆ.

Genus Hormurus, Thor.

HORMURUS AUSTRALASIÆ, Fab.

Hormurus australasiæ, Fab., Syst. Ent., 1775, p. 399.

Hab.—Russell Island (Froggatt). Widely distributed over the South Sea Islands.

Sub-Order PEDIPALPI.

Family PHRYNOIDÆ.

Genus Charon, Karsch.

CHARON GRAYI, *Gerv.*

Phrynus grayi, Gerv., Ins. Apt., iii., 1842, p. 4.

Hab.—Island of Howla. Previously recorded from New Georgia, Solomon Islands (Pocock). The type of this species was collected by Cuming, at Manilla, Philippine Islands.

Family EPEDANOIDÆ.

Genus Mesoceras, *Keys.*

MESOCERAS SPINIGERUM,* Sör.

Mesoceras spinigerum, Sör., Die Arach. Austr., Suppl., 1886, p. 70, pl. v., fig. 8.

Hab.—Russell Island (Froggatt). Previously recorded from Viti Levu, Fiji.

Sub-Order OPILIONEA.

Family PHALANGIDÆ.

Sub-family PHALANGIINÆ.

Genus Liobunum, C. K.

LIOBUNUM AURUM,* *sp. nov.*

(Fig. 1.)

♂ Body 3·5 mm. long, 3 mm. wide; *Palpi* 4·4 mm. long; Leg I., 12 mm.; II., 81 mm.; III., 39 mm.; IV., 53 mm.

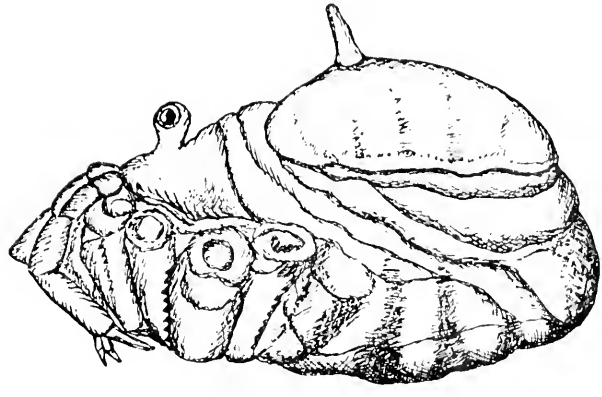


Fig. 1. *Lobunum aurum*, Rainb.

Cephalothorax.—Dark brown; granulate, margin reflexed and grooved. *Ocular eminence* shining-black, somewhat broadest at apex, grooved down the middle, height about equal to width at its widest part.

Maxillæ.—Pale translucent yellow, tips of claws black.

Legs.—Long, threadlike, tapering. *Coxæ* dark brown; lateral angles closely and finely denticulated; *femora* yellowish-brown, thence to tarsi pale yellow.

Palpi.—Long, pale yellow.

Sternum.—Much the broadest at posterior extremity where it is dark brown; anterior extremity yellowish-brown.

Abdomen.—Arched, broad, smooth, golden-yellow, surmounted at about one-third its length from anterior extremity by a large tapering erect spine; *ventral surface* dark brown, transversely wrinkled.

♀ Body 5 mm. long, 3·5 mm. broad; *palpi* 5 mm. long; Leg I., 43 mm. long; II., 84 mm.; III., 41 mm.; IV., 55 mm.

Obs.—Both sexes closely resemble each other both in general appearance and colour; the posterior extremity of the abdomen is, however, darker in the ♀, and there are also present shallow, broad, interrupted transverse grooves, both before and in front of dorsal spine. The measurements recorded of legs and palpi are more or less approximate, as they vary in length in different individuals.

Hab.—Solomon Islands (Froggatt).

Sub-Order ARANEIDÆ.

Family AVICULARIDÆ.

Sub-family DIPLURINÆ.

Group ATRACEÆ.

The species hereunder described, and for the reception of which I propose a new genus, apparently belongs to Hogg's group, the Artraceæ, and which he defines as follows [3]:—

"Inferior mammillæ close together, about 1 diameter apart. Tarsi of all legs thickly bristled and bespined. Two rows (besides an intermediate at lower end) of teeth on falx-sheath. Sternal sigillæ large and removed from margin. Superior mammillæ short, hardly exceeding two-fifths the length of the cephalothorax."

The group Atraceæ, up to the present, has consisted of only two genera, each of which are Australian. Hogg in his paper just quoted gives the spinneret formulæ of these two genera as follows [4]:—

"Last joint of superior spinnerets longer than second, cylindrical and smooth . . . . . *Atrax*, Cambr.

"Last joint of superior spinnerets short and conical . . . . . *Hadronyche*, L. Koch."

To this synopsis I now add:—

Last joint of superior spinnerets equally as long as first . . . . . *Styphlopis*, Mihi.

[3] Hogg.—Proc. Roy. Soc. 1901, p. 250.

[4] Hogg.—*Loc. cit.*, p. 272.

Genus Styphlopis,* *gen. nov.*

(Fig. 2.)

Cephalothorax. — Much longer than broad, *pars cephalica* elevated, truncated in front, lateral constrictions and depressions profound; *pars thoracica* gently arched, radial groves broad, *thoracic fovea* deep and pro-curved.

Falces.—Large, massive, porrected, the margins of the furrow of each falx armed with a series of closely set small teeth; grove between furrows granulated.

Eyes.—Eight, poised upon a slightly elevated protuberance which is considerably broader than long; they are arranged in two rows of four each, of which the anterior is only very slightly recurved; the front row, owing to the median eyes being smaller than the laterals, when viewed from the side, appear to be both pro- and re-curved; laterals of both series poised obliquely.

Legs.—Moderately long, strong, bespined, hairy and bristly; *tarsi* strongly bespined, not scopulated; *claws*, 3; superior pair armed at their base with a series of strong teeth. Relative lengths: 4, 1, 2, 3. (Fig. 2).

Fig. 2, *Styphlopis*, gen. nov., Superior claw.

Maxillæ.—Long, cylindrical, broadest at apex, where they are each terminated by an obtusely pointed projection on the inner angle.

Labium.—Short, broad, free, rounded at apex.

Sternum.—Shield-shaped, apex indented, posterior extremity acuminate; sagillæ large, removed from border, which latter is grooved all the way round.

Abdomen.—Ovate.

Spinnerets.—Four, short, closely grouped together, superior pair three-jointed; medium segment shortest; terminal segment equally as long as first, conical.

* στυφλὸς πρᾶγμα, of stern appearance.

STYPHLOPIS INSULARIS,* *sp. nov.*

(Fig. 3, 4.)

♀ Cephalothorax 12 mm. long, 9.1 mm. broad; abdomen 17.5 mm. long, 12.3 mm. broad.

Cephalothorax.—Shining, reddish-brown, smooth, furnished with a few fine hairs. *Pars cephalica* arched, ascending from base, sides rounded, normal grooves and lateral depressions strongly marked; *clypeus* deep broad, pale coloured. *Pars thoracica* broad, gently arched, radial grooves broad and distinct; *thoracic fovea* pro-curved, deep; *marginal band* broad, pale coloured, grooved.

Eyes.—As in figure; front median pair once their individual diameter apart, ringed with black; lateral eyes broadly margined with black on their inner angles, and poised obliquely; eyes of rear row sensibly smaller than those in front (fig. 3).

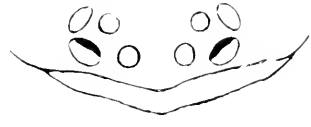


Fig. 3. *Styphlopis insularis*, Rainb. Eyes.

Legs.—Strong, clothed with long hairs and course bristles; those of the first pair slightly stouter than their neighbours; concolorous with cephalothorax; each *tibia* armed with one median spine on the underside; two lateral spines on the outerside of which one is near to the base and the other near to the apex, and two lateral ones on the inner side relatively placed; in addition to these there are three others of unequal length at the lower extremity of the segment; *metatarsi* each armed on underside with 16 long strong spines, and the *tarsi* each with 10. Measurements in millimeters:—

Leg	Coxa	Trochanter	Femur	Patella & Tibia	Metatarsus & Tarsus	Total
1	5	7	4.2	5	6.7	27.9
2	4.8	6.5	4.2	4.6	6.5	26.6
3	4	6	4	4	6 1	24.1
4	4	8	4.2	5.4	8.8	30.4

Palpi.—Concolorous with legs, moderately long, strong, clothed with long coarse hairs and bristles, and armed with strong spines; apical extremity terminated with a claw.

Falces. — Long, stout, porrected, rather darker than cephalothorax, densely hairy; *fangs* long and powerful, shining, nearly black.

Maxillæ.—Reddish-brown, inner angles densely fringed with long, fine, reddish hairs, granulated.

Labium.—Somewhat darker than maxillæ; clothed with long, reddish hairs; apical half closely granulated.

Sternum. — Shield-shaped, reddish-brown, gently arched, clothed with fine hairs.

Abdomen. — Ovate, strongly arched, overhanging base of cephalothorax, finely pilose, yellowish-brown, mottled with small, pale yellowish spots; a broad dark band runs down the middle on the upper side from base to spinnerets; inferior side yellowish-brown, hairy (fig. 4).

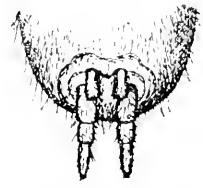


Fig. 4. *Styphlopis insularis*, Rainb.. Tip of abdomen and spinnerets.

Spinnerets.—Bunched together; *inferior mammillæ* very small, hairy; *superior mammillæ* hairy; basal joint stout; terminal joint tapering, conical, obtusely pointed.

Hab.—Solomon Islands (Froggatt).

Family PSECHRIDÆ.

Genus Fecenia, *E. Sim.*

FECENIA OBLONGA, * *sp. nov.*

(Fig. 5.)

♀ Cephalothorax 4·3 mm. long, 3·2 mm. broad; abdomen 9·7 mm. long, 5·3 mm. broad.

Cephalothorax.—Ovate, yellowish-red, pilose. *Pars cephalica* strongly defined, arched. *Pars thoracica* arched; segmental groove strongly defined; radial grooves distinct, but less strongly defined than the preceding; median depression deep; *marginal band* narrow.

Eyes.—Eight: disposition, arrangement, and relative size normal.

Legs.—Concolorous with cephalothorax. In the two specimens before me these limbs are imperfect; some have been completely broken off, whilst the others, with the exception of one, have lost their tarsi. There is sufficient, however, to show that they are, when in perfect condition, long.

Palpi.—Long, yellowish, pubescent.

Falces.—Long, yellowish above, piceus beneath, thickly clothed with long hairs or bristles and strongly arched in front, not divergent, robust; the superior margin of the furrow of each falx armed with three teeth, which are contiguous, and of which the median one is the strongest; the inferior margin is armed with four teeth, which are strong and nearly equal in size; fangs strong, piceus at base, wine-red at tips.

Maxillæ and labium.—Normal, clothed with long hairs; the former dark brown, the latter dark brown at base, yellowish at apex.

Sternum.—Yellowish, hairy, shield-shaped, posterior extremity acuminate.

Abdomen.—Long, oval, arched, yellowish, pubescent, slightly overhanging base of cephalothorax; *epiballum* normal; *epigyne* raised so as to form a sleight tuberenlar eminence, large, prominent, reddish-brown (fig. 5).

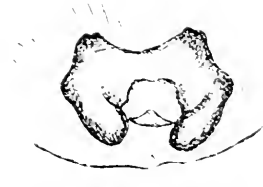


Fig. 5. *Epigyne.* Rainb.

Hab.—Island of Howla.

Family THERIDIIDÆ.

Genus Argyrodes, *E. Sim.*

ARGYRODES WALKERI, * Rainb.

Argyrodes walkeri, Rainb., Proc. Linn. Soc. N.S. Wales, xxvi., 1901, p. 524., pl. xxviii., figs. 2, 2*a*, 3, 3*a*.

Hab.—Russell Island (Froggatt). Previously recorded from Torres Island, between New Hebrides and Santa Cruz Groups.

Family ARGIOPIDÆ.

Genus Tetragnatha, *Latr.*

TETRAGNATHA MANDIBULATA,* *Walck.* ?

Tetragnatha mandibulata, Walck., Hist. nat. des. Ins., Apt. ii., 1837, p. 211 ; Koch, Die Arach. Austr., i., 1871, p. 194, pl. xvii., figs. 2, 2*a*, 2*b*, 3, 3*a*, 3*b*.

I have not much doubt, but that the specimen before me, badly damaged as it is, is any other than the species indicated above.

Hab.—Island of Howla. Previously recorded from New Granada, Viti, Upolu and Tonga.

Genus Leucauge, *White.*

LEUCAUGE CELEBESIANA, * Walck.

Tetragnatha celebesiana, Walck., Hist. nat. des Ins., Apt., ii., 1837, p. 222.

Meta decorata, Blackw., Ann. Mag. Nat. Hist., 1864, p. 44 ; Koch, Die Arach. Austr., i., 1871, p. 141, pl. xi., fig 5.

Argyroepeira celebesiana, Thor., Studi. Rag. Mal., iv., 1890, p. 194.

Hab.—Russell Island (Froggatt). Widely distributed over Malaisia, New Guinea, Australia and S. Sea Islands.

LEUCAUGE GRATA, *Guér.*

Epeira grata, Guér, Voy. de la Coq., Zool., ii., 2, p. 56.

Epeira coccinea, Dol., Nat. Tijd. Nederl. Ind., xiii., 1826, (supp. 3, vol. iii), p. 421, 1857.

Argyroepeira grata, Poc., Ann. Mag. Nat. Hist., i. (6), 1898, p. 464.

Hab.—Russell Island (Froggatt), Ugi and Howla. Widely distributed over the Austro-Malaisian area.

Genus Nephila, *Leach.*

NEPHILA MACULATA, Fab.

Epeira maculata, Fab., Ent. Syst., ii., 1793, p. 425.

Hab.—Russell Island (Froggatt), also Ugi and Gandalcanar. Numerous specimens of this typical species occur in all collections from the S. Sea Islands.

Genus Argiope, *Aud.*, in *Sav.*

ARGIOPE PICTA, L. K.

Argyope picta, L. K., Die Arach. Austr., i., 1871, p. 33, pl. iii., fig. 3.

Argyope principalis, L. K., *loc. cit.*, p. 207, pl. xviii., fig. 5.

Hab.—Russell Island (Froggatt); also the islands of Howla and Ugi; other localities are New Guinea, Queensland, N.S. Wales, and Fiji.

ARGIOPE LEOPARDINA, Poc.

Argyope leopardina, Poc., Ann. Mag. Nat. Hist., i. (7), 1898, p. 461, pl. xix., figs. 2, 2*a*.

Hab.—Russell (Froggatt) and Howla Islands. Pocock gives the locality for the type "Probably Shortland Island."

ARGYOPE ÆTHEREA,* *Walck.*

Epeira aethera, Walck., Hist. Nat. des Ins., Apt., ii., 1837, p. 112.

Argyope aethera, Keys., Verhandl. der k. k. Zool. bot. Ges. in Wien, 1865, p. 803, pl. xix., figs. 1 and 2.

Hab.—Russell (Froggatt) and Howla Islands; also recorded from New Guinea, Queensland and N. S. Wales.

Genus Cyrtophora, *E. Sim.*

CYRTOPHORA CYLINDROIDES, Walck.

Epeira cylindroides, Walck., Hist. Nat. Ins., Apt., ii., 1837, p. 136.

Epeira viridipes, Dol., Act. Soc. Sci. Indo-Néerland, 1859, p. 29, pl. i., fig. 7.

Epeira nephilina, L. K., Die Arach. Austr., i., 1871, p. 90, pl. vii., figs. 6, 6*a*.

Cyrtophora cylindroides, Poc., Ann. Mag. Nat. Hist., i. (7), 1898, p. 462.

Hab.—Island of Ugi; Pocock's specimens came "probably from Shortland Island," and others from New Georgia. This species is also recorded from Cochin China, Amboina, Yule Island, Queensland, &c.

Genus Araneus, *Clerck.*

ARANEUS THEIS,* *Walck.*

Epeira theis, Walck., Hist. Nat., Ins., Apt., ii., 1837, p. 53, pl. xviii., fig. 4.

Epeira mangarera, Walck., Hist. Nat. Ins., Apt., iv., 1847, p. 469.

Epeira mangarera, L. K., Die Arach. Austr., i., 1871, p. 85, pl. vii., figs. 4, 4*a*, 5, 5*a*.

Hab.—Russell Island (Froggatt). Common throughout Polynesia; occurs also in Queensland.

ARANEUS LUGUBRIS, * Walck.

Epeira lugubris, Walck., Hist. Nat. des Ins., ii., 1837, p. 34.

Epeira indagatrix, L. K., Die Arach. Austr., i., 1871, p. 66, pl. v., figs. 8, 8*a*, 9*a*.

Hab.—Russell Island (Froggatt). Other localities are Isle of France, and North Queensland.

ARANEUS ACUMINATUS,* L. K. ?

(Fig. 6.)

Epeira acuminata, L. K., Die Arach. Austr., i., 1871, p. 109, pl. ix., figs. 2, 2*a*, 2*b*.

The form described and figured by Koch was a male; the specimen before me is a female, but the latter agrees so closely with the description and figure of the former, that in the absence of specimens of both sexes, I hesitate to describe it as *sp. nov.* The female of *acuminatus* has not yet been recorded, and notwithstanding the fact that Koch's locality was Port Mackay, North Queensland, and the locality from whence the specimen under discussion was obtained was the Island of Howla, it is not at all unreasonable to assume that the two forms are conspecific, especially when we bear in mind that the fauna of the Solomon Island Archipelago, to quote Pocock, "closely resembles, so far as genera, and also so far as species are concerned, that of Papua and the neighbouring islands of the Austro-Malayan seas."[6]

[6] Pocock—Ann. Mag. Nat. Hist., (7), i, 1898, p. 458.

In order to assist students I give, herewith, a description and figure of the *epigyne* :—

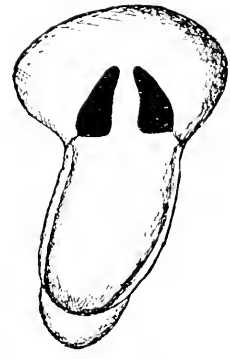


Fig. 6. *Araneus acuminatus*, L. K. ♀. Epigyne.

Epigyne.—A short broad, tongue-like process, proceeding from a small tubercular eminence; the edges of the process slighly reflexed, and the terminal extremity strongly so (fig. 6).

Hab.—♀ Island of Howla; Port Mackay, N. Queensland.

Genus Gasteracantha *(sensu stricto)*, Sund.

GASTERACANTHA SCINTILLANS, Butl.

Gasteracantha scintillans, Butl., Trans. Ent. Soc., 1873, p. 156, pl. iv., fig. 9.

Hab.—Russell (Froggatt) and Howla Islands.

GASTERACANTHA SCINTILLANS, *var.* CONCOLOR,* Rainb., *var. nov.*

This form I cannot regard as other than a colour variety of Butler's *G. scintillans*. It agrees with the latter in size, distribution and length of abdominal spines, and in the form of the *epigyne*. It will be readily distinguished from the typical form by the absence of the central brick-red area (abdominal) and by its uniformly brilliant green colour.

Hab.—Gaudalcanar (Froggatt).

GASTERACANTHA METALLICA, Poc.

Gasteracantha metallica, Poc., Ann. Mag. Nat. Hist., i. (7), 1898, p. 465, pl. xix., fig. 5.

Hab.—Bougainville and Howla Islands.

GASTERACANTHA SIGNIFER, Poc.

Gasteracantha signifer, Poc., Ann. Mag. Nat. Hist., i. (7), 1898, p. 465, pl. xix., fig. 6.

Hab.— Russell (Froggatt), Ugi and Howla Islands.

Family CLUBIONIDÆ.

Genus Heteropoda, *Latr.*

HETEROPODA VENATORIA, *Linn.*

Aranea venatoria, Linn., Syst. Nat., Ed. xii., 1767, p. 1035, *auctorum*.

Aranea regia, Fab., Ent. Syst., ii., 1793, p. 408.

Heteropoda regia, E. Sim., Hist. Nat. des Ar., ii., 1897, p. 54.

Hab.—The Archipelago generally; all tropical and subtropical regions.

Genus Pandercetes, L. K.

Pandercetes, sp.*

Pandercetes, sp., one specimen, but too immature for determination or description.

Hab.—Solomon Islands (Froggatt).

Genus Prychia, *L. K.*

PRYCHIA GRACILIS, *L. K.*

Prychia gracilis, L. K., Die Arach. des Austr., ii., 1875, p. 654, pl. liii., fig. 1.

Prychia gracilis, Poc., Ann. Mag. Nat. Hist., i. (7.), 1898, p. 471.

Hab.—Solomon Islands (Froggatt).

Genus Palystes, *L. K.*

PALYSTES SPECIOSUS, Poc.

Palystes speciosus, Poc., Ann. Mag. Nat. Hist., i., 1898, p. 465, pl. xix., figs. 8, 8*a*.

Hab.—Russell (Froggatt) and Howla Islands.

Family AGELENIDÆ.

Genus Desis, *Walck.*

DESIS VORAX,* *L. K.*

Desis vorax, L. K., Die Arach. Austr., i., 1871, p. 345, pl. xxix., figs. 1, 1*a*, 1*b*, 1*c*, 1*d*, 1*e*, 1*f*.

Hab.—Russell Island (Froggatt); previously recorded from Upolu.

Family OXYOPIDÆ.

Genus Oxyopes, *Latr.*

OXYOPES MACILENTUS,* L. K.

Oxyopes macilentus, L. K., Die Arach. Austr., ii., 1878, p. 1000, pl. lxxxvii., figs. 4, 4*a*, 5, 5*a*, 5*b*.

Hab.—Russell Island (Froggatt); previously known from Cape York, N. Queensland, and New Guinea.

Family SALTICIDÆ.

Genus Linus, *C.* and *E. Peckh.*

LINUS ALTICEPS, Poc.

Linus alticeps, Poc., Willey's Zool. Results, 1898, p. 117, pl. xi., fig. 14.

Hab. — Russell Island (Froggatt) and Rubiana, New Georgia.

Genus Cosmophasis, *E. Sim.*

COSMOPHASIS MICARIOIDES,* *L. K.*

Attycus micarioides, L. K., Die Arach., ii., 1880, p. 1178, pl. cii., figs. 3, 3*a*, 3*b*, 3*c*.

Hab.—Russell Island (Froggatt); previously known from Cape York and British New Guinea.

Genus Zenodorus, *C.* and *E. Peckh.*

ZENODORUS VARIATUS,* Poc.

Zenodorus variatus, Poc., Willey's Zool. Results, 1898, p. 117.

Hab.—Russell Island; previously recorded from New Britain.

Genus Carrhotus, *Thor.*

CARRHOTUS OSCITANS, Poc.

Eustiromathus oscitans, Poc., Ann. Mag. Hist., i. (7), 1898, p. 473, pl. xix., figs. 11, 11*a*, 11*b*.

Hab.—Solomon Islands (Froggatt).

Genus Plexippus, *C. K.*

PLEXIPPUS STRIDULATOR,* Poc.

Plexippus stridulator, Poc., Willey's Zool. Results, 1898, p. 119, pl. xi., figs. 16, 16*a*, 16*b*, 16*c*.

Hab.—Russell Island (Froggatt); previously recorded from New Britain.

Genus Bathippus, *Thor.*

BATHIPPUS MACROPROTOPUS, Poc. (?)

Bathippus macroprotopus, Poc., An. Mag. Nat. Hist., i. (7), 1898, p. 471, pl. xix., fig. 10.

Hab.—Russell Island (Froggatt); Pocock gives his locality as "probably in Shortland Island."

Genus Athamus, *O. P. Cambr.*

ATHAMUS WHITMEI,* *O. P. Cambr.*

Athamus whitmei, O. P. Cambr., Proc. Zool. Soc., 1877, p. 576, pl. lvi., fig. 11; L. Koch, Die Arach. Austr., ii., 1879, p. 1076, pl. xciv., figs. 5, 5*a*, 5*b*, 5*c*, 6, 6*a*, 6*b*.

Hab.—Russell Island (Froggatt); previously recorded from Tahiti and Upolu.

Genus Sigytes, *E. Sim.*

SIGYTES DILORIS,* *L. K.*, ♀

Hasarius diloris, L. K., Die Arach. Austr., ii., 1881, p. 1302, pl. cxi., figs. 3, 3*a*, 3*b*, 3*c*, 3*d*, 3*e*.

Hab.—Russell Island (Froggatt); previously recorded from Port Mackay, N. Queensland, and from Viti.

Genus Hasarius, *E. Sim.*

HASARIUS GARETTI,* *L. K.*

Hasarius garetti, L. K., Die Arach. Austr. ii., 1881, p. 1289, pl. cx., figs. 4, 4*a*, 4*b*.

Hab.—Russell Island (Froggatt); previously recorded from Ragatea.

Genus Euryattus, *Thor.*

EURYATTUS NIGRIVENTRIS,* *L. K.* (♀)

Hasarius nigriventris, L. K., Die Arach. des Austr., ii., 1881, p. 1293, pl. cx., figs. 6, 6*a*, 6*b*, 6*c*.

Hab.—Russell Island (Froggatt); originally recorded from Rockhampton, N. Queensland.

On a VARANUS and a FROG from BURNETT RIVER, QUEENSLAND, and a REVISION of the VARIATIONS in *LIMNODYNASTES DORSALIS*, Gray.

By Dene B. Fry, Junior Assistant.

(Plates i-iii, and Figs. 7-13.)

The Trustees have recently received from Dr. T. L. Bancroft several very interesting consignments of Reptiles and Batrachians, collected at Eidsvold on the Burnett River, Queensland. Amongst those deserving special attention are the two species here mentioned, a rare frog, *Hyla latopalmata*, Günther, and a new variety of *Varanus punctatus*, Gray, which is described as var. *orientalis*.

The collections also include a large series of a strikingly coloured form of *Limnodynastes dorsalis*, Gray, and it has been thought best to deal with them in conjunction with a detailed account of the distribution and variation of this widely distributed frog.

A list of the Reptiles and Batrachians from the Burnett River District has been published in Semon's "Zoologische Forschungsreisen in Australien"[1] by Drs. Böttger and Oudemans. They record forty-two species, twenty-five of which are represented in Dr. Bancroft's collections, together with the following, which up till the present were not recorded from the district.

Batrachia.

Limnodynastes peronii, Dum. and Bibr.
,, *tasmaniensis*, Günther.
,, *dorsalis*, Gray, var. *dumerilii*, Peters.

[1] Böttger and Oudemans—Semon's Zool. Forschung. Austr., v., 1894, Batrachia, p. 109, Ophidia, p. 115, Lacertilia, p. 129.

OPHIDIA.

Typhlops affinis, Boulenger.
Denisonia textilis, Dum. and Bibr.
Pseudechis australis, Gray.
,, *mortonensis*, de Vis.
Denisonia nigrescens, Günther.
,, *carpentaria*, Macleay.
Hoplocephalus bitorquatus, Jan.

LACERTILIA.

Gymnodactylus milii, Bory.
Diplodactylus taeniocauda, de Vis.
Oedura tryoni, de Vis.
Gehyra australis, Gray.
Lialis burtoni, Gray.
Varanus punctatus, Gray, var. *orientalis*, Fry.
Lygosoma (Hinulia) fasciolatum, Günther.
,, *(Leiolepisma) mundum*, de Vis.
,, ,, *peronii*, Dum. and Bibr.
,, *(Rhodona) fragile*, Günther.
Cryptoblepharus boutoni, Desj., var.
,, *gregi*, Gray.

VARANUS PUNCTATUS, *Gray*, VAR. ORIENTALIS, *var. nov.*

(Figs. 7-10.)

Head scales small, flat, sub-equal; largest and mostly hexagonal on the snout and between the eyes; smallest on the supraorbital region, and very much broken up and irregular on the occipital and pineal regions. Scales of back (fig. 7) flat, not keeled, larger and much broader than in the typical Western Australian form. Dorsal scales of anterior half of tail (fig. 9) as long as or slightly longer than broad, keeled and produced into a distinct black spine, which arises well inside the posterior margin of the scale; scales smallest on the base of the tail and becoming elongate and more sharply keeled towards the extremity. Abdominal scales in 74-77 rows.

Colour:—This variety appears to constantly differ in the greater brilliancy of the yellow spots which extend right on to the head, thus differing from the typical form in which the head and shoulders are uniform brown.

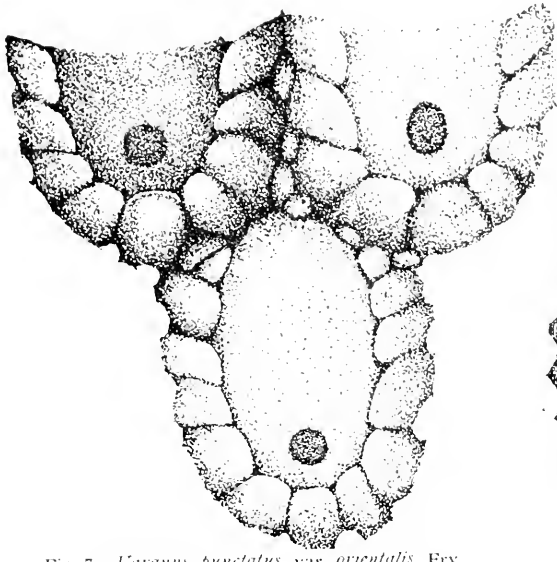


Fig. 7.—*Varanus punctatus*, var. *orientalis*, Fry. Mid-dorsal scales from the back.

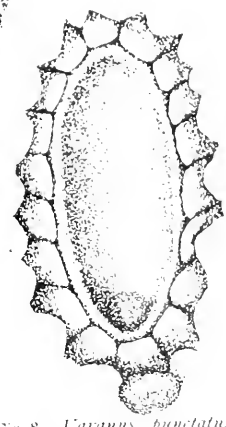


Fig. 8.—*Varanus punctatus*, var. *typica*. Mid-dorsal scales from the back.

The characters which distinguish this variety from the typical form are, the broad flat condition of the scales of the back (fig. 7) as opposed to the long, tectiform scales of the typical variety (fig. 8); the much broader and coarser scales on the anterior half of the tail (fig. 9, var. *orientalis*; fig. 10, var. *typica*). The caudal scales and colouration approach the condition in the more brilliant *V. acanthurus*, Blgr.

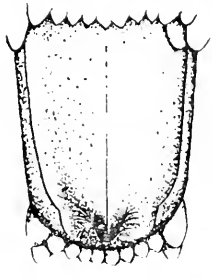


Fig. 9.—*Varanus punctatus*, Gray, var. *orientalis*, Fry. Scales from anterior half of tail (thirty-five or forty rows the from base on the middle line).

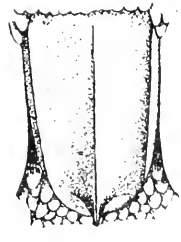


Fig. 10.—*Varanus punctatus*, Gray, var. *typica*. Scales from the same region as in Fig. 9.

Dr. Boulenger[2] gives the range of *V. punctatus* as North and West Australia and records it from Perth, Western Australia, North-west Australia, Port Essington, and Torres Strait. The type came from Shark Bay, Western Australia.

Locs.—In the Australian Museum are one adult and two half grown specimens from Eidsvold, Upper Burnett River, Queensland. They were collected by Dr. Bancroft and presented to the Trustees through Drs. J. Burton Cleland and T. Harvey Johnston of the Health Department of Sydney.

Type.—In the Australian Museum, Sydney.

Hyla latopalmata, *Günther.*

(Plate i, and figs. 11 and 12.)

Litoria latopalmata, Günther, Ann. Mag. Nat. Hist., xx., 1867, p. 55.

Hyla latopalmata, Boulenger, Brit. Mus. Cat. Batr., 2nd. ed., 1882, p. 414, pl. xxvi., fig. 4.

Hyla latopalmata, Fletcher, Proc. Linn. Soc. New South Wales, xxii., 1898, pp. 681 and 2.

Habit very slender. Head as broad as or slightly broader than long, the measurement taken at a line drawn between the hinder margins of the tympana. Tongue sub-circular, slightly nicked and free behind. Vomerine teeth in two oval, oblique groups, their front edges on a level with a line drawn between the anterior margins of the choanae. Snout pointed, very prominent, once and one half to twice as long as the orbital diameter; nostril nearer the tip of the snout than the eye. Inter-orbital space as broad as or slightly broader than the upper eye-lid. Canthus rostralis distinct, rounded; loreal region concave, with a groove from the nostril to below the eye. Tympanum very distinct, with a distinct rim, four-fifths the diameter of the eye. Fingers free or fringed, the fringe most prominent between the bases of the fingers; first finger opposed, slightly longer than the second; no distinct rudiment of pollex. Discs very small; sub-articular tubercles small and very prominent. Toes fringed and with the exception of the fourth, webbed almost to the discs. A small inner and a

[2] Boulenger—Brit. Mus. Cat. Lizards, 2nd ed., ii., 1885, p. 322.

still smaller outer metatarsal tubercle, and a row of small tubercles on the underside of the metatarsals of the first to the fourth toes. The tibio-tarsal articulation of the outstretched limb reaches well beyond the tip of the snout. Skin of back almost smooth, with a few scattered small warts. Abdomen and underside of thighs granular, chest and throat smooth. A fold above the tympanum absent or feebly developed; another across the chest, and a well developed tarsal fold.

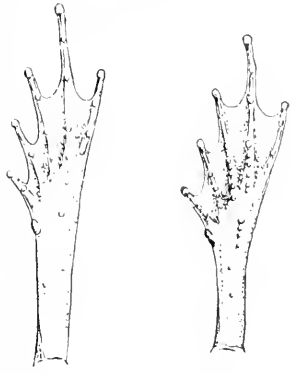
Colour (spirits):—Light bluish or greenish-grey above, uniform or with more or less distinct irregular marblings of darker grey. Sometimes a triangular dark mark between the eyes. A dark streak runs from the nostril, through the eye to behind the tympanum. Upper and lower lips spotted with white. A yellow streak runs from the front of the eye to the angle of the mouth. Undersurfaces yellowish. Arms with a row of black and white dots along the hinder border. *Front and hinder side of thighs with very accentuated black and brown reticulations on a yellow ground.* Outer border of tibial and tarsal regions with a row of black and white spots. Undersurface of foot and sometimes the web marbled with brown.

Total length of largest specimen, from snout to vent, 37.5 mm.

This species is allied to *Hyla freycineti*, D. and B., which it exactly resembles in general form. The following synopsis of characters will serve to distinguish them.

Hyla freycineti, *D.* and *B.*:—Upper surfaces covered with large raised warts. A prominent fold above the tympanum. Back dark brown, coarsely variegated with light brown. Hinder side of thighs dark brown with a few irregular lighter spots. Webbing of toes as in fig. 11.

Hyla latopalmata, *Günther*:—Upper surfaces smooth or with a few small, flat warts. A fold above the tympanum may be feebly marked or absent. Back greyish, uniform, or with irregular reticulations, never as distinct or as coarse as in *H. freycineti*. Hinder side of thighs pale yellow, reticulated with black or brown markings. Webbing as in fig. 12.



11. 12

Fig. 11.—Foot of *H. freycineti*, D. and B.

Fig. 12.—Foot of *H. latopalmata*, Günther.

Dr. Bancroft has forwarded a fine series of this rare frog, and as his specimens show considerable differences from Dr. Boulenger's description of the type, I have redescribed the species.

Laws.—*Hyla latopalmata* has a wide and noteworthy distribution. Krefft says[3]:—"We believe this to be a well distributed species which occurs at Adelaide, near Sydney, and probably in the intermediate district." The above record of Adelaide is the only notice of the species south of Sydney. Since then, however, it has been recorded from the following localities:—Port Denison, Queensland (types); Brisbane, Queensland, and Richmond, New South Wales (Boulenger); St. Marys, near Sydney, Dandaloo on the Bogan River in Western New South Wales, Warroo in Queensland, King's Sound and Kimberley in North West Australia (Fletcher); the Australian Museum collection contains specimens collected by Mr. Robert Helms between Bourke and Wilcannia on the Darling River, Western New South Wales, a large series collected by Dr. Bancroft at Eidsvold, Upper Burnett River, Queensland, and five specimens collected by the author at Norton's Basin, Nepean River, New South Wales. Its distribution is mainly coastal, but it also occurs in Western New South Wales and South Western Queensland. Together with *Phractops brevipes*, Peters, *P. brevipalmatus*, Günther, and *Hyla rubella*, Gray, it goes to show that the watershed of Queensland is not such an efficient barrier to the migration of frogs as is the Great Dividing Range in New South Wales. These coastal forms have apparently found their way to the head of the Darling River system on the tablelands of Southern Queensland, and, following the permanent water, they have become established on the Western Plains of New South Wales and Southern Queensland.

Limnodynastes dorsalis, *Gray.*

In the preparation of the following pages I am indebted to Mr. J. J. Fletcher, M.A., for much help and valuable criticism. As explained in his paper,[4] he has, after examining a large series of *Limnodynastes dorsalis*, found certain variations, which, however, he refrains from naming. I have endeavoured,

[3] Krefft.—Austr. Vertebrata Fossil and Recent, 1871, p. 63.

[4] Fletcher—Proc. Linn. Soc. N. S. Wales, xxii., 1897, p. 675.

to show here, to what extent these variations may be termed geographical, and have separated the Eastern and Riverina forms from the Western. The accompanying map (fig. 13) shows the distribution of the various varieties as at present known.

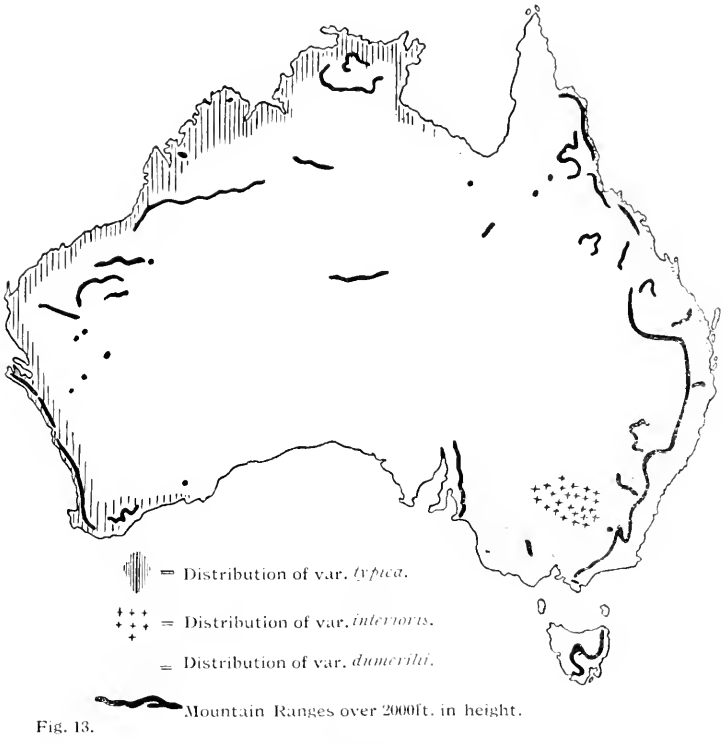


Fig. 13.

The following key will serve to distinguish the varieties

(a) Back smooth. Markings in the form of isolated dark spots or bands on a light ground. A light dorsal stripe . . . . . var. *typica*.

(b) Back warty, granular, or with flat glands. Back dark olive or brown, spotted or uniform. Rarely a pronounced dorsal stripe.

(c) Toes cylindrical and devoid of fringe, or fringed and webbed at the base. Back very dark, with or without very obscure spots or marmorations. Sometimes a complete dorsal stripe..... var. *duméritii*.

(cc) Toes with a broad fringe, the first toe entirely webbed and the second about two-thirds webbed. Back with irregular dark smudges or occasional spots. A curved yellowish axillary mark..... var. *interioris*.

LIMNODYNASTES DORSALIS, *Gray*, VAR. TYPICA.

(Plate ii., figs. 2 and 2a.)

Cystignathus dorsalis, Gray, Ann. Mag. Nat. Hist., vii., 1841, p. 91.

Cystignathus dorsalis, Gray, Grey's Journ. Exped. W. Austr., ii., 1841, App. p. 446.

Cystignathus dorsalis, Gray, Eyre's Journ. Exped. Centr. Austr., i., 1845, pl. i., fig. 2.

Limnodynastes dorsalis, Günther, Brit. Mus. Cat. Batr., 1st ed., 1858, p. 33.

Limnodynastes dorsalis, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 261.

Limnodynastes dorsalis, Fletcher, Proc. Linn. Soc. New South Wales, xxii., 1897, p. 675.

Size and habit moderate. Head three-fourths to four-fifths as long as broad, the measurement taken at a line drawn between the hinder margins of the tympana. Tympanum distinct in most adult specimens, rather indistinct in young examples. Vomerine teeth in two straight series extending to the outer edge of the choanæ. Toes rather long, depressed, with a basal web. No outer metatarsal tubercle. Back almost invariably smooth; in one specimen there is a granular dorsal patch.

Colour (spirits):—Upper surfaces light brown with large, well defined, isolated dark brown spots or bands, which are arranged in two series. One commences on the upper eyelids, narrows and continues to the vent, and is divided by the light dorsal stripe. The other commences behind the eyelid, and

running along the back, breaks up into spots. These bands may be so broken up as to represent a chain of spots only, but the above pattern is always traceable. A light creamy dorsal stripe extending from the tip of the snout to the anus is always present. A dark brown band commences on the tip of the snout and continues to above the arm. A dark spot on the upperlip beneath the eye. Upper surface of shank barred with brown. Under surfaces creamy white, throat speckled with brown.

Length of largest specimen (snout to vent)	56 m.m.
Width of head	25 m.m.
Length of head (to level of tympana)	20 m.m.
Length of outstretched hind limb	80 m.m.

Examples of var. *typica* never attain the dimensions of the largest specimens of var. *dumerilii*, the western form, so far as is known, never exceeding 60 m.m. in length.

Locs.—Properly localised specimens of var. *typica* would appear to be rare in collections. It is, as far as I am aware, recorded from the following places only.—Hontman Abrolhos, Western Australia (Günther, 1858, and Boulenger, 1882), Geraldton and Perth, Western Australia (Fletcher, 1898), Eighty miles South of Perth (Austr. Mus.), King George Sound, Western Australia (Krefft, 1867 as *L. bibronii*, see below, p. 32), Port Essington, Northern Territory (Günther, 1858, and Boulenger, 1882).

There are no records of this or any other frogs occurring between King George Sound and Spencer Gulf in the Great Australian Bight, and, as the country is almost devoid of water permanent enough for breeding purposes, it seems improbable that any will be found there. However, as our knowledge of the distribution of frogs in South and Western Australia is very meagre, it is quite possible that some of the burrowing forms will be found to have adapted themselves to the unfavourable conditions of the Bight county as they have done in Central Australia. Another stretch of country where the occurrence of *L. dorsalis* is as yet conjectural, is between Geraldton on the West coast and Port Essington in the Northern Territory. But, as the present known distribution of this frog points to its having reached South-Western Australia by way of the North West coast, it seems reasonable to presume that it still occurs there.

Limnodynastes dorsalis, *Gray*, var. dumerilii, Peters.

(Plate ii., figs. 1 and 1a, Plate iii., figs. 2 and 2a.)

? *Wagleria dorsalis*, Girard, Proc. Acad. Nat. Sci. Philad., vi., 1853, p. 421.

Limnodynastes (Platyplectrum) dumerilii, Peters, Monatsb. Ak. Wiss. Berlin, 1863, p. 235.

Heliorana grayi, Steindachner, Reise "Novara," Amphib., 1867, p. 32, pl. ii., figs. 11-14

Platyplectrum superciliare, Keferstein, Gottingen Nachrichten, 1867, p. 346.

Heliorana superciliaris, Keferstein, Archiv. Naturg., xxxiv., 1868, p. 267, pl. v., fig. 7.

Heliorana grayi (Steindachner), Keferstein, Archiv. Naturg., xxxiv., 1868, p. 266.

Limnodynastes dorsalis, Günther, Brit. Mus. Cat. Batr., 1st ed., 1858, p. 33.

Limnodynastes dorsalis, Günther, Journ. Mus. Godeff., iv., Heft. xii., 1876, p. 47.

Limnodynastes dorsalis, McCoy, Prodr. Zool. Vict., 1880, v., p. 12, pl. xxxii., fig. 2.

Limnodynastes dorsalis, Boulenger, Brit. Mus. Cat. Batr., 2nd ed., 1882, p. 261.

Limnodynastes dorsalis, Fletcher, Proc. Linn. Soc. New South Wales, xxii., 1897, p. 675.

Limnodynastes dorsalis, Savage-English, Proc. Zool. Soc., 1910, p. 629, pl. li., fig. 3.

Size moderate to large. Habit moderate to very stout. Head two-thirds to four-fifths as long as broad, the measurement taken at a line drawn between the hinder margins of the tympana. Tympanum hidden or visible. Vomerine teeth in two straight or somewhat arched series, extending to or beyond the outer edge of the choanæ. Toes moderate or short, fringed or totally devoid of fringe. A web more or less developed, the first toe occasionally almost entirely webbed. Outer metatarsal tubercle present[1] or absent. Back tuberculated, granulated, or with flat glandular swellings.

[1] In several of Dr. Bancroft's specimens from Eidsvold, Queensland, there is a very distinct outer metatarsal tubercle, resembling in one case a miniature shovel-shaped inner tubercle.

Colour (spirits) :—Dark greyish, brownish, or olive above, with or without a light dorsal stripe. Back clouded, marmorated, or spotted with black or dark brown, the spots in a few cases, as in North Queensland examples and occasional southern specimens, taking the form of more or less continuous obscure bands. Sides, gland at angle of mouth, and under surfaces lemon yellow; the sides are always, and the belly, throat, and the legs are sometimes reticulated with black or brown. Hinder side of thigh black, spotted with grey, or, as in some Queensland examples blotched with crimson. The under surfaces of the hind limbs in some Queensland specimens are uniform bright scarlet. Sometimes in specimens from Monaro Range, Southern New South Wales, the legs, sides of back, canthus and gland at angle of mouth, have bright burnished bronzy reticulations.

The following measurements are given for the purpose of showing still further racial forms. In all cases a specimen typical of its district has been selected and measured, and when the largest specimen is typical I have always measured that one. Thus it will be seen that Queensland specimens are very large and have very broad heads, and in North Queensland examples the leg is very short; Sydney specimens are much smaller and have a longer snout; tableland specimens are larger again and also possess a greater amount of webbing to the toes; and so on.

Table of Measurements in millimetres.

	1	2	3	4	5	6	7	8	9
From snout to vent	79.5	78	64	55	59	77	52	64	58.
Head, to level of tympanum	21	22	19	20	19	22	17	21.	17.
Width of head	37.5	36	30	25.5	28	37	22	26	25
Hind limb, outstretched ...	87	100	83	75	78	106	70	79.	70.

1. Cape York, Queensland, figured on Pl. iii., figs. 2 and 2a.

2. Burnett River, Queensland. Like the Cape York specimens most of these examples have practically no fringe to the toes, but the leg is considerably longer. In all respects they link up Cape York and southern examples.

3. Brisbane, Queensland. This specimen agrees almost exactly with Dr. Steindachner's figure[6] of *Heliorana grayi*.
4. Sydney, New South Wales. The largest Sydney example in the Australian Museum Collection. The average length is about 50 m.m.
5. Katoomba, Blue Mts., Central Tableland, New South Wales. A rather distinct race, with a greater development of fringe and web than Sydney examples. A specimen figured on Pl. ii., figs. 1 and 1a.
6. Jindabyne, Muniong Range, Southern Tableland, New South Wales. This specimen is regarded as the nearest approach to var. *interioris* on account of the excessive webbing of the toes. It is in all respects however, a true var. *dumerilii*.
7. Bathurst, Central Tableland, New South Wales. Specimen in the Macleay Museum. The type of marking on this example is nearer the Western Australian form than any other New South Wales specimen I have seen.
8. Launceston, Tasmania. These specimens are typically the common eastern form. They appear to differ from Flinders Island specimens in the obscurity of the dorsal stripe, which is quite distinct in the Island specimens.
9. Narracoorte, near the Victorian border in South Australia. These resemble the Bathurst specimens mentioned above in having very accentuated markings, and it will be seen that they agree fairly well in measurements also.

Loca.—A list of all the localities where this variety is known to occur is here given :—

Queensland :—Somerset, Cape York (Austr. Mus.), Cooktown, North-east Coast (Garman, 1901), Gayndah, Central-coastal (Günther, 1876, and Boulenger, 1882), Eidsvold, near Gayndah, Burnett River (Austr. Mus., presented by Dr. Bancroft), Brisbane, South-coastal (Austr. Mus.).

New South Wales. (a) Coastal District :—Clarence River, North Coast (Krefft, 1861), Nambucca River, North Coast (Austr. Mus.), Port Stephens, Central-coastal (Macleay Mus.), Sydney (Krefft, 1861, Fletcher, 1891, Austr. Mus.), Emu Plains, Central-coastal (Fletcher, 1891), Mayfield, Shoalhaven District, Central-coastal (Ogilby, in Etheridge and Thorpe, 1890), Illawarra, Central-coastal (Fletcher, 1890), Jervis Bay, South Coast (Fletcher, 1894).

[6] Steindachner—Reise "Novara," Amphibia, 1867, p. 32, pl. ii., figs. 11-14.

(b) Tablelands and Mountains (The Great Dividing Range) :—Tamworth, Northern Tableland (Fletcher, 1894), Inverell, North-west slopes (Fletcher, 1894), Springwood and Mt. Wilson, Blue Mts., Central Tableland (Fletcher, 1890), Katoomba, Tarana, and Coal River at Hartley, Blue Mts. (Austr. Mus.), Guntawang and Cullenbone, Central Tableland (Fletcher, 1890), Lucknow near Orange, Central Tableland (Fletcher, 1892), Bathurst, Central Tableland (Fletcher, 1892, and Macleay Mus.), Rylstone, Central Tableland (Krefft, 1861), Cooma, Southern Tableland (Fletcher, 1892), Jindabyne and Berridale, Southern Tableland (Austr. Mus.).

Victoria:—Benalla, North-eastern (Fletcher, 1898), Warrogul, South-eastern (Fletcher, 1890), Melbourne (McCoy, 1880), Lake Boga, North-west (Krefft, 1861).

Tasmania :—Ulverstone (Fletcher, 1898, and Savage-English, 1910), Hobart, and Fingal (Savage English, 1910), Launceston (Austr. Mus. and Savage-English, 1910), Flinders Island, Bass Strait, (Austr. Mus.).

South Australia :—Adelaide (Peters, 1863, and Krefft, 1867 and 1871), Narracoorte, near the Victorian border (Austr. Mus.).

The great amount of variation within this form is to be credited purely to its diversified environment. Where conditions are so unvarying as they are in Western Australia, we do not find nearly the same amount of variation in the typical variety. The thickly timbered gullies of the Great Dividing Range, the sandstone country around Sydney, and the rich, sub-tropical, well-watered districts of the Northern Rivers and Queensland, all facilitate the development of specialised variations. But, just why examples from the Great Dividing Range should have a greater extent of webbing to the toes, or why Sydney specimens should, on the whole, be smaller than most others, is only to be accounted for by some local influence, the character of which has yet to be observed.

The brilliant colours which occur in the breeding season are due, as pointed out to me by Mr. Fletcher, to the abounding vitality at this period, which in *L. dorsalis* affects also the mucous glands, causing them to become enlarged and to exude freely. With regard to breeding colours I have two interesting

records to make. In a large specimen from Jindabyne, Southern New South Wales, collected by Mr. A. R. McCulloch, the back and legs were suffused with a bright coppery colour, approaching that of *Hyla aurea*. The ground colour was dark green, and the undersurfaces, as is usual in breeding specimens, was a bright lemon yellow. The coppery marmorations were confined to the head, sides of body, and the upper surfaces of the limbs. Again, in a large series of specimens from Eidsvold, Upper Burnett River, Queensland, the legs and sides showed bright scarlet markings. Thinking that this might be due to the action of the preserving fluid, as is sometimes the case, I wrote to Dr. Bancroft, who collected the specimens, and who very kindly forwarded me a drawing showing the distribution of the colours during life. The throat, gland at angle of mouth, and sides of the abdomen are bright lemon yellow, while there is a yellow streak marking a glandular area on the side of the back. The chest, and the belly and symphysis are creamy white. The groin, front side of thighs, and underside of shank is brilliant red. Reticulations of black or brown on the belly may or may not be present, and are not breeding colours. In a series of breeding specimens, collected during the phenomenally rainy season of January and February, 1910, at Katoomba, Blue Mts., these reticulations were exceptionally marked; a specimen is figured on Pl. ii., figs. 1 and 1a.

The Cape York examples, obtained by Messrs. C. Hedley and A. R. McCulloch in 1907, present a rather distinct form (Pl. iii., figs. 2 and 2a.) The vomerine teeth are very strong and extend well beyond the edge of the choanæ; the toes are short and cylindrical and totally devoid of fringe, while the marking approaches that of var. *typica*, a very distinct light dorsal stripe being present. However these variations are entirely linked up by the Burnett River series.

After the examination of a very large series of this frog from many localities Mr. J. J. Fletcher[7] says of its colour varieties:—"Tasmanian examples show a fairly established differentiation into a spotted variety, with at least an incomplete dorsal stripe, and an unspotted variety without a dorsal stripe. In Victoria the differentiation seems to be fairly well established. In Western Australia there seems to be only the

[7] Fletcher—Proc. Linn. Soc. N. S. Wales, xxii., 1897, p. 675.

spotted variety, but in this the pattern has become more definite and accentuated, and the dorsal stripe more striking. In New South Wales we get commonly an unspotted variety, and more rarely a variegated but not satisfactorily spotted variety." It will appear from this that it is impossible to separate eastern and western examples on colour alone, and while it is equally evident that the presence of a dorsal stripe and spots in eastern examples must be regarded as characters likely to arise quite erratically, and which are not indicative of racial variation, yet in no eastern examples are there such accentuated or isolated spots as in western specimens, nor is the dorsal stripe so pronounced, and in the few cases where it does occur, it is generally incomplete.

I am indebted to Mr. E. A. Briggs, of the Australian Museum, for the only South Australian specimens I have seen. The four specimens were collected at Narracoorte, in South Australia, near the Victorian border. They all have very accentuated markings on the back, resembling in this respect the specimens from Bathurst, Central Western New South Wales. The markings however are in the form of irregular marmorations, thus differing from the very accentuated markings of var. *typica*, which are disposed in definite bands. In one specimen there is a faint, broken indication of a dorsal stripe. The under surfaces are densely reticulated with black. The back is granular and in one example there are a few flat warts. The toes are moderately webbed and fringed, and the fingers resemble those of var. *typica* in being pointed. There is no doubt however that South Australian specimens are much more closely allied to the eastern than the western form.

Mr. H. H. Scott, Curator of the Victoria Museum, Launceston, has recently forwarded to the Trustees four fine specimens from Tasmania. They are typically the eastern form, but have very prominent warts on the back which sometimes form short longitudinal ridges. The upper surfaces are dark purplish-brown and rather indistinctly variegated. In two specimens there is a faint indication of an interrupted dorsal stripe. The under surfaces are faintly and delicately spotted with brown or grey. The toes are but slightly webbed and fringed.

Short as is Dr. Peters' description[8] of *Limnodynastes (Platyplectrum) dumerilii*, there is sufficient to identify it with the eastern form. It is rather unfortunate that his name should have to be used however, as North Queensland examples, although showing close affinity to New South Wales specimens, are very different from the South Australian form described by him.

I am unable to refer to Keferstein's original description[9] of *Platyplectrum superciliare* and so do not know the locality of his type. But as his somewhat obscure figure[10] published later represents the eastern form I have included his name in the synonomy of var. *dumerilii*. Dr. Steindachner's fine figure[11] of *Heliorana grayi* leaves no doubt as to the form implied, and represents a much more typical eastern example.

Mr. Gerard Krefft mentioned[12] a frog by the name of *Limnodynastes bibronii*, giving no description or remarks, but appending the localities Adelaide and King George Sound. I am not aware of any other reference to this name and it is probably nothing more than a *lapsus calami* for *L. dumerilii*. This view is strengthened since Krefft knew and recognised *L. dumerilii* as distinct, but did not mention it in his list of species on this occasion.

In 1878 Dr. E. P. Ramsay exhibited[13] before the Linnean Society of New South Wales three specimens of a burrowing frog allied to *Limnodynastes dorsalis*, Gray, taken by Mr. James Ramsay, near Merool Creek, Lachlan District. After examining one of these specimens, two having apparently been lost since, together with two others from Yandenbah, Riverina, New South Wales, I have decided, as they are so distinct, to separate them under the varietal name of *interioris*.

[8] Peters—Monatsb. K. Preus. Akad. Wiss. Berlin, 1863, p. 235.
[9] Keferstein—Gottingen Nachrich., 1867, p. 346.
[10] Keferstein—Archiv. f. Naturg., xxxiv., 1868, p. 267, pl. v., fig. 7.
[11] Steindachner—Reise der "Novara," Amphibia, p. 32, pl. ii., figs. 11-14.
[12] Krefft—Cat. Nat. and Industrial Products N. S. Wales, Paris Exhibition, 1867, App. p. 107.
[13] Ramsay—Proc. Linn. Soc. N. S. Wales, ii., 1178, p. 73.

LIMNODYNASTES DORSALIS, *Gray*, VAR. INTERIORIS, *var. nov.*

(Plate iii, figs. 1, 1a, 1b, and 1c).

Size large, habit very stout. Head five-eighths as long as broad, the measurement taken at a line drawn between the hinder margins of the tympana. Vomerine teeth in two stout groups not extending out beyond the outer edge of the choanæ. In the type, the specimen figured, the vomerine teeth are exceptionally stout. Foot very broad; toes short, stout, with a very prominent fringe and with a well developed web which extends to the extremity of the first and almost to the extremity of the second toe; third, fourth, and fifth toes about one-third webbed. No outer metatarsal tubercle. Back smooth or with a leathery texture.

Colour (spirits).—Light brown above, with a few large brown markings, situated on the sides of the back. These markings border above a lighter brown band which starts behind the eyelid and continues to the groin. A very distinct brown band starts on the canthus and extends on to the side where it breaks up into a series of reticulations. Upper-lip brownish. A curved half-moon shaped yellowish axillary mark.

Total length of largest specimen (Type) ...	84 m.m.
Length of head to level of tympana	23 m.m.
Width of head	38 m.m.
Length of outstretched hind limb	102 m.m.

The distinguishing characters of this variety are:—

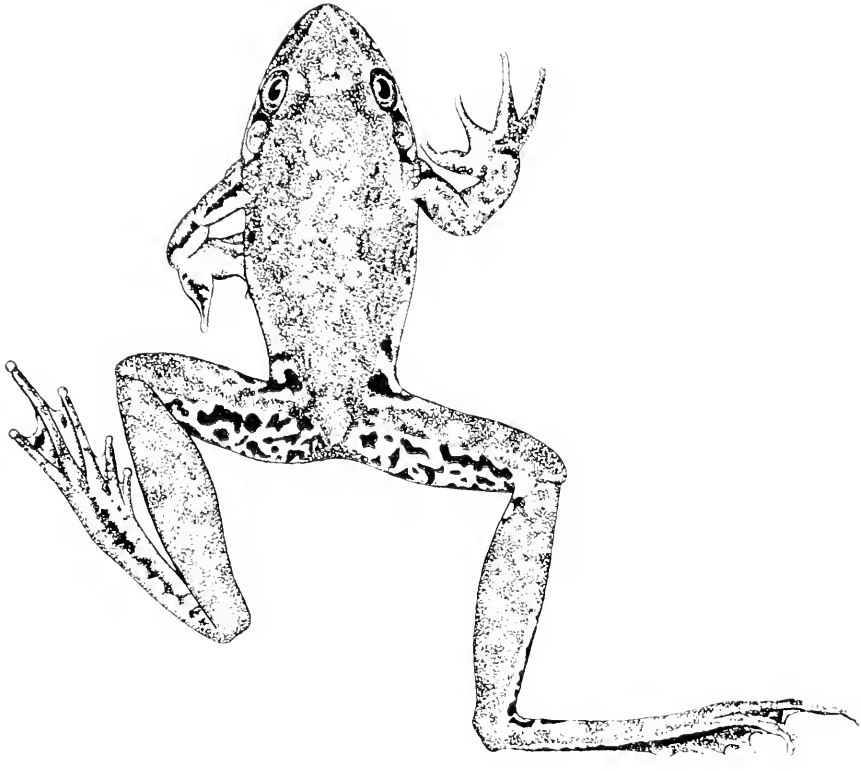
1. From *L. dorsalis* var. *typica* it differs in the broader head, stouter form and much larger size, the excessively webbed and fringed toes, the stout vomerine teeth, and the absence of a definite pattern of colour marking.
2. From *L. dorsalis* var. *dumerilii* it is also distinguished, though less definitely, by the greater extent of webbing and fringe to the toes, and the short, stout vomerine teeth. The head is broader and the peculiar axillary mark is absent in both var. *dumerilii* and var. *typica*.

Locs.—Four specimens are in the collection. The type was collected at Merool Creek, Riverina, New South Wales, by Mr. James Ramsay. Two other specimens almost as large, were collected by Mr. K. H. Bennett at Yandenbah, Riverina; a fourth, somewhat smaller specimen is unfortunately without data.

The above is a very distinct geographical variety and has very little in common with the typical form. Although approached by some examples of var. *dumerilii*, it is nevertheless constantly separated by the characters given above. It is worthy of note however, that the specimens of var. *dumerilii* which show the closest affinity to this form, occur on the Great Dividing Range in a region where the range may be said to be the eastern boundary of the Riverina District, and the habitat of var. *interioris*.

EXPLANATION OF PLATE 1.

Hyla latopalmata, Günther. Enlarged.



D. B. FEY, del.

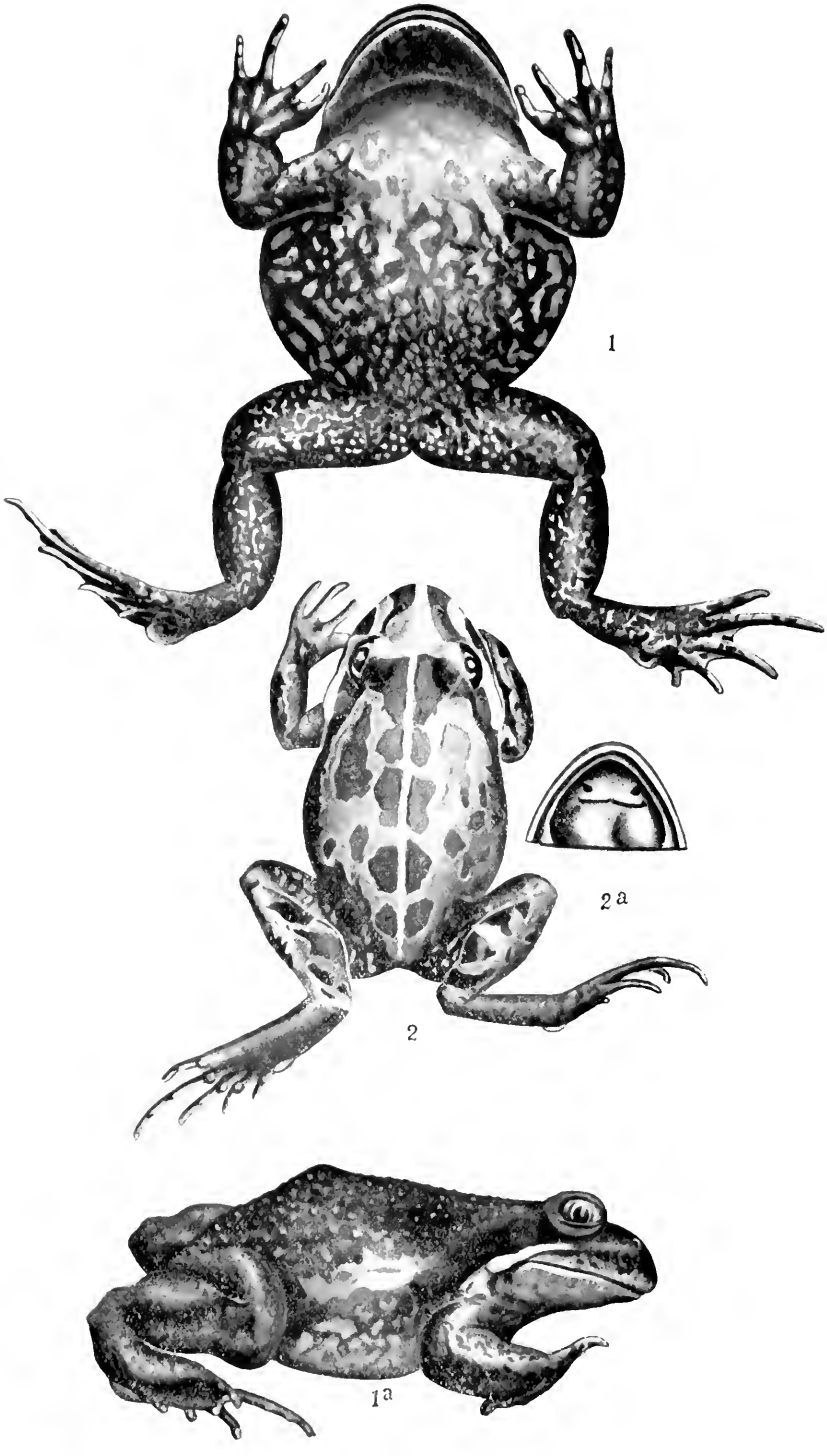
EXPLANATION OF PLATE II.

Fig. 1. *Limnodynastes dorsalis*, Gray, var. *duncani*, Peters. Blue Mountains, Central Tableland, New South Wales. Ventral view.

Fig. 1a. *Limnodynastes dorsalis*, Gray, var. *duncani*, Peters. Blue Mountains, Central Tableland, New South Wales. Side view.

Fig. 2. *Limnodynastes dorsalis*, Gray, var. *typica*. Western Australia. Dorsal view.

Fig. 2a. *Limnodynastes dorsalis*, Gray, var. *typica*. View of palate.



D. B. Fry, del.

EXPLANATION OF PLATE III.

Fig. 1. *Limnodynastes dorsalis*, Gray, var. *interioris*, Fry. From the type specimen, Merool Creek, Riverina, New South Wales. Dorsal view (reduced).

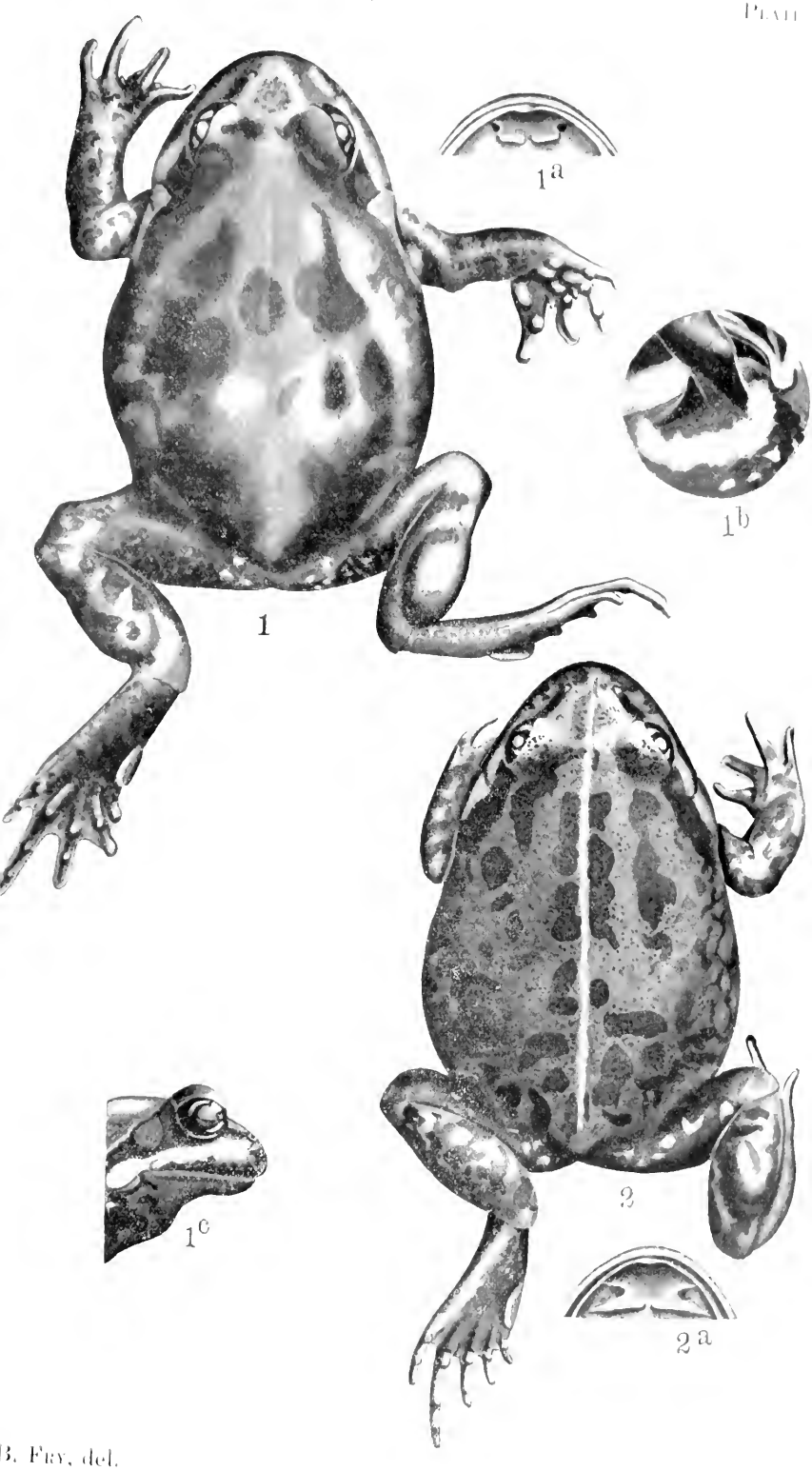
Fig. 1a. *Limnodynastes dorsalis*, Gray, var. *interioris*, Fry. From the type specimen. View of palate (reduced).

Fig. 1b. *Limnodynastes dorsalis*, Gray, var. *interioris*, Fry. From the type specimen. View of axilla, showing the curved white mark.

Fig. 1c. *Limnodynastes dorsalis*, Gray, var. *interioris*, Fry. From an unlocalised specimen. Side view of head (reduced).

Fig. 2. *Limnodynastes dorsalis*, Gray, var. *duncvilli*, Peters. Somerset, Cape York, Queensland. Dorsal view (reduced).

Fig. 2a. *Limnodynastes dorsalis*, Gray, var. *duncvilli*, Peters. Somerset, Cape York, Queensland. View of palate (reduced).



B. Fry, del.

A VERY REMARKABLE SPECIES OF *SPONGOPHYLLUM* FROM THE UPPER SILURIAN ROCKS OF NEW SOUTH WALES.

By R. Etheridge, June., Curator.

(Plates iv-vii.)

The subject of the present paper first came under my notice whilst engaged in a geological traverse of the Upper Silurian beds exposed in the course of the Yass River, between the town of the same name and the Devil's Punch-bowl, near the Yass-Murrumbidgee Rivers Junction. The specimens so obtained were subsequently augmented by additions made by Mr. A. J. Shearsby.

Genus Spongophyllum, *Edwards and Haime*, 1851[1]

(Polyp. Foss. Terr. Pal., 1851, p. 425.)

Spongophyllum enorme, *sp. nov.*

(Plates iv-vii.)

Sp. Chars.—Corallum compound, in the form of very large spreading masses with an uneven or undulating upper surface. Corallites very large, separating from one another on percussion, polygonal (quadrangular, pentagonal, or hexagonal), defined at the surface by grooves, and formed by a series of close-fitting invaginated cups, sometimes two and a half inches in diameter. Theca ill developed and often undefined. Calices funnel-shaped, moderately deep, flat bottomed, to some extent flattened around the peripheries, thence shelving inwards and downwards, average diameter one half to three quarters of an inch. Visceral chambers simply defined by the edges of inturned vesicular plates, and by successive repetition forming the general mass of each corallite. Septa numerous but weak, visible only as short laminæ around the edges of each calicular fossa passing for a brief distance on to the central, flat, tabulate area, and sometimes faintly continued over the funnel-shaped peripheral surfaces of the calices. Tabulæ incomplete, consisting of flat or slightly rolling close plates forming lenticular vesicles which pass insensibly into the general body of smaller vesicles forming the peripheral mass of each corallite.

[1] Emended Schlüter.

Obs.—The large size of the corallum in the first instance, and that of the corallites in the second renders this a conspicuous and striking coral. It is composed of a series of closely abutting polygonal corallites defined on a weathered surface by grooves which are not the external manifestation of corallite walls, but simply mark the boundaries of each corallite, and in some conditions of weathering become exsert. Notwithstanding this close contact the corallites are not firmly united laterally, but remain separate and distinct and on percussion fall apart.

Each corallite is composed of an outer or peripheral zone of superimposed small arched vesicles, which inwardly merge into highly inclined lenticular vesicles forming the sides of the calices and visceral chambers, passing more or less horizontally across the latter, the uppermost forming the bare central tabulate area. The constant repetition of this structure gives rise, in weathered specimens, to a series of irregularly invaginated cups, the largest corallite observed measuring two and a half inches in its longest diameter. Within the boundary grooves the surface of each corallite slopes slightly inwards to form a peripheral area around the central deeper portion, or calice proper, the whole assuming a more or less funnel-shaped appearance.

The weakly developed lamellar septa only extend for a comparatively short distance over the calice floors; the number of lamellæ is unknown.

The tabulæ proper, *i. e.* the floors within the visceral chambers are incomplete, they do not individually extend from side to side, but are formed by lenticular vesicles, and merge into those around the peripheries; this tabulate area is, as a rule from half to three quarters of an inch wide.

Thin sections prepared for the microscope reveal but little more than the features already described, it is, therefore, unnecessary to refer to these in detail. In the transverse section figured, it will be noticed that the short lamellar septa are not traceable on the vesicles surrounding the viseral chambers, and are only seen on the exterior of weathered specimens. Sections taken in both directions display the discontinuous development of the walls. In places there certainly appears to be a wall

proper (Pl. vii., fig. 2), yet again at the junction of contiguous corallites we see only the outer ends of the peripheral vesicles abutting against one another leaving a single dark line resembling a wall; or, the ends of the vesicles facing one another separated by a given space filled with stereoplasmic matter similar to that lining the general cavities of the coral. This deposit sometimes undergoes a further alteration into chalcedonic matter. In weathered examples the ends of the vesicles are visible without any covering whatever.

To neither of our described Australian species (*S. bipartitum*, and *S. gigauteum*) is this nearly related, the various parts are on a far larger scale and the development of the septal system is less. It was, at first, very doubtful whether or not to refer the coral to *Spongophyllum*, but no more available genus has presented itself. The only species in any way comparible with *S. enorme* in size is *S. knuthi*, Schlüter[2], but even here the differences are very marked. The vesicular structure closely resembles that of *Cuphyma*.

Loc.—Escarpment north-east of Boonoo Ponds Creek, Hatton's Corner, Yass River, near Yass (*R. Etheridge* and *A. J. Shearsby*).

Hor.—Boonoo Ponds Limestone, Upper Silurian. The limestone is the "coralline" or "fourth" limestone of Prof. T. W. E. David's Yass section[3] or immediately below the Hatton Corner (? Humewood) Limestone[4], the uppermost limestone bed of the Yass River series.

[2] Schlüter—Verhandl. Nat.-Vereines Preuss. Rheinl. Westf., xxxvii., 1881, pl. viii., figs. 1 and 2.

[3] David—Ann. Rept. Dept. Mines N. S. Wales, 1881 (1882), p. 148, map and sections.

[4] The "Coral-reef" of Jenkins—Proc. Linn. Soc. N. S. Wales, iii., 188, p. 26.

EXPLANATION OF PLATE IV.

Spongophyllum enorme, *Eth. fil.*

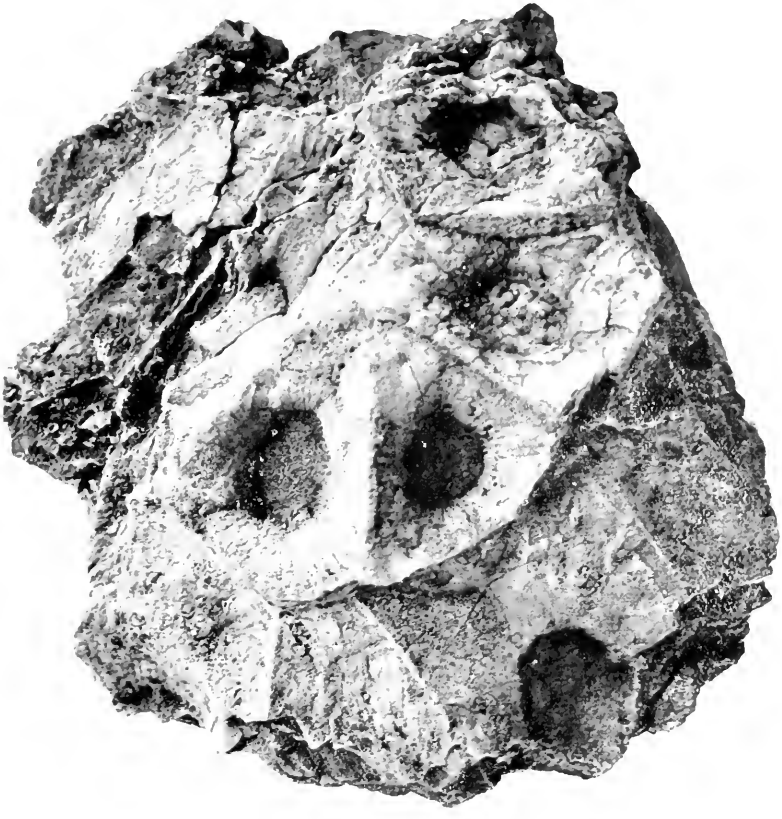
A large weathered specimen, seen from above. The closely fitting invaginated cups are distinctly visible. Reduced approximately one-third.

H. Barnes, Junr., photo,
Austr. Mus.

EXPLANATION OF PLATE V.

Spongophyllum enorme, *Eth. fil.*

A weathered but better preserved example than that shown in Plate iv. The corallites are more clearly defined and the septal lamellæ visible. Magnified approximately one-fourth.



BARNES, JUNR., photo,
Austr. Mus.

EXPLANATION OF PLATE VI.

Spongophyllum enorme, *Eth. fil.*

Three weathered corallites viewed laterally; that on the right is one of the largest corallites in the collection. Nat. size.

H. BARNES, JUNR., photo,
Austr. Mus.

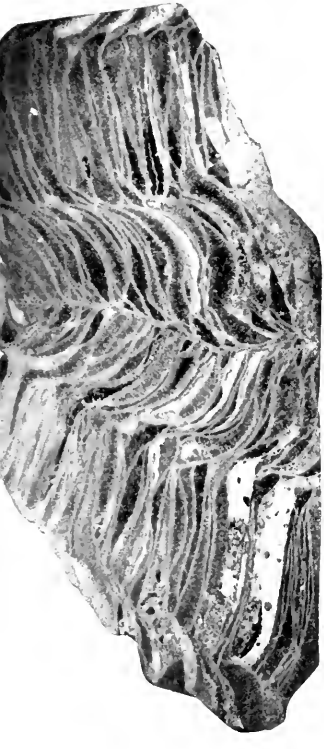
EXPLANATION OF PLATE VII.

Spongophyllum enorme, *Eth. jil.*

Fig. 1. Longitudinal section of portions of two corallites.—Magnified approximately one-third.

Fig. 2. Transverse section of portions of three corallites displaying their functions with one another, the central tabulate spaces, and peripheral vesicles.—Magnified approximately one-third.

Fig. 3. Transverse section of a single corallite, with the same magnification as that of Fig. 2.



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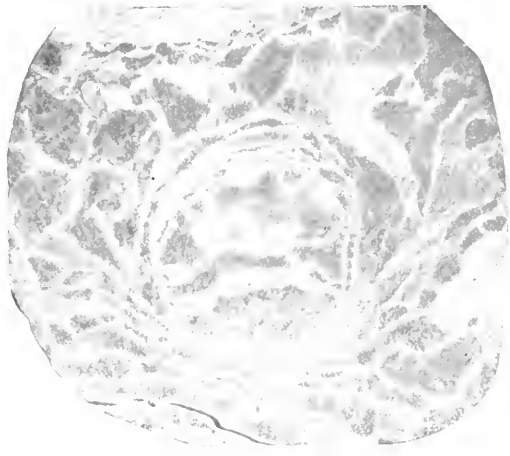

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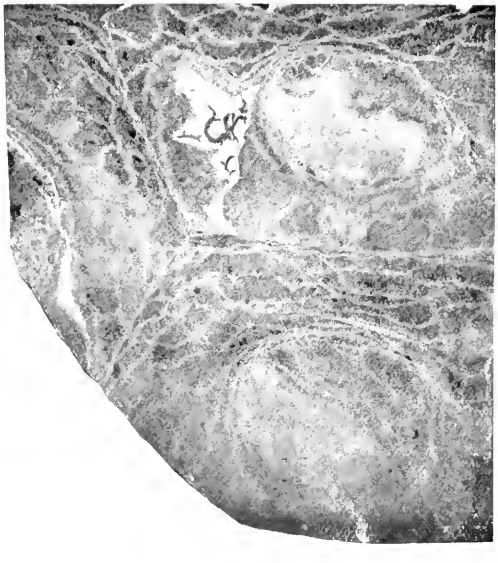

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H. Barnes, Junr., micro.-photo,
Austr. Mus.

ON THE EARLY HISTORY OF THE AUSTRALIAN CASSOWARY (*CASUARIUS AUSTRALIS*, Wall).

By Alfred J. North, C.M.Z.S., C.M.B.O.U., Ornithologist.

(Plates viii-ix.)

Casuarius australis was the only avi-faunal type secured during Kennedy's ill-fated expedition in 1848, from Rockingham Bay to Cape York, when so many valuable lives were lost. Singularly enough its early history is associated with the second, third and fourth Curators of the Australian Museum,[1] which was the first Institution to receive a specimen.

For my purpose it will be necessary to transcribe the following extracts relating to *Casuarius australis*.

The existence of a Cassowary inhabiting Australia was first made known in 1849 by the late Mr. Wm. Carron, Botanist to the Kennedy Expedition, who remarks in his "Narrative"[1a] November 4th (1848):—"This morning Jackey went to examine a scrub through which we wanted to pass, and while out, shot a fine Cassowary; it was very dark and heavy, not so long in the leg as the common Emu, and had a larger body, shorter neck, with a large red, stiff, horny comb on its head; Mr. Wall skinned it, but from the many difficulties with which he had to contend, the skin was spoiled before it could be properly preserved."

Referring to this specimen the following is the gist of Gould's remarks in his "Handbook to the Birds of Australia"[2] under the name of *Casuarius australis*, Wall. "All that we at present know on the subject is comprised in the following extract from the 'Illustrated Sydney Herald' of the 3rd June,

[1]—The first Curator of the Australian Museum, 1838-45 was the Rev. William Branthwaite Clarke, M.A., the "Father of Australian Geology," Rector of St Thomas Church of England, North Sydney, 1846-70 and Elective Trustee of the Australian Museum, 1853-74. (R.E.)

[1a] Carron—Narrative of an Expedition undertaken under the direction of the late Mr. Assistant Surveyor E. B. Kennedy for the Exploration of the Country lying between Rockingham Bay and Cape York, 1849, p. 64.

[2] Gould—Handbook Bds. Austr., 1865, ii., p. 206.

1854.—A specimen of this bird was procured by the late Mr. Thomas Wall, Naturalist to the Expedition commanded by Mr. Kennedy. It was shot near Cape York in one of those almost inaccessible gullies on that part of the Australian continent. This Cassowary when erect stands about five feet high; the head is without feathers, but covered with a blue skin and like the Emu, is almost without wings, having mere rudiments, the body is thickly covered with dark brown wiry feathers; on the head is a large prominence or helmet of a bright red colour, and to the neck are attached, like bells six or eight round fleshy balls of bright blue and scarlet which gives the bird a very beautiful appearance. The first and indeed, the only specimen obtained of the Australian Cassowary was unfortunately left at Weymouth Bay, and has not been recovered. Mr. Wall being most anxious for its preservation had secured it in a canvass bag, and carried it with him to the spot where it was unfortunately lost. In the ravine where the bird was killed, as well as other deep and stony valleys of that neighbourhood, it was seen running in companies of seven or eight. On that part of the north-eastern coast therefore it is probably plentiful, and will be met with in all the deep gullies at the base of high hills. The flesh was eaten and found to be delicious; a single leg afforded more substantial food than ten or twelve hungry men could dispose of at a single meal. The bird possesses great strength in its legs and makes use of it in the same manner as the Emu. Its whole build is more strong and heavy than the latter bird. It is very wary but its presence may be easily identified by its utterance of a peculiarly loud note, which is taken up and echoed along the gullies; and it could be easily killed with a rifle.

The above account was furnished by Mr. Thomas Wall's brother, Mr. William Sheridan Wall (the second) Curator of the Australian Museum."

Gould had previously supplied virtually the same information to the Zoological Society of London, and it was published in the "Proceedings" for 1857 (p. 271).

According to Dr. P. L. Sclater at a meeting of the Zoological Society of London, held on the 28th February, 1867, the Secretary (Mr. now Dr. P. L. Sclater) read the following extracts from a letter addressed by Dr. (afterwards Baron) F.

von Mueller, of Melbourne, to a newspaper, "The Australasian," of the 15th December, 1866, giving further particulars as to the Cassowary of Australia:—"For the intelligence of the existence of an Australian true Cassowary, and for the means of defining preliminarily its specific characters, I am indebted to G. Randall Johnson, Esq. who in September last, while on a visit to Rockingham Bay, shot in the Gowrie Creek scrub, the only specimen of this remarkable bird as yet obtained, and whose name I wish it should bear; and I cannot do better than to give in the first instance publicity to the lucid remarks transmitted to me by that gentleman." Here follows Mr. Johnson's, not Dr. Mueller's, description of the bird, and for which Mueller has in so many instances been placed as the authority for the description of *Casuarius johnsoni*, instead of only suggesting a specific name to Mr. Johnson's description. "In referring to this letter Mr. Sclater called attention to the communication he had made on the same subject to the meeting on December 13th, 1866[3] and remarked that the bird was, no doubt, the *Casuarius australis*, Gould."

At the meeting of the Zoological Society held on the 9th May of the same year[4] "A letter was read from Dr. G. Bennett, F.Z.S. (Trustee of the Australian Museum) dated 21st February, and addressed to the Secretary, in which details were given respecting the re-discovery of *Casuarius australis* in Queensland, and photographs were enclosed of a specimen of this bird recently received by the Sydney Museum. Dr. Bennett's communication enclosed a copy of the following letter, addressed to the Editor of the 'Sydney (Morning) Herald' by Mr. W. Carron, one of the three survivors of Kennedy's Expedition, during which the original example of *Casuarius australis* had been procured:—

"Botanic Gardens, Sydney,
8th February, 1867.

"Sir—In the 'Herald' of to-day is a letter from Mr. G. Krefft of the Sydney Museum, giving the description of a Cassowary lately obtained by Mr. G. Randall Johnson at Rockingham Bay, and also alluding to one shot by Mr. Thomas

[3] Sclater—Proc. Zool. Soc., 1866, p. 557.

[4] Bennett—Proc. Zool. Soc., 1867, p. 473.

Wall while on the expedition to Cape York with the late Mr. E. B. Kennedy.

"I have just seen the bird sent to the Museum by Mr. Johnson, and I think it is identical with that shot by Mr. Wall in the vicinity of Weymouth Bay, in November, 1848; but the description given of the latter as quoted from Gould's work on 'Australian Birds' is not correct. I am aware that in the few remarks on Wall's bird, which appear in my narrative of Kennedy's expedition, there is an error as to the colour of its helmet or comb, which was *black* not *red* (the redness referred to the wattles) an error which I have before corrected. As I was present when Wall's bird was shot, and helped to eat it, I had a good opportunity of knowing something about it. Instead of going in flocks of five or six together, it is certainly a solitary bird, and would appear to be very scarce, as only two others were seen by our party during the whole journey from Rockingham Bay to my furthest camp at Weymouth Bay in latitude 12° 25'S. This bird had shorter but larger legs, heavier body, and shorter neck than the Emu, the colour very dark, its habits, too, being unlike those of the Emu. It appears to confine itself to the gullies in the thick jungles with the Brush-Turkeys and Jungle Fowl, feeding on the various fruits found there, even swallowing the large seeds of *Castanospermum* and *Pandanus*. Mr. Wall took every care of the skin he was able to do; but it was completely destroyed before he died, together with my own specimens at Weymouth Bay. This bird was certainly very large, and furnished our whole party with a better supper and breakfast than we had enjoyed for some months, or than poor Wall was destined to enjoy again (as he and all his companions, with the exception of myself and one other, had died in six weeks after from want of food); but there was not one in the party who would not have eaten more if he could have got it, every meal being divided with the greatest nicety, and having been so for a long time.

"I am, Sir, yours etc.,

W. Carron."

At the same meeting, and recorded only a few pages farther on, Mr. Gerard Krefft, the third Curator of the Australian Museum, remarks[5]:—"The existence of a species of Cassowary

[5] Krefft—Proc. Zool. Soc., 1867.

in the northern part of Australia has been known for many years, from native ornaments in which Cassowary feathers form a part, and from the report of the survivors of Kennedy's Expedition, who state they actually shot one of these birds. Mr. W. S. Wall, late Curator of this Museum, has even gone so far as to give a very brief description in a defunct Sydney newspaper, published in June 1854. Gould has quoted this description in his 'Handbook on the Birds of Australia,' accepting the name proposed by Wall, of *Casuarius australis*, though Wall's description (?) was founded on nothing more than the remarks of one of Kennedy's men, that they had shot a bird unlike an Emu with wiry feathers and a top-knot or helmet."

"The brief account which Wall gives us is as follows:—'The body thickly covered with dark-brown wiry feathers; on the head is a large prominence or helmet of a bright red colour, and to the neck are attached like bells six or eight round fleshy balls of bright blue and scarlet.'" Mr. Carron who gave some notes to Wall about this bird, has assured me that this specimen had no red helmet, that its plumage was not brown, but black, and that it was not true that twelve hungry men made a meal off a single leg, and had enough and some to spare. So much therefore for this very vague account quoted by Mr. Gould.

"The Cassowary which I am now about to describe was presented to the Australian Museum by Mr. G. Randall Johnson, who informs me that it was shot by him when on a visit to Messrs. Scott and Co's. Herbert Station, in the Gowrie Creek Scrub, near Rockingham Bay. Mr. Johnson has furnished me with a description of the appearance of the fleshy part of of the neck in the living bird, and is anxious to see some former statements made by him through Dr. Ferd. Mueller, corrected; and as the newspaper account given by Dr. Mueller will probably be quoted by other writers, I call the attention of the Fellows of this Society to the fact that it contains many inaccuracies.

"When announcing the discovery of a Cassowary, Dr. Mueller suggested that, if new, it should be named in honour of the discoverer; and acting upon this suggestion I beg to propose the name of *Casuarius Johnsoni* for it." Here follows Krefft's description of the bird described under this name.

Let us now revert to the original description of *Casuarius johnsoni*, published in "The Australasian" and subsequently in the "Proceedings of the Zoological Society of London." It will be noted that Dr. Mueller, even then widely known for his high scientific attainments, whether intentionally or not, omits to make any reference to Mr. W. S. Wall's description of a similar bird, thirteen years before, under the name of *Casuarius australis*, in the "Illustrated Sydney News" of 3rd June, 1854, and which Gould had transcribed into his "Handbook to the Birds of Australia" published in 1865[6]. Moreover, Carron had so far back as 1849 made reference to a Cassowary from Northern Queensland in his "Narrative of Kennedy's Expedition from Rockingham Bay to Cape York."

At a meeting of the Zoological Society of London, held on the 11th June, 1868[7] "Dr. (then Mr.) P. L. Sclater, exhibited a very fine and perfect skin of the Australian Cassowary (*Casuarius australis*), which had been transmitted to him by Mr. Charles J. Scott, of Queensland, and was believed to be the first example of this bird that had reached Europe.

"The present specimen of the Australian Cassowary had been shot in the beginning of November last by Mr. Henry Stone, overseer to Messrs. Scott Brothers & Co., at their station in the Vale of Herbert, in the same scrub from which the specimen described by Mr. Krefft in the Society's 'Proceedings' for 1867 (p. 482) had been procured."

The late Baron von Mueller, although of world-wide fame as a Botanist, was not an Ornithologist, and it is remarkable that being in the same city he did not submit Mr. Johnson's description to the late Sir Frederick McCoy, the eminent Director of the National Museum, Melbourne, and a high authority on the Australian avi-fauna. This is more extraordinary seeing that both Dr. Mueller and Professor McCoy were members of the Council of the Acclimatisation Society of Victoria, and their names among others appear next one another as having attended the usual weekly meeting on Tuesday, 11th December, 1866, only four days before Dr. Mueller

[6] Gould—Handbk. Bds. Austr., ii., 1865, p. 206.

[7] Proc. Zool. Soc., 1868, p. 376.

sent Mr. Johnson's description of the Cassowary to "The Australasian."[8] Moreover, the latter is followed by a paper by Professor McCoy, entitled: "On a new Victorian species of Diamond-bird," *Pardalotus xanthopygæ (xanthopygius)*. Professor McCoy could have told Dr. Mueller at once that the bird had been already described, and thus prevented the creation of a synonym. On referring to "The Australasian" of December 29th, 1866, not the 15th December as recorded by Gould, Salvadori, Rothschild and others, I find Dr. Mueller's letter on page 1221 under the heading "Discovery of a True Cassowary in North-east Australia." It consists of a letter over a column in length, and clearly shows that Dr. Mueller did not wish to appropriate the credit of Mr. Johnson's description, for the latter, placed between inverted commas, is wedged in the middle of Dr. Mueller's remarks, from which the following extracts are made. "From these notes and a sketch simultaneously received it is obvious that *Casuarius Johnsonii* must rank as a separate species. The size of the bird may be the same as that of the Indian *Casuarius galeatus* . . . . . Farther discrepancies between the two species will unquestionably be pointed out by our learned professor of natural history, whenever that solitary specimen, which I intend to present to the Melbourne Zoological Museum shall have arrived." It was destined, however, never to reach Melbourne, nor Dr. Mueller to even see this specimen, for in "The Sydney Morning Herald," February 8th, 1867, p. 3, Mr. G. Krefft refers to the same specimen under the title of "The new Casuary—Casuarius Johnsonii," and among others, makes the following remarks:—"In the last December number of 'The Australasian,' Dr. Mueller announced the discovery of a new Casuary, which Mr. G. Randall Johnson shot at Gowrie Creek, Rockingham Bay. The excellent description by the discoverer, which Dr. Mueller quotes in his letter enabled me to see at once that this could not be the Casuary mentioned by the late Mr. T. Wall. . . . . .

"The discoverer has presented this interesting novelty to the Trustees of the Australian Museum, on whose behalf I beg to thank Mr. Johnson for his valuable gift.

[8] "The Australasian," Dec. 15th, 1866, p. 1170.

"The bird will be set up at once, and I hope to find a corner for it in the now overcrowded Museum."

Krefft's version of Wall's original description of the first Australian Cassowary obtained is somewhat misleading for he quotes only a part of what the latter really did record in the 'Sydney Illustrated News' (not "Herald" as has so persistently been used by every writer giving a reference to the original description, from Gould downwards), of Saturday, June 3rd, 1854, p. 88. As to Krefft's statement that Wall's description of *Casuarius australis* was published in "a (now) defunct Sydney newspaper" let me here quote a letter received by me from Mr. H. Wright, then Acting Principal Librarian of the Public Library of New South Wales, under date, 26th April, 1911:—"In reply to your letter of yesterday's date, I beg to inform you that 'The Illustrated Sydney News' was first issued in October, 1853, and the last issue is dated February, 1894."

On turning up the original description of *Casuarius australis*, at the Public Library, Sydney, published nearly fifty-nine years ago, I was astonished to find that Wall accompanied his description of *Casuarius australis*, with unmistakable figures (wood-cuts) of a Cassowary, one bird standing up, the other crouched down. This fact has not been previously recorded. Following on after his description is this paragraph:—"The above discovery of the Australian Cassowary, was together with the description taken from rough sketches and notes belonging to the late Mr. Thomas Wall, the discoverer of the bird, and kindly forwarded by his brother, Mr. William Sheriden Wall, Curator of the Australian Museum."

Little knowledge can be gained from the "Australian Museum Report" for 1867, of the type of *Casuarius johnsoni*, beyond the fact that Mr. Johnson presented the specimen in that year, but in the minutes of the Board Meeting of the Trustees for February, 1867, the Curator has found that it was received during the previous month. No Registers were kept in these days, neither has any communication from Mr. Johnson been preserved respecting it. The accompanying figure has been reproduced from the original photograph of the type taken by the late Mr. Henry Barnes, and which is still in the Museum.

Count Salvadori in the "Catalogue of Birds in the British Museum"[9] in referring to *Cyclopsitta macleayana* described by Dr. E. P. Ramsay in the "Sydney Morning Herald" remarks:—"According to the rule followed in the Zoological Catalogues of the British Museum, right to priority cannot be claimed for specific names published in newspapers." In the present instance, however, Wall's name of *Casuarius australis*, was made good by Gould in his "Handbook to the Birds of Australia," and that of *C. johnsoni* (a synonym of the former) suggested by Mueller, properly described later on by Krefft in the "Proceedings of the Zoological Society."

Dr. E. P. Ramsay, the fourth Curator, in addition to writing the most perfect life history of this species, was also the first to make us acquainted with its eggs, and young and immature birds in the "Proceedings of the Zoological Society of London," in 1874-6. Read in conjunction with what has been put together by Gould in his "Supplement" to the "Birds of Australia" in 1869 where *Casuarius australis*, is beautifully figured from the specimen sent by Mr. Scott to Dr. Sclater, little has subsequently been added to our store of knowledge.

Finally, Carron's "Narrative of Kennedy's Expedition," printed by Kemp & Fairfax, Lower George Street, Sydney, in 1849, within a year of Carron being placed, in an exhausted state, on the "Ariel" and which left Weymouth Bay for Sydney on Sunday, 31st December, 1848, but Kennedy's papers, after his death, were secreted by Jackey Jackey in a hollow tree and were not recovered by the latter until the 11th or 12th May, 1849. Carron's pathetic story, has never had an equal, in the annals of Australian exploration, for of the thirteen persons who left Sydney on the 29th April, 1848, death at the hands of the Cape York aboriginals, and disease, left only Carron, Goddard and Jackey Jackey of the expedition to return and tell the tale.

Nearly seven years ago[10] when writing on Gilbert, with the kind permission of the Rev. W. I. Carr-Smith, I had the privilege of figuring the mural tablet erected to his memory

[9] Salvadori—Cat. Bds. Brit. Mus., xx., 1891, p. 95.

[10] North—Rec. Austr. Mus., vi., 1906, p. 128, pl. xxvii.

by the colonists of New South Wales in the historic S. James Church of England, Sydney, built in Governor Macquarie's time in 1820. I am now able to supplement this through the courtesy of the present Rector, the Rev. W. F. Wentworth Sheilds, M.A., with the tablet next to Gilbert's, erected by the Executive Government to the memory of Kennedy, who was killed by the natives, and those who perished on the same expedition. In contradistinction to the Gilbert memorial tablet of which the tent, tree, and recumbent figure of Gilbert are in fairly high relief, the figures in the Kennedy mural tablet are in intaglio. It represents Kennedy, recently speared by the natives, dying in the arms of the faithful Jackey Jackey, while in the background are several hostile savages brandishing their weapons.

EXPLANATION OF PLATE VIII.

Australian Cassowary.

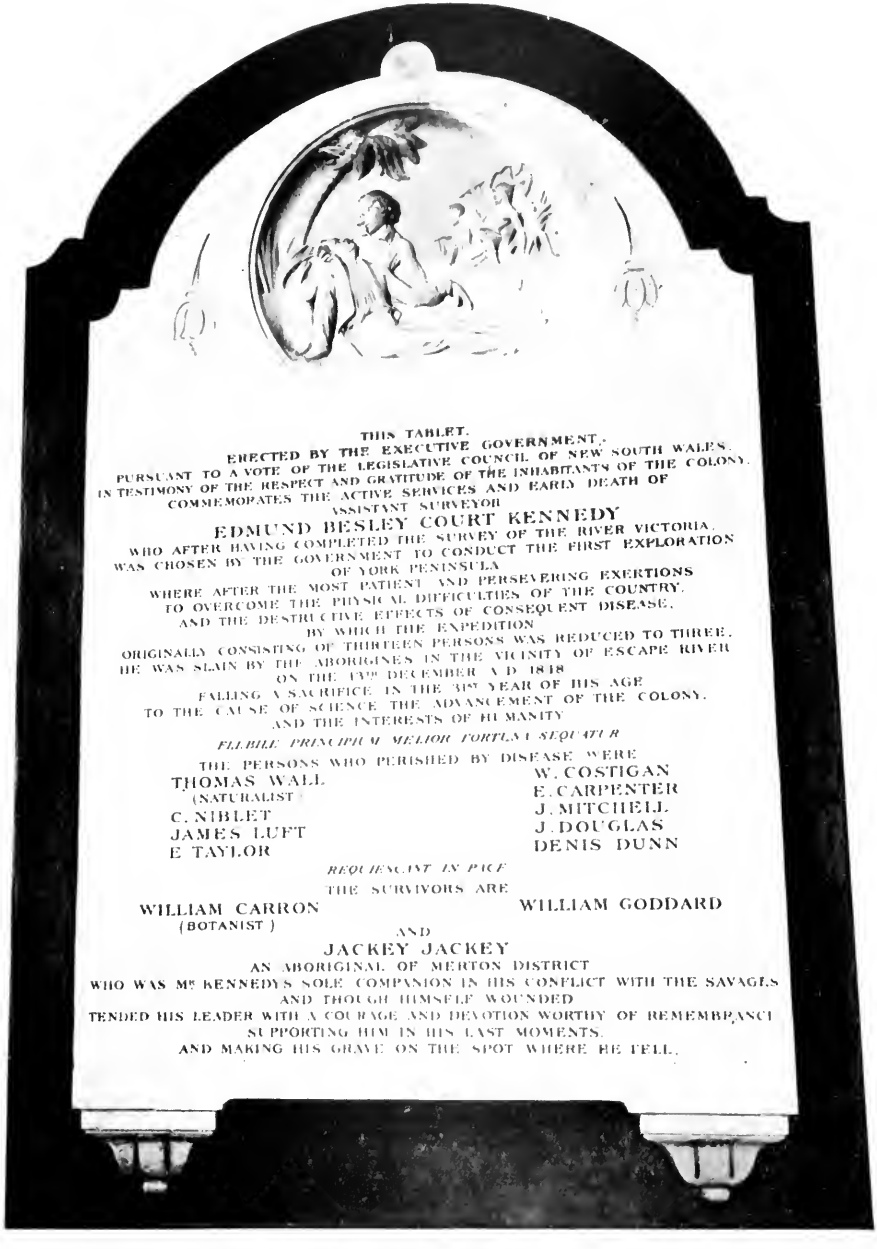
CASUARIUS AUSTRALIS, *Wall.*

Reproduced from the original photograph of the type taken by the late Mr. Henry Barnes.

H. BARNES, photo.,
Austr. Mus.

EXPLANATION OF PLATE IX.

Mural Tablet in S. James Church of England, Sydney, erected by the Executive Government of New South Wales in memory of Edward Besley Court Kennedy and his nine companions, who perished during the first exploration of Cape York Peninsula, North Queensland.



A. J. NORTH, photo.,
Austr. Mus.

DESCRIPTION AND ANALYSIS OF THE BINDA METEORITE.

By C. Anderson, M.A., D.Sc. (Edin.), Mineralogist, Australian Museum, and J.C.H. Mingaye, F.I.C., Analyst and Assayer to the Department of Mines of New South Wales.

(Plates x-xiii.)

History.—This Aerolite fell, probably, on the night of Saturday, 25th May, 1912. On that date a meteor was seen passing over Goulburn and Crookwell, travelling N.E. to S.W. Observers report that the luminous phenomenon was accompanied by a loud noise, a Crookwell resident taking it for the sound of an aeroplane overhead. The meteorite was discovered on 5th June by Alick McCormack on Mr. Fraser's property four miles from Binda (Lat. 34° 18′ S, Long. 149° 25′ E); it is not absolutely certain that the stone found is actually that seen in flight on 25th May, but circumstantial evidence is strongly in favour of this being the case. McCormack was engaged in rabbit trapping, and noticed what he at first took for a newly formed rabbit burrow; on tracing the furrow to its termination he found the meteorite partly embedded in the ground. We may conclude, therefore, that the stone had fallen quite recently, a conclusion strengthened by examination of the meteorite itself, which is in a perfectly fresh condition. The meteorite subsequently passed into the custody of Mrs. A. Gilmartin, proprietress and editress of the "Argyle Liberal" newspaper at Crookwell: it was on exhibition for some time at the office of that paper, and there, unfortunately, it was broken into two pieces, one of which, weighing 5lbs 13½ozs., was presented to the Trustees by Mrs. Gilmartin, the other, weighing 4lbs 6½ozs, being presented to the Technological Museum, Sydney, by the finder. The meteorite is stated to have weighed 12lbs originally, so that about 2lbs weight is unaccounted for.

For the preceding details we are indebted to Mr. James McCormack, whose son discovered the meteorite, to Constable Donnelly, who made enquiries for us at Crookwell, and to Mrs. Gilmartin, in whose paper, the "Argyle Liberal," of 14th June, an account of the find was published.

Physical Characters.—The portion in the Australian Museum collection is represented in Pls. x-xiii; that in the Technological Museum, which was kindly lent to us by Mr. R. T. Baker, Curator, differs in no essential particular from the first. Externally the stone is covered with a fused black crust, which shows distinct lines of flow radiating from the point marked with a cross in Pls. x.-xi. This was evidently the forwardly directed surface of the stone during its flight, or just prior to its reaching the ground. The crust is in two layers, the upper, secondary crust brilliant black and of varying thickness; it is marked by striations due to flow, and by anastomosing and dendritic ridges of fused matter. This outer skin can be peeled off, exposing the second layer, the primary crust, which is dull black and not detachable from the body of the meteorite. The portion of the front surface, between A and B (Pl. x.), is not smooth and rounded like the remainder, but shows a number of "thumb marks," or piezoglyphs, and the dendritic ridges are strongly marked in the hollows; we may suppose that a fracture took place at this part just before the stone came to rest, so that the roughnesses had not become smoothed off by atmospheric friction before the flight came to an end. The two crusts are of no great thickness on the front, the white felspar showing through in places. The posterior surface of the meteorite (Pls. xii.-xiii.) differs considerably in appearance from the front. The upper shining crust is thicker but less regular, and is pitted with numerous small, crater-like depressions, which represent burst bubbles; here and there a rounded unbroken bubble may be seen. This appearance doubtless results from the spattering which took place when the fused substance, flowing backwards, reached the cooler surface in the lee of the moving body. Between C and D (Pl. xii.) a considerable area of the underlying primary crust is exposed, with an island of the secondary crust a little above D. In the top left corner of Pl. xiii. is seen a sort of cascade, formed by the fused matter pouring over the edge.

A fractured surface is in the main ash coloured, with white patches of anorthite and black shining specks of chromite. The pyroxene is light brown in colour; before the blowpipe it is practically infusible, but becomes distinctly magnetic, therefore, it is probably hypersthene bordering on bronzite. Metallic specks are few and inconspicuous. The texture is medium grained.

The two portions measure respectively $6\frac{1}{2}$ inches $\times$ 7 inches $\times$ 3 inches (front to back) and $6\frac{1}{2}$ inches $\times$ $5\frac{1}{2}$ inches $\times$ 3 inches (Technological Museum portion).

The specific gravity is 3.25.

Microscopic Characters.—The stone is rather friable, and the section prepared is unduly thick. The only constituents identifiable under the microscope are anorthite, hypersthene, chromite and specks of nickel-iron. The structure is holocrystalline; there is no sign of chondrules.

Chemical characters.—Analysis yielded the following figures:

	%
H_2O (110°C)	0.10
H_2O (110°C+)	nil.
SiO_2	50.50
Al_2O_3	8.84
FeO	15.29
Fe	0.45
FeS	.96
MnO	.51
Cr_2O_3	.75
CaO	6.15
MgO	16.15
BaO	absent
SrO	absent
Na_2O	0.28
K_2O	0.13
NiO)	
CoO)	absent
CuO	minute trace
V_2O_3	0.01
CO_2	absent
P_2O_5	0.03
Cl	absent
SO_3	absent
F	absent
C	0.07
	100.22

56.7860 grams of the finely crushed material passed through a fine sieve yielded .0384 grams of metal, = .067%. A qualitative examination of the metal showed it to consist of metallic iron with a very small amount of nickel. No phosphorus was detected, but may be present, as the quantity of metal treated was probably too small to permit of its detection. The absence of uranium oxide and tin oxide was proved. On treatment of the fine powder for one hour with a boiling solution of pure copper sulphate, .45% of iron was dissolved, which would represent fine particles of the metal which had passed through the sieve. The absence of oxidation products proves that the meteorite is of recent fall.

The "norm" calculated from the percentage composition on the lines laid down by Farrington[1] is as under :—

	%
Orthoclase	0.56
Albite	2.62
Anorthite	22.52
Diopside	6.58
Hypersthene	64.76
Olivine	0.48
Chromite	1.12
Troilite	0.96
Nickel-iron	0.45
	100.05

This no doubt approximates pretty closely to the actual mineral composition, which is relatively simple, but some re-adjustment may be necessary between the felspar and pyroxene molecules.

Systematic position.—According to Farrington's classification and nomenclature the Binda stone falls into Class IV. with the Mässing, Petersburg, Peramiho and Stannern Meteorites, and would be described as dofemic, persilicic, perpolic, perpyric, permirlic, domiric, magnesiferrous. In Brezina's classification[2] it takes its place in the Eukrite division of the Achondrites.

[1] Farrington—Field. Mus. Publication 151, Geol. Ser., iii., 9, 1911.

[2] Ward—Cat. Ward-Coonley Coll. Meteorites, Chicago, 1904, p. 97; Brezina—Proc. Amer. Phil. Soc., xliii., 1904, p. 233.

A CATALOGUE AND BIBLIOGRAPHY OF AUSTRALIAN METEORITES,

With Census and Taxonomy.

By C. Anderson, M.A., D.Sc. (Edin.), Mineralogist.

I.—Catalogue.

In 1897 Dr. T. Cooksey, at that time Mineralogist to the Australian Museum, published a Catalogue and Bibliography of Australian Meteorites.[1] Since that date the number of meteorite falls recorded from Australia has doubled and the literature has increased proportionately, therefore, the present occasion has been utilised to bring the record up to date. The general plan adopted by Cooksey has been followed in this revision, the chief departure being in the method of entering the references to published papers, which are numbered consecutively and referred to by number under each meteorite. An attempt has been made to indicate where the main mass of each fall is now deposited, but here great accuracy cannot be claimed as changes take place from time to time. Those who desire more detailed information regarding the distribution of Australian Meteorites in collections must consult the various published catalogues.[2]

[1] Cooksey—Rec. Austr. Mus., iii., 1897-9, p. 51-62, 90, 130-1.

[2] Fletcher (British Museum)—An Introduction to the Study of Meteorites. Brit. Mus. Guide, 1908.

Klein (Berlin Museum)—Sitz. Akad. Berlin, 1904, p. 114-153.

Berwerth (Hofmuseum, Vienna)—Ann. k.k. Naturhist. Hofmus. Wien., xviii., 1903, p. 1-90.

Cohen (Greifswald)—Mitt. naturw. Ver. Neuvorpommern u. Rügen, xxxvi., 1904, p. 1-34.

Farrington (Field Mus., Chicago)—Field Mus. Publication, 77, Geol. Ser. ii., 1903, p. 79-124.

Ward (Ward-Coonley, Rochester)—Catalogue, Chicago, 1904.

Tassin (U.S. National Museum)—Rep. U.S. Nat. Mus., 1902, pp. 671-698.

ABEL CRANBOURNE NO. 2, *q.v.*

ARLTUNGA.

Type—Siderite.
Weight—40lbs.
Loc.—Two miles south of Government Cyanide Works, Arltunga (Lat. 23° 30′S, Long. 134° 40′E, about), South Australia.
Finder and date—Dan Pedler, about 1908.
Coll.—South Australian Museum, Adelaide.
Ref.—**82.**

BALLINOO.

Type—Siderite. Finest octahedrite, *Off.*
Weight—93lbs.
Loc.—Ten miles south of Ballinoo (Lat. 23° 30′S, Long. 116° 30′E), Murchison River, Western Australia.
Finder and date—George Denmack, 1892.
Coll.—Ward-Coonley, Rochester, U.S.A.
Ref.—**10,** p. 63, **11,** pp. 221, 228, 242, Pl. v., fig. 41, **24, 26,** p. 391, **28,** p. 85, **59, 87, 88,** pp. xi., 4, 101.

BARRABA.

Type—Siderite.
Weight—About 3lbs.
Loc.—Near Barraba (Lat. 30° 22′S, Long. 150° 36′E), New South Wales (exact locality unknown).
Finder and date—
Coll.—Mining and Geological Museum, Sydney; H. M. Porter, Torrington, New South Wales; Hofmuseum, Vienna.
Ref.—**63.**

BARRATTA NO. 1, or DENILIQUIN.

Type—Aerolite. Brecciated grey chondrite, *Cgb* (Brezina); black chondrite, *Cs* (Klein); intermediate chondrite, *Ci* (Farrington).
Weight—145lbs.
Loc.—Barratta Station (Lat. 35° 5′S, Long. 141° 36′E), thirty-five miles north-west of Deniliquin, New South Wales.
Finder and date—[illegible] Twyne, 1852.
Coll.—Australian Museum, Sydney.
Ref.—**1a, 9,** pp. 252, 301, **11,** pp. 220, 225, 229, 232, 236, **28,** pp. 81, 85, Pl. xxxi., **33,** p. 264, **35,** pp. 448-449, **47,** p. 143, **49, 50, 55,** pp. 207-217, **88,** pp. ix., xi., 35, 99.

BARRATTA NO. 2.

Type—As No. 1.
Weight—31lbs.
Loc.—Near No. 1.
Finder and date—
Coll.—Australian Museum, Sydney.
Ref. **54, 57, 70.**

BARRATTA NO. 3.

Type—As No. 1.
Weight—48lbs.
Loc.—Near No. 1.
Finder and date—
Coll.—Australian Museum, Sydney.
Ref.—**54, 57, 70.**

BARRATTA NO. 4.

Type—As No. 1.
Weight—175lbs.
Loc.—Near No. 1.
Coll.—Ward-Coonley, Rochester, U.S.A.
Ref.—**88,** pp. ix., xi., 35, 99.

BEACONSFIELD.

Type—Siderite. Broad octahedrite, *Og* (Brezina); broadest octahedrite, *Ogg* (Klein).
Weight—75 kilos (= 165lbs. av.)
Loc.—About two miles east of Beaconsfield Station (Lat. 38° 31′S, Long. 145° 30′E), Co. Mornington, Victoria.
Finder and date— — Feltus.
Coll.—Krantz Mineralien-Contor, Bonn, Germany.
Ref.—**11,** p. 227, **22, 23,** pp. 485, 486, **25, 28,** p. 86, **32,** pp. 150-151, 152, **88,** p. 4, Pl. i., fig. 9.

BENDOCK.

Type—Siderolite.
Weight—Said to have weighed 60lbs originally.
Loc.—Seven miles from Bendock (Lat. 37° 11′S, Long. 148° 58′E), Co. Croajingolong, Victoria.
Finder and date—About 1899.
Coll.—
Ref.—**61, 62.**

BINDA.

Type.—Aerolite. Achondrite (Eukrite, *Eu.*)
Weight.—12lbs av.
Loc.—Binda (Lat. 34° 18′S, Long. 149° 25′E), near Crookwell, New South Wales.
Finder and date.—Alick McCormack, June 5th, 1912.
Coll.—Australian Museum, and Technological Museum, Sydney.
Ref.—**1.**

BINGERA.

Type.—Siderite. Granular Hexahedrite, *Ha.*
Weight.—240.7 grams (= $8\frac{1}{2}$oz. av.)
Loc.—Bingera (Lat. 29° 48′S, Long. 150° 33′E), New South Wales.
Finder and date.—1880.
Coll.—Mining and Geological Museum, Sydney; Hofmuseum, Vienna.
Ref.—**6.** p. 43, **9,** pp. 235, 294-295, 305, **14, 16, 23,** pp. 482-484, **51, 55,** pp. 218-220, **83,** pp. 5, 103.

BLUE TIER.

Type.—Siderite. Medium octahedrite, *Om.*
Weight.—3lbs.
Loc.—Blue Tier (Lat. 41° 0′S, Long. 148° 0′E about), Co. Dorset, north-east coast of Tasmania.
Finders and date.—Party of miners, some years previous to 1893.
Coll.—Mrs. W. F. Petterd, Launceston, Tasmania.
Ref.—**9,** p. 307, **64,** p. 10, **68, 38,** p. 5.

BOOGALDI.

Type.—Siderite. Fine octahedrite, *Of.*
Weight.—2057 grams (= $4\frac{1}{2}$lb av.)
Loc.—Two miles from Boogaldi Post Office, fifteen miles from Coonabarabran (Lat. 31° 18′S, Long. 149° 5′E), New South Wales.
Finder and date.—Gould, Jan. 1900.
Coll.—Technological Museum, Sydney.
Ref.—**3, 57, 88,** p. 101.

BRUCE (CRANBOURNE No. 1, *q.v.*

CADELL.

Type—Aerolite?
Weight—7¼lbs.
Loc.—Three miles from Morgan (Lat. 34° S, Long. 139° 45′E), east side of River Murray, Hundred of Cadell, South Australia.
Finder and date—April 11th, 1910.
Coll.—South Australian Museum, Adelaide.
Ref.—Undescribed.

CASTRAY RIVER.

Type—Siderite.
Weight—51 gr.
Loc.—Bank of the Castray River, tributary of the Heazlewood River, North-West Tasmania.
Finder and date—A miner, 1899.
Coll.—Mrs. W. F. Petterd, Launceston, Tasmania.
Ref.—**65**, **66**, **68**.

COWRA.

Type—Siderite. Finest octahedrite, *Off.*
Weight—12¼lbs.
Loc.—Summit of Battery Mountain, Junction of Burrowa and Lachlan Rivers, near Cowra, (Lat. 33° 52′S, Long. 148° 45′E), New South Wales.
Finder and date—John O'Shaughnessy, before 1888.
Coll.—Mining and Geological Museum, Sydney; Hofmuseum, Vienna.
Ref.—**9**, pp. 235, 267, 306, **14**, **16**, **63**, **88**, pp. 9, 101, **89**.

CRANBOURNE NO. 1, or BRUCE.

Type—Siderite. Broad octahedrite, *Og.*
Weight—3,500 kilos (= 68.89cwt.)
Loc.—Cranbourne (Lat. 38° 11′S, Long. 145° 20′E), Co. Mornington, Victoria.
Finder and date—Known 1854.
Coll.—British Museum (Nat. Hist.), London.
Ref.—**4**, **5**, **9**, pp. 273, 285, 302, **11**, p. 244, **13**, **21**, pp. 144-148, **28**, p. 93, **32**, p. 152, **33**, pp. 552-553, **34**, **35**, p. 59-65, **37**, **41-45**, **46**, p. 330, **78**, **79**, **80**, **83**, **85**, **86**, pp. 267, 268, 271, 272, **88**, pp. 9, 102, Pl. iii., fig. 3, **92**.

CRANBOURNE NO. 2, or ABEL.

Type—As No. 1.
Weight—30cwt.
Loc.—Six miles north of No. 1 (Lat. 38° 8'S, Long. 145° 22'E).
Finder and date—Known 1854.
Coll.—National Museum, Melbourne.
Ref.—**34**, **41-45**, **86**, pp. 268, 271, 272.

DANDENONG = Cranbourne (? No. 2) —See **42**.

DENILIQUIN = BARRATTA NO. 1, *q.v.*

ELI ELWAH, or HAY.

Type—Aerolite.
Weight—35½lbs.
Loc.—Eli Elwah Station, fifteen miles west of Hay (Lat. 34° 30'S, Long. 144° 56'E), New South Wales.
Finder and date—? Known 1889 (**9**, p. 306).
Coll.—British Museum (Nat. Hist.), London.
Ref.—**9**, p. 306, **54**, **57**, **69**.

EMMAVILLE.

Type—Aerolite.
Weight—127.15 grams (= 4½ozs. av.)
Loc.—Near Emmaville (Lat. 29° 14'S, Long. 151° 45'E), New South Wales.
Finder and date—About 1900.
Coll.—
Ref.—Undescribed.

GILGOIN NO. 1.

Type—Aerolite. Crystalline chondrite, *Ck* (Brezina); black chondrite, *Cs* (Klein).
Weight—67½lbs.
Loc.—Gilgoin Station (Lat. 30° 35'S, Long. 147° 12'E), forty miles south-east of Brewarrina, New South Wales.
Finder and date—1888 or 1889.
Coll.—Australian Museum, Sydney.
Ref.—**28**, p. 97, **47**, p. 146, **54**, **57**, **70**, **72**, **73**, **88**, pp. 44, 100.

GILGOIN NO. 2.

Type—As No. 1.
Weight—7 4/4 lbs.
Loc.—Two miles south of Gilgoin, No. 1.
Coll.—Australian Museum, Sydney.
Ref.—**57**, **72**, **73**.

GILGOIN NO. 3.

Weight—55 1/4 lbs.
Coll.—Ward-Coonley, Rochester, U.S.A.

GILGOIN NO. 4.

Weight—37lbs.
Coll.—Ward-Coonley, Rochester, U.S.A.

GILGOIN NO. 5.

Coll.—Ward-Coonley, Rochester, U.S.A.

GILGOIN NO. 6.

Weight—16lbs.
Coll.—Mining and Geological Museum, Sydney.

HADDON.

Type—Aerolite (?)
Loc.—Haddon, Grenville Co., Victoria.
Ref.—**35**, p. 107-8.

Note—A Meteor was seen and immediately afterwards an eyewitness thought he saw something fall near him. Several pieces of melted matter of varying colour were found. Nothing more is known of this supposed meteorite and there is no reliable evidence that it was of meteoric nature.

HAMMERSLEY RANGE = ROEBOURNE, *q.v.*

HAY = ELI ELWAH, *q.v.*

HAY, or PEVENSEY.

Type—Aerolite.
Weight—9 1/2 lbs.
Loc.—Pevensey Station, Old Man Plain, ten miles below Hay, (Lat. 34° 30′S, Long. 144° 56′E), in a paddock fifteen miles south of the Murrumbidgee River, New South Wales.

Finder and date—1868-1870.
Coll.— — Godfrey, Melbourne.
Ref.—**27**, p. 130.

Note.—It is unfortunate that two meteorites (which may, however, be parts of one and the same mass) have been referred to by the same name. Perhaps the second Hay would be preferably called Pevensey.

HERMITAGE PLAINS.

Type—Aerolite.
Weight—About 70lbs. originally.
Loc.—Hermitage Plains, twenty miles south-east of Canbelego (Lat. 31° 28'S, Long. 146° 11'E about).
Finder and date—1909.
Coll.—Mining and Geological Museum, Sydney.
Ref.—**91.**

KULNINE.

Type—Siderolite (?).
Weight—122lbs.
Loc.—Kulnine Run, Victoria, near Wentworth (Lat. 34° 8'S, Long. 141° 56'E), New South Wales.
Finder and date—Known 1886; first seen by J. L. Thompson.
Coll.—South Australian Museum, Adelaide.
Ref.—Undescribed.

LAKE GILES = MOUNT DOOLING, *q.v.*

LANGWARRIN.

Type—Siderite.
Weight—17½cwt.
Loc.—Langwarrin (Lat. 38° 10'S, Long. 145° 10'E), Co. Mornington, Victoria.
Finder and date—A. H. Padley, 1886.
Coll.—National Museum, Melbourne.
Ref.—**27**, p. 130, **86**, pp. 268, 271, 272.

Note.—Perhaps a part of the Cranbourne fall.

LEFROY.

Type—Siderite.
Weight—3,328 grains.
Loc.—Lefroy (Lat. 41° 9'S, Long. 146° 58'E), Co. Dorset, twenty-seven miles north-west of Launceston, Tasmania.
Finder and date—A prospector, 1904.
Coll.—Mrs. W. F. Petterd, Launceston, Tasmania.
Ref.—**67**, (a) pp. 78-79, (b) pp. 86-87, **68.**

LE GOULD.

Loc.—Two days march beyond the Isaacs River, the first branch of the MacKenzie River, Queensland.
Ref.—**48.**

Note.—An aerolite, ten inches in diameter, which had struck and broken a tree, was found.

MACQUARIE RIVER.

Type—Siderolite. Mesosiderite, *M.*
Weight—
Loc.—Macquarie River (Lat. 31° 30′S, Long. 152° 56′E), New South Wales.
Finder and date—1857.
Coll.—Ward-Coonley, Rochester, U.S.A.; Berlin Museum.
Ref.—**47,** p. 126, **88,** p. 31.

MOLONG.

Type—Siderolite. Pallasite.
Weight—Main mass 204lbs. and fragments weighing 28lbs.
Loc.—E. Farrell's Selection, Portion 218, Pa. Molong, Co. Ashburnham, New South Wales.
Finder and date—John Williams, August 1912.
Coll.—Mining and Geological Museum, Sydney.
Ref.—Undescribed.

MOONBI.

Type—Siderite. Fine octahedrite, *Of.*
Weight—29lbs.
Loc.—Moonbi Range, eighteen miles from Moonbi (Lat. 31° 9′S, Long. 151° 1′E), New South Wales.
Finder and date— — Langston, 1892.
Coll.—Technological Museum, Sydney.
Ref.—**9,** pp. 235, 268, 272, 307, **14, 16, 60, 88,** p. 101.

MOORANOPPIN.

Type—Siderite. Broadest octahedrite, *Ogg* (Brezina, Klein); broad octahedrite, *Og* (Farrington).
Weight—2½lbs.
Loc.—Mooranoppin, fifty miles west of Coolgardie (Lat. 32° 0′S, Long. 119° 25′E), Western Australia.
Finder and date—An aboriginal, in or before 1893.
Coll.—Ward-Coonley, Rochester, U.S.A.
Ref.—**10,** p. 63, **11,** p. 245, **28,** p. 108, **59, 87, 88,** pp. 17, 102.

MOUNT BROWNE.

Type—Aerolite. Spherulitic chondrite, *Cc*.
Weight—25½lbs.
Loc.—Mount Browne (Lat. 29° 45′S, Long. 141° 46′E), Co. Evelyn, New South Wales.
Finder and date—W. Jordan; fell July 17, 1902.
Coll.—Mining and Geological Museum, Sydney.
Ref.—**11**, p. 238, **17**, p. 218, **18**, **88**, pp. 55, 99, **90**.

MOUNT DOOLING, or LAKE GILES.

Type—Siderite.
Weight—
Loc.—Mt. Dooling, north Yilgarn, Western Australia.
Finder and date—1910.
Coll.—Geological Survey Museum, Perth, Western Australia.
Ref.—**77**.

MOUNT DYRRING.

Type—Siderolite. Pallasite-Krasnojarsk group, *Pk*.
Weight—25lbs. (in fragments).
Loc.—Mount Dyrring (32° 30′S, 151° 10′E), eight miles north of Bridgman, Singleton District, New South Wales.
Finder and date—An aboriginal, in 1903.
Coll.—Mining and Geological Museum, Sydney.
Ref.—**11**, p. 223, **17**, p. 218, **63**, **88**, pp. 31, 101.

MOUNT STIRLING.

Type—Siderite. Broad octahedrite, *Og*.
Weight—200½lbs.
Loc.—Twenty-five miles south-east of Mount Stirling (Lat. 31° 58′S, Long. 117° 55′E), one hundred and thirty miles east of Perth, Western Australia.
Finder and date—Known 1892.
Coll.—Australian Museum, Sydney.
Ref.—**27**, pp. 58, 131, **88**, pp. 17, 102, Pl. i., fig. 6.

MUNGINDI NOS. 1 and 2.

Type—Siderite. Finest octahedrite, *Off* (Brezina, Klein); fine octahedrite, *Of* (Farrington).
Weight—No. 1, 51lbs.; No. 2, 62lbs.
Loc.—South Queensland, three miles north of Mungindi (Lat. 29° 0'S, Long. 149° 0'E), New South Wales.
Finder and date—Louis Troutman, early in 1897.
Coll.—Mining and Geological Museum, Sydney.
Ref.—**10**, p. 63, **11**, pp. 226, 242, **15**, pp. 121-122, **16**, **28**, p. 109, Pl. xxxviii., **87**, **88**, pp. 18, 101, Pl. ii., fig. 11.

MURNPEOWIE.

Type—Siderite.
Weight—2,520lbs.
Loc.—Beltana Pastoral Co.'s Murnpeowie Run (Lat. 29° 35'S, Long. 139° 54'E about), South Australia.
Finders and date—A. Hamblin and others, Aug. 1909.
Coll.—School of Mines and Industries Museum, Adelaide.
Ref.—**36**, **81**, **82**.

NARRABURRA.

Type—Siderite. Finest octahedrite, *Off*.
Loc.—Narraburra or Yeo Yeo Creek, twelve miles east of Temora (Lat. 34° 10'S, Long. 147° 43'E), New South Wales.
Finder and date— — O'Brien, 1855.
Coll.—Australian Museum, Sydney.
Ref.—**12**, **58**, **71**, **88**, pp. 18, 102.

NOCOLECHE.

Type—Siderite. Medium octahedrite, *Om*.
Weight—44.18lbs.
Loc.—Five miles south-west of Nocoleche Station, near Wanaaring (Lat. 29° 35'S, Long. 144° 10'E), forty miles north-west of Bourke, New South Wales.
Finder and date—Known 1895.
Coll.—Australian Museum, Sydney; Ward-Coonley, Rochester, U.S.A.
Ref.—**11**, pp. 244, **27**, **88**, pp. 19, 102, Pl. iii., fig. 5.

NULERI.

Type—Siderite. Octahedrite.
Weight—120.2 grams (= 4.24 oz. av.)
Loc.—Two hundred miles east of Mount Sir Samuel, Nuleri Land District, Western Australia.
Finder and date—A prospector, in or before 1902.
Coll.—Geological Survey Museum, Perth, Western Australia.
Ref.—**74**, **75**.

PENKARRING ROCK = YOUNDEGIN NO. 1., *q.v.*

PEVENSEY = HAY, *q.v.*

PREMIER DOWNS (Two).

Type—
Weight—
Loc.—Premier Downs, Nullarbor Plains, Eucla Division, Western Australia.
Finder and date—1911.
Coll.—Geological Survey Museum, Perth, Western Australia.
Ref.—**77**.

QUEENSLAND.

Type—Siderite. Broad octahedrite, *Og.*
Weight—
Loc.—South Queensland (exact locality unknown).
Finder and date—
Coll.—Queensland Museum, Brisbane[3]; Ward-Coonley, Rochester, U.S.A.
Ref.—**88**, pp. 20, 102.

RHINE VILLA.

Type—Siderite. Medium octahedrite, *Om.* (Brezina); broad octahedrite, *Og.* (Klein).
Weight—$7\frac{1}{2}$ lbs.
Loc.—Rhine Villa, Hundred of Angas, about fifty miles north-east of Adelaide, South Australia.
Finder and date—H. W. Payne, before Nov., 1900.
Coll.—South Australian Museum, Adelaide; main mass was sent to Germany.
Ref. **38**, **39**, **88**, pp. 21, 102.

[3] Dr. R. Hamlyn-Harris, Director of the Queensland Museum, informs me (Oct. 24, 1912) that there is no such meteorite in the Queensland Museum at the present time.

ROEBOURNE, or HAMMERSLEY RANGE.

Type—Siderite. Medium octahedrite, *Om*.
Weight—191½lbs.
Loc.—Two hundred miles south-east of Roebourne (Lat. 22° 20′S, Long. 118° 0′E), and eight miles from the Hammersley Range, Western Australia.
Finder and date—H. Reginald Hester, 1892.
Coll.—Ward - Coonley, Rochester, U.S.A.; Field Museum, Chicago.
Ref.—**6**, p. 43, **7**, **10**, p. 63, **11**, pp. 221, 243, **59**, **87**, **88**, pp. 21, 102, Pl. iii., fig. 4.

TEMORA.

Type—Siderite. Broadest octahedrite, *Ogg*.
Weight—
Loc.—Between Temora (Lat. 34° 12′S, Long. 147° 26′E) and Cootamundra, New South Wales.
Finders and date—Party of miners, 1890.
Coll.—Mining and Geological Museum, Sydney; Hofmuseum, Vienna; Ward-Coonley, Rochester, U.S.A.
Ref.—**9**, pp. 235, 288, 302, **14**, **16**.

THUNDA.

Type—Siderite. Medium octahedrite, *Om*.
Weight—137lbs.
Loc.—Thunda, Windorah (Lat. 25° 25′S, Long. 142° 40′E), Diamantina District, Queensland.
Coll.—A. Liversidge.
Ref.—**6**, pp. 40, 43, **8**, p. 7, **9**, pp. 272, 283, 306, **11**, pp. 226, 243, **26**, pp. 381-382, **52**, **53**, **54**, **55**, p. 221, **88**, pp. 25, 102, Pl. iii., fig. 9.

WARBRECCAN.

Type—Aerolite.
Weight—61,223 grams (three pieces).
Loc.—Windorah (Lat. 25° 25′S, Long. 142° 40′E). Diamantina District, Queensland.
Finder and date—
Coll.—British Museum (Nat. Hist.), London.
Ref.—**31**, p. 104.

YARDEA.

Type.—Siderite. Medium octahedrite, *Om.*
Weight.—7lbs 3½ozs.
Loc.—Four miles south of Yardea Station (Lat. 32° 20′S, Long. 136° 0′E), Gawler Range, South Australia.
Finder and date.—James Martlew, November, 1875.
Coll.—South Australian Museum, Adelaide.
Ref.—**9.** p. 304, **19.** pp. 82-83, **20.** **88.** p. 28.

YOUNDEGIN NO. 1, or PENKARRING ROCK.

Type.—Siderite. Broad octahedrite, *Og.*
Weight.—Four fragments weighing respectively 25¾lbs., 24lbs., 17½lbs., 6lbs., and broken pieces weighing 17lbs.
Loc.—Three-quarters of a mile north-west of Penkarring Rock (Lat. 31° 30′S, Long. 117° 30′E), Sub-district Youndegin, about seventy miles east of York, Western Australia.
Finder and date.—Alfred Eaton, June 5, 1884.
Coll.—British Museum (Nat. Hist.), London; National Museum, Melbourne.
Ref.—**8.** p. 8, **9.** pp. 285, 286-287, 288, **11.** pp. 227, 244, **29.** **30.** **32.** **40.** **59.** **88.** pp. xi., 28, 102.

YOUNDEGIN NO. 2.

Type.—As No. 1.
Weight.—382½lbs.
Loc.—Youndegin, Western Australia.
Finder and date.—Louis Knoop, 1891.
Coll.—J. R. Gregory, London; Ward-Coonley, Rochester, U.S.A.
Ref.—**28.** p. 120, Pl. xxxvii., **40.**

YOUNDEGIN NO. 3.

Type.—As No. 1.
Weight.—204lbs.
Loc.—Youndegin, Western Australia.
Finder and date.—Louis Knoop, 1892.
Coll.—Hofmuseum, Vienna.
Ref.—**2.**

II.—Bibliography.

All the papers descriptive of Australian Meteorites which have come under my notice are here collected and arranged alphabetically under authors' names. It is hoped that no important reference has been omitted, but no doubt some have been overlooked, and I shall be grateful if such omissions are pointed out to me. I have indexed Brezina's list of the Meteorites in the Hofmuseum, Vienna,[4] and Ward's list of the Ward-Coonley Collection in Rochester[5] rather fully, as these are the most comprehensive lists in German and English respectively, and contain much descriptive and systematic information. Where a meteorite fall consists of two or more portions, found, may be, at different times, as in the case of the Barratta and Youndegin Meteorites, one cannot always be certain which particular portion is dealt with in a given paper, but this is a point of no great importance.

It was originally intended to include in the Bibliography references to the enigmatical Obsidianites or Australites which are regarded by many authorites as being of meteoric origin, but Mr. E. J. Dunn, Director of the Geological Survey of Victoria, has recently published an exhaustive paper on these, with a Bibliography,[6] which has rendered this unnecessary.

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79. On the Composition of the New Meteoric Mineral Daubréelite, and its frequent if not universal occurrence in Meteorites. *Ibid.*, (3), xvi., 1878, p. 272.
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83. The Gold Fields and Mineral Districts of Victoria, p. 423-426 (Melbourne, 1869).

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85. The Cranbourne Meteorite. *Science*, April 13th, 1883, p. 285-286.

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86. Additions and Corrections to the Census of Victorian Minerals. *Proc. Roy. Soc. Vict.* (N.S.), xiii., 1900 (1901), p. 253-272.

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87. Four new Australian Meteorites. *Amer. Journ. Sci.* (4), v., 1898, p. 135-140.

88. Catalogue of the Ward-Coonley Collection of Meteorites (Chicago, 1904).

WEINSCHENK (E.)—See COHEN (E.)

WILKINSON (C. S.)

89. [Cowra]. *Journ. Roy. Soc. N. S. Wales*, xxii., 1888 (1889), p. 341.

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90. Notes and Analysis of the Mount Browne Meteorite. *Rec. Geol. Surv. N. S. Wales*, vii., 1904, p. 312-314.

91. [Hermitage Plains (anal.)]. *Ann. Rept. Dept. Mines N. S. Wales*, 1910 (1911), p. 188.

ZIMMERMANN (K.)

92. [Cranbourne]. *Neues Jahrb. Min.*, 1861, p. 557.

III—Census and Taxonomy of Australian Meteorites.

Dr. Cooksey in his list enumerated twenty-three falls, including the doubtful Haddon and reckoning the several portions reasonably believed to belong to one and the same meteorite as a single fall. We have now a grand total of forty-six known meteorites contributed by Australia, a striking advance in fifteen years. If, as Berwerth says,[7] the civilisation of a country can be gauged in a measure by the number of

[7] Berwerth Tscherm. min. petr. Mitt., xxii., 1903, p. 191.

meteorites recorded from it, then Australia is advancing by leaps and bounds; moreover, it is certain that many meteorites yet wait to be discovered in some of the sparsely settled regions of Australia, where the dryness of the climate would make their disintegration a very slow process.

Following Brezina's Classification[8] Australian Meteorites would be distributed as follows:—

A. Siderites.

1. Finest octahedrite, Off:—Ballinoo, Cowra, Mungindi, Narraburra.
2. Fine octahedrite, Of:—Boogaldi, Moonbi.
3. Medium octahedrite, Om:—Blue Tier, Nocoleche, Rhine Villa, Roebourne, Thunda, Yardea.
4. Broad octahedrite, Og:—Beaconsfield, Cranbourne, Mount Stirling, Queensland, Youndegin.
5. Broadest octahedrite, Ogg:—Mooranoppin, Temora.
6. Octahedrite (unclassed):—Barraba, Nuleri.
7. Granular hexahedrite, Ha:—Bingera.
8. Siderite (unclassed):—Arltunga, Castray River, Langwarrin, [probably = Cranbourne], Lefroy, Murrpeowie, Mount Dooling.

B. Siderolites.

1. Mesosiderite, M:—Macquarie River.
2. Pallasite:—Molong, Mount Dyrring.
3. Siderolite (unclassed):—Bendock.
4. Siderolite (?):—Kulnine.

C. Aerolites.

1. Achondrite,
   (a) Eukrite, Eu:—Binda.
2. Chondrites.
   (a) Brecciated grey chondrite, Cgb:—Barratta.
   (b) Spherulitic chondrite, Cc:—Mount Browne.
   (c) Crystalline chondrite, Ck:—Gilgoin.
3. Unclassed:—Cadell, Eli Elwah, Emmaville, Hay, Hermitage Plains, Le Gould, Warbreccan.
4. Doubtful:—Haddon.

D. Unclassed Meteorite.

Premier Downs.

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[8] Ward—Cat. Ward-Coonley Coll. of Meteorites. p. 97-103, (Chicago 1904),

Distributing the falls according to the States we get the following Tabular Statement: –

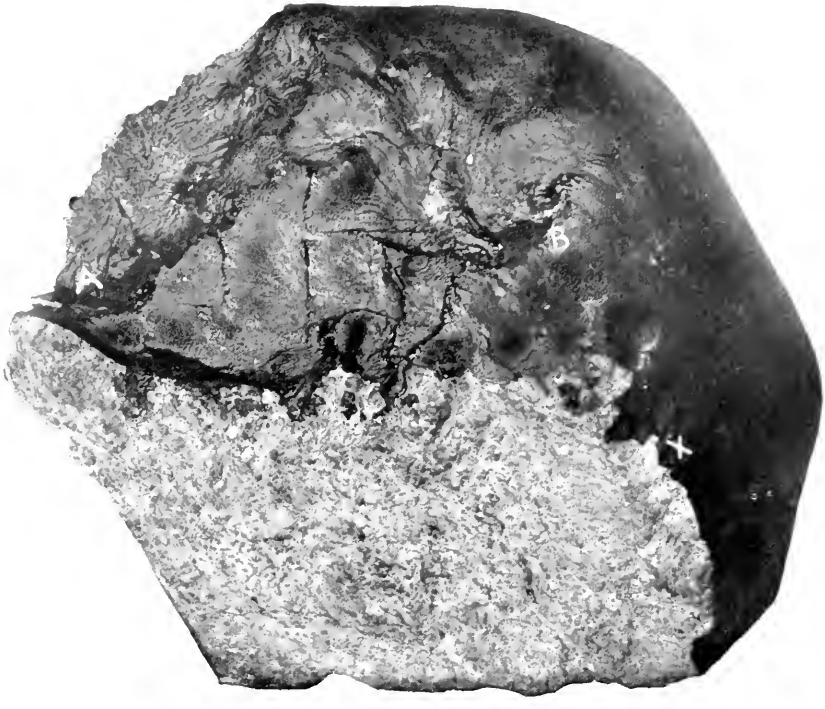
	SIDERITES	*SIDEROLITES*	*AEROLITES UNCLASSED*	
N. S. Wales 19.	Barraba Bingera Boogaldi Cowra Moonbi Narraburra Nocoleche Temora	Macquarie R. Molong Mt. Dyrring	Barratta Binda Eli Elwah Emmaville Gilgoin Hay Hermitage Plains Mt. Browne	
	8	3	8	
Victoria 6.	Beaconsfield Cranbourne Langwarrin	Bendock (2) Kuiaine	(Haddon)	
	3	2	1	
Queensland 5.	Mungindi Queensland Thunda		Le Gould Warbreccan	
	3		2	
S. Australia 5.	Arltunga Murnpeowie Rhine Villa Yardea		Cadell	
	4		1	
W. Australia 8	Ballinoo Mooranoppin Mt. Dooling Mt. Stirling Nuleri Roebourne Youndegin			Premier Downs
	7			1
Tasmania 3	Blue Tier Castray R. Lefroy			
	3			
Total 46.	28	5	12	1

In conclusion, I have pleasure in acknowledging my indebtedness to Messrs. W. R. Browne, B.Sc., Demonstrator in Geology, the University, Sydney, G. W. Card, A.R.S.M., Curator of the Mining and Geological Museum, Sydney, A. Gibb Maitland, Government Geologist, West Australia, R. H. Walcot, Mineralogist, National Museum, Melbourne, B. H. Woodward, Director of the Western Australian Museum, for cordial assistance in compiling the information contained in this paper.

EXPLANATION OF PLATE X.

Binda Meteorite.

The photograph shows the front of the meteorite, the white cross indicating the point from which the lines of crustal flow radiate. The area between A and B shows the "tertiary" crust, formed just before the stone reached the ground. The rest of the surface is invested with secondary crust. About three-fifths natural size.



H. BARNES, JUNR., photo.,
Austr. Mus.

EXPLANATION OF PLATE XI.

Binda Meteorite.

Front showing the ridges of the secondary crust radiating from the spot marked with a cross. About natural size.

H. BARNES, JUNR., photo.,
Austr. Mus.

EXPLANATION OF PLATE XII.

Binda Meteorite.

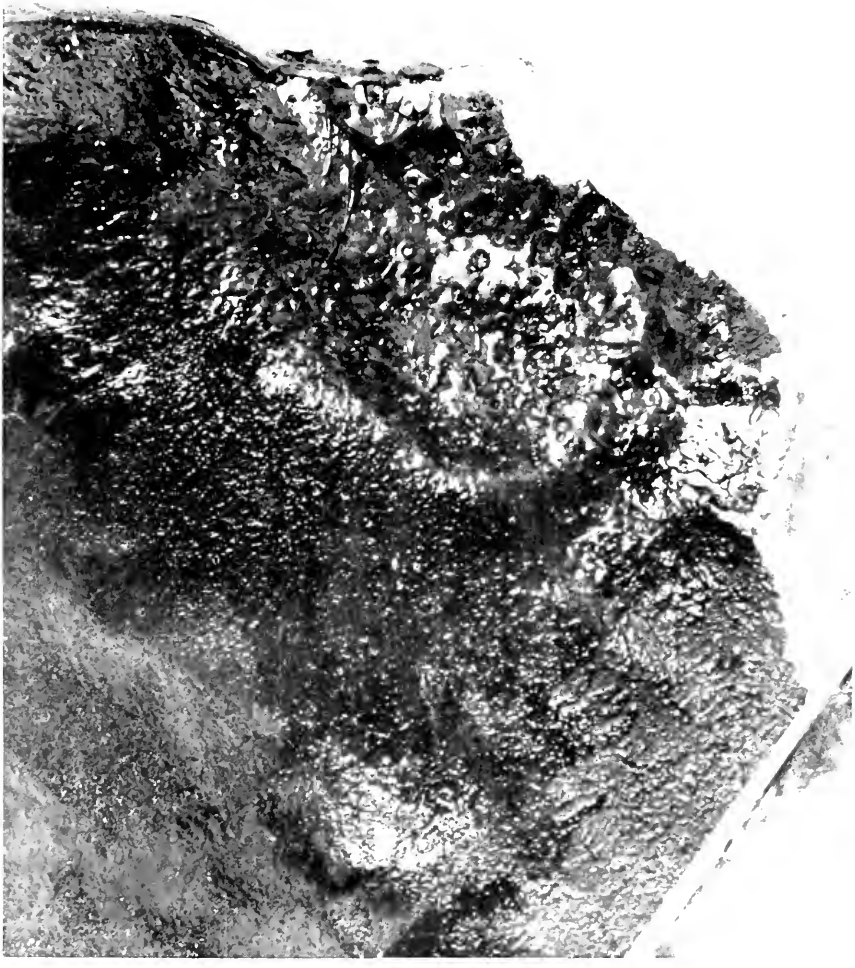
Rear surface showing the irregular blebby secondary crust on the right; between C and D on the left there is an exposure of the primary crust. About two-thirds natural size.

H. BARNES, JUNR., photo.,
Austr. Mus.

EXPLANATION OF PLATE XIII.

Binda Meteorite.

Rear surface, covered with irregular vesicles and blebs of secondary crust. In the top left corner is an overhanging ridge where the fused crust has cascaded over from the front of the meteorite. About natural size.



H. BARNES, JUNR., photo.,
Austr. Mus.

THE MYRIAPODA IN THE AUSTRALIAN MUSEUM.

Part ii.—DIPLOPODA.*

By H. W. Brölemann, Pau.

(Plates xiv-xviii., and Figs. 14-37.)

Chilognatha, Latreille, 1802.

Opisthandria, Verhoeff, 1894.

Genus Cyliosoma, *Pocock*, 1895.

(Pocock, 1895, Ann. Mag. Nat. Hist. (6), xvi., p. 414.)

This genus was created by R. I. Pocock with the New Zealand *Sphaerotherium angulatum*, Butler, 1878, as type species.

From his above mentioned work the following particulars may be gathered :—

1. "Male copulatory organs :—The movable digit of both pairs of copulatory forceps are composed of a single segment

position of the dorsal spine seems to vary and the distance between it and the claw is a question of more or less.

Yet the matter is far from being exhausted with these rough notes ; further, valuable particulars may be obtained by comparing the head of *Cyliosoma* with that of *Sphaeroparus*. In failure of material, the excellent drawings published by vom Rath[1] and by Verhoeff[2] will answer the purpose, and the reader will kindly refer to same to fully appreciated the following differences :—

* For Part i. see these "Records," ix., 1.

[1] vom Rath—Beiträge zur Kenntnis der Chilognathen, Bonn, 1886, figs. 13, 14, 27, 32.

[2] Verhoeff—Die Diplopoden Deutschlands, Leipzig, 2/3 Liefer., 1911/12, figs. 142, 178.

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From his above mentioned work the following particulars may be gathered :—

1. "Male copulatory organs :—The movable digit of both pairs of copulatory forceps are composed of a single segment.

2. "Female vulva as in *Zephronia*" (*i.e.*: 'composed of two pieces, a proximal hairy piece bearing the aperture, and a distal usually polished piece'), but the proximal plate divided into two distinct pieces, whereof the external partially overlaps the internal.

3. "Tarsi as in *Zephronia*" (i.e.: 'distally narrowed, claw terminal, the upper spine close to but behind the claw.'")

The characters numbered one and two rank, of course, amongst the very best. As to the structure of the tarsi, it is not possible so far to allow it the same importance as the position of the dorsal spine seems to vary and the distance between it and the claw is a question of more or less.

Yet the matter is far from being exhausted with these rough notes; further, valuable particulars may be obtained by comparing the head of *Cyliosoma* with that of *Sphaeropurus*. In failure of material, the excellent drawings published by vom Rath[1] and by Verhoeff[2] will answer the purpose, and the reader will kindly refer to same to fully appreciated the following differences :—

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* For Part i. see these "Records," ix., 1.

[1] vom Rath—Beiträge zur Kenntnis der Chilognathen, Bonn, 1886, figs. 13, 14, 27, 32.

[2] Verhoeff—Die Diplopoden Deutschlands, Leipzig, 2/3 Liefer., 1911/12, figs. 142, 178.

Measured on the level of the eyes, the head is still broader than in *Sphaeropoeus* though almost as short. The upper lip is less produced. The antennal fossa, instead of extending backwards and being closed in front as shown by Verhoeff (*l.c.*, Pl. ix., fig. 142), is open frontwards and downwards and closed backwards by a strong, perpendicular, rounded ridge on which stand the isolated ocelli (fig. 14). The lateral surface behind the ridge is feebly depressed. The back part of the head is completely and evenly rounded, smooth and densely clothed with short hairs. A deep sulcus is to be seen laterally similar to that illustrated by Verhoeff, accompanied by a more or less distinct horizontal ridge beginning at a point near and below the inferior ocellus and dying out before reaching the posterior surface of the head. The processes which start from the posterior margin of the head are well developed and are fused with the hypostoma into a bridge (Verhoeff's "*pons gulo-occipitalis*"). But the distal part of the bridge, equivalent to the hypostoma, instead of being in a line with the processes, is placed nearly at right angle so as to be almost horizontal.

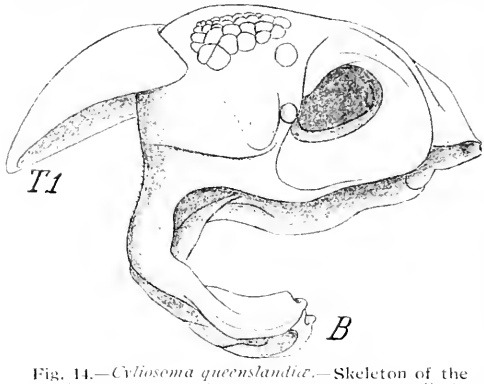

Fig. 14.—*Cyliosoma queenslandiae*.—Skeleton of the head (antennæ and mouth parts removed), in profile, showing the "gulo-occipital bridge" (*B*) and the position of the first tergite (*T1*).

Epipharynx and hypopharynx very much resemble the same organs of *Sphaeropoeus*. The same might be said of the mandible except that the pectinate lamellæ are represented by only five rows of minute rods or spines, the two inner rows being composed of smaller and less numerous elements than the three outer rows. For instance, it is possible to distinguish fourteen rods in the first (outer) row, fourteen in the second, ten in the third and six in each of the fourth and fifth row, and besides some (five) pale warts which have probably to be considered as rudimentary rods. The tracheal stalk of the

mandibula is considerably expanded, lamellar at its distal end; the proximal end is fused with the basal ring of the mandibula.

The gnathochilarium, compared with that of *Sphæropæus* as represented by vom Rath, is shorter; the proximal part (lamellocardines) is broader as the outer margins are almost parallel and do not converge backwards. The mentum is distinctly divided into two sclerites.

The above mentioned features are not all of equal value, but some of them, such as, namely, the structure of the head, are undeniably of first rate importance and are well suited to characterize a distinct family.

The limits of this new group cannot at present be better delineated, as very little is known of these interesting forms. However, it could be ascertained that *Sphærotherium libidinosum* Sauss. and Zehnt., from Madagascar[3] the type of which is preserved at the Paris Museum, participate of the structure of *Cyliosoma* as far as the head, the gnathochilarium and the tracheal stalk of the mandibula are concerned. Therefore, it is likely that the Australian and the South African (including Madagascar) species will have to stand together in one family—Sphærotheriidæ—equivalent to the old (Brandt's) genus *Sphærotherium*, while the Indian forms of *Sphæropæus*, and probably of *Arthrosphæra* and of *Zephronia*, will have to be set apart in another family, equivalent to the old (Brandt's) genus *Sphæropæus*, for which the name Sphæropœidæ is proposed.

Turning to the genus *Cyliosoma*, the following details observed on both species hereafter described are well worth mentioning and may be characteristic for that genus.

Antennæ very short, not much longer than the first tergite; the sixth joint is nearly cylindrical, similar in both sexes; the last joint is tipped with four strong sensory cones. In *S. libidinosum*, the antennæ are elongate, nearly twice as long as the first tergite; the sixth joint is slightly swollen distally; the last joint shows many chitinized, contignous cells closed with a membrane, in the middle of which stand a tiny comb.

[3] Whether *S. libidinosum*, S. and Z., is a good representative of the genus *Sphærotherium* is not known.

The male seminal duct opens in the posterior surface of the second pair of coxæ, into which a large round aperture is cut open. The aperture is filled with a bead-like organ which is the distal end of the seminal duct. When not entirely contracted, it shows, near its top margin, a transverse opening sunk between two membranaceous, lip-shaped pads. The rest of the organ is protected by two chitinous plates of nearly equal development which leaves between them a narrow membranaceous band; their inner angle is rounded or cut off, and their outer margins are folded back on the anterior surface of the bead. *S. libidinosum* shows only one plate covering all the proximal part of the bead, with concave anterior margin; the plate is therefore much broader than long.

The representatives of the genus *Cyliosoma* are confined to the Australian continent and to the adjoining southern archipelagos. In this genus have been listed:—*Sphærotherium angulatum*, Butler, 1878 (Rockhampton); *Zephronia delacyi*, White, 1859 (New Zealand); *Sphærotherium leiosomum*, Hutton (New Zealand); *Cyliosoma semna*, Silvestri, 1898 (Queensland); *Cyliosoma striolatum*, Pocock, 1895 (New Zealand); *Cyliosoma turpionii*, Silvestri, 1898 (Queensland); *Cyliosoma unicolor*, Silvestri, 1897 (Queensland).

Cyliosoma queenslandie, *sp. nov.*

(Plate xiv., figs. 1-4, figs. 14 and 15; with Figs. 16-21.)

♂ : length about 22. m m.; breadth 10.50 to 11. m m.

♀ : length about 28. m m.; breadth 14 to 15 m m.

Colour a uniform dark reddish or olivaceous brown, sometimes clearing up towards the anterior margin of the segments. Integuments smooth, shining.

Upper lip densely and finely punctured; rest of the head showing rare and small dimples—or coarse punctures—provided at the bottom with a tiny bristle. Posterior margin depressed in the middle. Eyes composed of about thirty-six larger and smaller ocelli, of which two stand apart behind the antenna on the ridge which closes the antennal fossa backwards. Antennæ very short, tapering; the sixth joint cylindrical; the

last tipped with four sensory cones. Micrometrical measurements of the joints :— 1st joint, 0.544 m m ; 2nd, 0.320 m m ; 3rd, 0.320 m m ; 4th, 0.288 m m ; 5th, 0.288 m m ; 6th, 0.544 m m ; 7th and 8th, 0.096 m m ; total length, 2.400 m/m. Diameter of first joint, 0.672 m m ; of sixth joint, 0.576 m/m.

First tergite not wider than the head ; anterior margin slightly convex in the middle, otherwise straight ; posterior margin evenly rounded. Its length equals 1.376 m/m ; its breadth 3.776 m/m.

Lateral keels of the second tergite rounded with upraised, yet flattened centre and thickened, pad-like margins ; the slope between the upraised centre and the marginal pad is flat, not grooved ; a row of fleecy hair is seen inside the marginal pad. Keels of the third tergite narrow, angular. On the fourth segment, the keels are almost triangular, but gradually become more quadrangular backwards, the anterior angle being always completely rounded, while the posterior grows more or less acute. Occupying the anterior half of the keels a triangular, flattened field is to be seen, the surface of which is clothed with tiny golden setæ and appears finely punctured. Last tergite somewhat gibbous in the middle ; the space between the summit and the posterior margin is scarcely noticeably flattened on each side of the middle line, the two surfaces meeting mesially without forming any distinct carina. The posterior margin shows traces of a delicate pre-marginal sulcus.

From the fourth segment backwards, the inner surface of the keels is provided with a strong horizontal ridge which stands below and near the insertion line of the pleural membrane. It is thus disposed that, in the contracted state of the body, the posterior end of a ridge comes in contact with the anterior end of the ridge of the next segment so as to form an uninterrupted projecting line upon which the lateral and part of the anterior margin of the second segment is pressed tight. On the last segment, the ridge sets forth converging with the hind margin of the tergite, but dies out before reaching it, thus leaving free the middle part of the inner surface.

Sterna of the first pair angularly produced and hairy ; following sterna rounded ; tracheal stigmata everywhere strongly chitinized.

Last joint of the ambulatory legs longer than the third, flattened, smooth, widely punctured. Dorsal spine standing apart from the claw; missing on the two anterior legs. The two ventral ridges normally furnished each with a row of five spines, except on the first, the second and the twenty-first where one or two of the proximal spines might be missing in the posterior row. Claw more or less sickle-shaped, with a basal tooth.

Male:—Last tergite with a transverse depression above the posterior margin. A finely and densely punctured space is seen connecting the summit of the tergite with the middle of the posterior margin; the punctures bear each a very short hair.

The posterior surface of the coxæ of the second pair show the opening of the seminal duct in the shape of a bead-like organ closing a large circular aperture cut into the surface of the coxa. The surface of each bead is protected by two chitinous plates which do not join on the middle line, and of which the outer margins are folded back on the opposite side of the bead.

Copulatory organs:—First pair very hairy. Basal joint broad, sub-quadrangular; its thinner surface is flattened and is but slightly produced into a thick and short, rounded cone. Second joint seemingly triangular; its inner margin shorter than the outer margin; its distal angle rounded, hollowed internally and furnished with small and sharp warts along its inner edge. Third joint partly engaged in the second, reduced, rounded, showing on its posterior surface, opposite the warted edge of the preceding joint, a chitinized ridge likewise provided with sharp warts.

Second pair three-jointed, shortly pilose. Anterior median horns hooked, gradually tapering from the base, apex split into two tiny rods. Posterior median processes conic, as long as the anterior horns. Second joint produced internally into a moderately long but stout and blunt process, the so-called immovable digit, the posterior-upper edge of which is furnished with small rounded warts. Third joint, or movable digit, slightly arched, with rounded apex; its inner surface is deeply excavated; its posterior edge bears a row of short transverse, concentrically wrinkled ridges which come in contact with the

warts of the preceding joint when the forceps are closed; of these organs the former (the row of ridges) is termed the "harp," and the latter (the warts) is termed the "bow," as it is admitted that they act as musical apparatus.

Fig. 15.—*Cyhosoma queenslandiæ*.—Coxæ of 2d pair of ♀, showing vulvæ. *v* = ventral plate; *ts* = tracheal stalk.

Female organs composed of three plates of which two are proximal, and one distal; the latter pointed. Of the two proximal plates the outer is larger than the inner; its inner margin is sinuate; its upper margin is rounded and partly overlaps the proximal margin of the distal plate.

The female is provided with an anal sternite, an organ which is not found developed in Glomeridæ. It is as long as wide at its base, in shape of a pointed arch (or ogive) and hairy along its distal end.

Loc.—Four males and three females from Gayndah, Queensland.

The above described species could have been identified with *C. targionii*, Silv., from Cairns, had not the author verified the existence on the last tergite of a very faint carina with a depression on each side, nor described and represented the process of the second joint of copulatory organs as comparatively long

and acute.[4] As moreover no mention is made of the punctured band on the last tergite of male, it is to be admitted that *C. queenslandica* stands by itself as a distinct species.

Fig. 16.

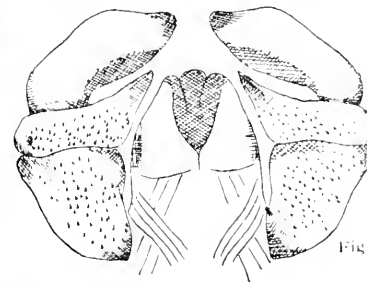

Fig. 18.

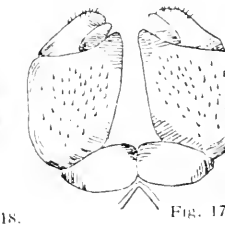

Fig. 17.

It is also closely allied to *C. unicolour*, Silv., from Gayndah.[5] Yet it differs in having the proximal joint of the first pair of copulatory organs notched in front, causing the inner process to be more distinct, longer and more slender than in *C. queenslandica*; moreover, the two following joints stand endwise, the distal appearing to be entirely free.

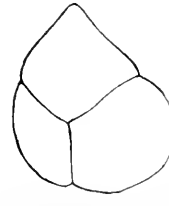

Fig. 19.

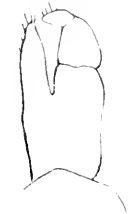

Fig. 20

Fig. 21.

[4] The following is a copy of Silvestri's description of *Cyllosoma targionii* (Bull. Soc. Entom. Ital., xxix., 1897, p. 228):—

"♀ Color niger, ventre pedibusque fusco-terreis. Caput sparse et grosse punctatum, circa labrum dense punctatum. Antennae perbreves, articulo sexto cylindrico, coteris magis attenuato et longiore. Somita: tergitum primum latum, breve. Tergita coetera omnia laevigata. Tergitum ultimum medium postice vix vix carinatum, utrimque depressum. Vulva (fig. 16) articulo superbo triangulari apice acuto externe aliquantum reverso. ♂ foemina minor, tergito ultimo postice distincte carinato et utrinque depresso. Organum copulativum par anticum (fig. 17) articulo secundo permagno et valde latoapice interno aliquantum producto, forcipe parvo digitus longitudine subaequalibus, par posticum (fig. 17) forcipis digito immobili, mobili, valde breviore, trianguliformi acuto, digiti mobili pererasso. Long. corp. mm. ♀ 38, ♂ 27; lat. corp. mm. ♀ 17, ♂ 12. Hab. Cairns, Queensland."

[5] Silvestri's description of *C. unicolor* (Ber. Zool. Mus. Dresden, vi., 9, 1896/97, p. 16), reads thus:

"Color plus minusve brunneo-viridescens totus. Caput laevigatum punctis valde sparsis et sat magnis impressum, vertice profunde excavato. Antennae attenuatae articulo 6° longiore, septimo minimo. Tergita primum laevigatum; secundum lateribus normaliter latis; tergita coetera omnia laevigata, granulis vel punctis destituta. Pedes pilis brevibus vestiti, articulo ultimo intra spinis 6-7, ungue apicali sat brevi, multum uncinato. ♀ Vulva (fig. 19) articulorum basalium externo majore, articulo supero apice acuminato. ♂ Foemina minor. Organum copulativum par anticum (fig. 20) forcipis digitis perbrevibus, mobili tuberculato; par posticum (fig. 21) digito immobili mobili fere duplo breviore, triangulifromi, digito mobili crasso, spatulato, apice rotundato. Long. corp. ♀ mm. 35, ♂ mm. 29; lat. corp. ♀ mm. 16, ♂ mm. 13. Hab. Nova Hollandia: Gayndah."

No more can the Gayndah specimens be identified with *C. angulatum*, Butler, 1878,[6] as the latter is said to have the anterior portions of dorsal segments densely covered with coarse but very shallow punctures.

CYLIOSOMA PENRITHENSIS, *sp. nov.*

(Plate xiv., figs. 5-7, fig. 22; with Figs. 23-25.)

♂ : length about 38. m/m; breadth 12.50 m/m.

♀ : length from 21. to 33. m/m; breadth from 11 to 17 m m.

Olive chestnut, darkened along the posterior margin of the segments; darker in females which are of a muddy brown.

Head twice as broad as long; anterior margin almost straight, feebly notched in the middle and with a small, blunt tooth. Surface smooth, between the eyes with rare, coarse punctures, rugose along the upper lip; each puncture furnished with setæ. Antennal fossa open in front and below, closed above and behind by a strong ridge. Eyes composed of about thirty-two larger and smaller ocelli congregated on a rounded field; besides an isolated ocellus is seen standing somewhat apart, near and below the Tömösvary organ which is dot-like. Antennæ very short, scarcely longer than the first tergite in the middle, tapering endwards; sixth joint sub-cylindrical, more slender than any of the preceding joints; last joint tipped with four sensory cones. Micrometrical measurements of the joints: 1st, 0·430 m/m; 2nd, 0·473 m/m; 3rd, 0·387 m m; 4th, 0·301 m/m; 5th, 0·473 m/m; 6th, 0·774 m/m; 7th and 8th, 0·086 m/m; total length 2·924 m/m. Diameter of first joint, 0·397 m/m; of 6th joint, 0·279 m/m.

First tergite not quite as broad as the head; length 2.236 m/m, breadth 5.504 m/m. Anterior margin feebly sinuate; posterior margin rounded, the curve being more flattened in the middle than on each side.

Integuments of the following segments leathery, more distinctly so on the keels than dorsally; keels of the second segments rounded with a pad-like margin; centre of the keel

[6] Butler—Trans. Ent. Soc., 1878, iv., p. 299.

raised but flat. The space between the raised surface and the marginal pad is grooved (not flat, as in *C. queenslandiae*), the inner slope being abrupt and the bottom of the groove being flat and furnished with delicate fleecy hair. Other keels as in *C. queenslandiae* with a rather stronger inner ridge. Last tergite evenly globular, slightly depressed near the posterior margin which is delicately sulcate all round.

Tarsi of ambulatory legs compressed, longer than the corresponding femora, except in the first and second pair where both joints are of equal length. Ventral spines do not appear to exceed five in each row. When both rows are not alike, it is the anterior which lacks of some of the proximal spines; for instance, the tarsi of the two first pair show an anterior row of two spines and a posterior row of five; the tarsi of the second and third pair show an anterior row of three spines and a posterior row of five; the tarsi of the twenty-first pair show an anterior row of four spines and a posterior row of five. The dorsal spine is missing on the two anterior pair of legs; on the other legs it stands apart from the claw. The latter is sickle-shaped with a basal tooth.

Male:—The bead-like penis is similar to the same organ of *C. queenslandiae*; the plates do not join in the middle and are more chitinized.

Copulatory organs:—Basal joint of the anterior pair almost naked, broad and short; inner edge scarcely sinuate or even somewhat convex, ending in a triangular, short and blunt process pointing straight downwards. Inner surface concave. Second joint with rare, rather long setæ, conic; the immovable digit short with rounded apex and with an anterior surface covered with rather acute warts. Third joint small, tapering, slightly curved backwards in its distal third; its posterior surface is furnished with warts similar to those of the immovable digit.

Second pair poorly beset with short setæ except along the inner edge of the second joint and of the immovable digit, where the setæ are more dense. Anterior median horns almost parallel-sided proximally, quickly thinning out in their distal third. Posterior median processes nearly quadrangular in outline, with the outer angle rounded and the inner angle

produced into a cone; the latter represent one fourth of the total length of the process, and its root is equal to about one third of the breadth of the process if measured at its base. The proximal joint of the appendages is short, of the usual form; second joint short but bearing an immovable digit nearly as long as the movable; the apex is rounded; the warts of the posterior (outer) edge are small and flat, not unlike a stone pavement. The last joint is rather stout with its end cut obliquely; the "harp" is composed of some twenty elongate nodules ornamented with delicate concentrical ridges. Standing in a line with the harp, is to be seen at the end of the digit a more chitinized space covered with minute dark dots, the nature of which could not be ascertained.

Female:—The anal sternite is very broad, and rounded; the length is equal to half of the breadth at the base; it is adorned with delicate fleecy hairs on its distal half and particularly along the posterior margin.

The opening of the sexual ducts in the coxæ of the second pair of legs is protected by three plates disposed as in the preceding species. The pistal plate is strongly chitinized, in shape of a gradually tapering cone with rounded apex, reaching slightly beyond the distal margin of the coxa. This structure seems to come very near to that of *C. bergiouii*, as drawn by Prof. Silvestri; but the total absence of carina and depressions on the last tergum precludes the identification of these specimens with the Queensland form.

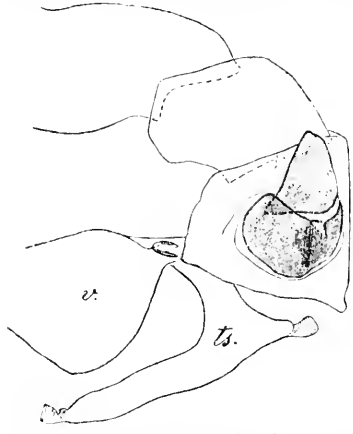

Fig. 22.—*Cyliosoma penrithensis*. Right coxa of 2nd pair of ♀, showing vulva. *v* = Ventral plate; *ts* = tracheal stalk.

One male from Penrith and three females from Cambewarra, New South Wales.

C. peninsularis is closely related to *C. senna*, Silv., 1898, but is to be distinguished from it on account of the following particulars :—

First pair of copulatory organs :—In *C. senna* the proximal joint is less broad, its length stands to its breadth as 8 to 7. Its inner margin is sinuate, the inner angle being bent outwards and less distinct, while in *C. peninsularis* the length stands to the breadth at least as 3 to 4.50 and the inner margin is differently shaped.

Second pair of copulatory organs :—The inner produced angle of the posterior median processes, if measured at its root, is as broad as half the process itself in *C. senna*, while it is less developed in *C. peninsularis*.

Female sexual organs :—In *C. senna* the distal plate rapidly thins out into a slender, acute top, the lateral margins being therefore concave and not straight as in *C. peninsularis*.

No doubt further differences would be brought to light should the types be carefully compared.[7]

Fig. 23.

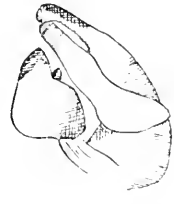

Fig. 25.

Fig. 24.

[7] Silvestri's description of *C. senna* runs as follows :—

"♀ Color fusco olivaceus, margine postico somitorum nigrescente. Caput sparse "punctatum, circa labrum magis punctatum setigerum. Antennae breves articulis "1-5 subaequalibus, articulo 6° coeteris fere duplo longiore, cylindrico. Somita: "tergitum primum sparse setosum, tergitum secondum in excavatione laterum "setosum. Tergita coetera laevigata. Vulva (fig. 23) articulo supero trianguliformi, "apice magis attenuato interne vix reverso. ♂ Foemina minor, tergito ut in "foemina. Organum copulativum: par anticum (fig. 24) articulo secundo minus "magno, forcipe elongato, digito mobili breviore, par posticum (fig. 25) forcipis "digito mobili immobili parum longiore, magnitudine altero subaequali. Long. "corp. mm. ♀ 24, ♂ 22; lat. corp. mm. ♀ 12, ♂ 10. Hab. Cairns (Queensland)."

PROTERANDRIA, Verhoeff, 1894.

POLYDESMOIDEA, Pocock, 1894.

Genus Australiosoma, *gen. nov.*

The characters of this new genus are the following: –

1. Pore formula: 5, 7, 9, 10, 12, 13, 15 to 19.

2. Keel of second tergite reaching below the level of the posterior angle of the first tergite, and of the following keels.

3. Keels more or less reduced.

4. Tarsi of male furnished below with a brush.

5. First pair of legs of male thickened, the third joint being provided with a tooth-like process.

6. Anterior part of fifth sternite bearing a more or less developed lamella.

7. Coxal aperture more or less contracted on the middle line.

8. Gonopods:—Coxal hook present. Femoral part of telopodit distinct. Telopodit more or less condensed and more or less deeply divided into three (sub. gen. *Australiosoma*) or two (sub. gen. *Dicladosoma*) branches.

Type:—*Australiosoma rainbowi*, sp. nov.

This genus is established on the four species, the descriptions of which are given hereafter. All the characters recorded are probably not of equal value; but it has not been possible to ascertain which are to be considered as secondary, as hardly anything is known of the Polydesmids of the Australian continent, Tasmania and New Zealand.

So far the only species recorded from these regions are:—

Polydesmus (Strongylosoma) rubripes, L. Koch, 1867 ..... ♀: Brisbane.

Polydesmus (Strongylosoma) transverse-lineatum, L. Koch, 1867 ..... ♂: Brisbane.

Polydesmus (Strongylosoma) novarae, Humb. and Sauss., 1869 ..... ♂: Auckland.

Polydesmus (Strongylosoma) innotatum, Karsch, 1881 ..... ♀: Adelaide.

Polydesmus (Strongylosoma) sagittarium, Karsch, 1881 ..... ♂: Sydney.

Strongylosoma semoni, Attems, 1898 .....♀: Queensland.
Eustrongylosoma transverse-fasciatum, Silvestri, 1897 .....♀: Gayndah.

Eustrongylosoma bifalcatum, Silvestri, 1898 . ♂: Cairns.

But four out of the eight species can afford no useful indications, as they are known only from female specimens. Nothing is to be made out of the embryonary description of a fifth species, *S. sagittarium*, Karsch. Three more species remain, the copulatory organs of which are known through sketches given by their authors; and this makes it possible to compare them with *Australiosoma*.

For instance, there is hardly any doubt that *S. novarra* is closely related to the continental forms. Attems' drawing[8] shows coxa of the gonopods to be crooked, and the femora to be very distinct; also Humbert & Saussure's description mentions "chez le mâle, entre les pattes de la première paire du cinquième segment, une apophyse courte, arrondie et comprimée transversalement." On the other hand, the development of the keels (which is indeed of little importance), and the shape of the gonopods, with long outstretched tibia and short rudimentary branches, indicates that *S. novarra* has to be held as an aberrant form showing traces of evolution[9]; it will, therefore, be probably found necessary to isolate this species from the bulk of the continental *Australiosoma*, when the limits of variation of the characters of the latter become better known.

As regards *S. transverse-taeniatum* and *Eustrongylosoma bifalcatum*, it may be safely assumed that they belong to the new genus, judging from the shape of the gonopods which bear a striking resemblance to the same organs of *A. raiaboui* and of *A. froggatti*. Yet nothing is known as to the presence of secondary sexual characters, the authors remaining silent on this point. That

[8] Attems System der Polydesmiden, I, 1898, Pl. iii., fig. 58.

[9] A similar case, though less characterized, will be found hereafter in *Australiosoma kosciuscovagum*.

such a blank should exist in Prof. Silvestri's text is not surprising, as the diagnosis of *E. bifalcatum* is shortened, and the fact that the matter was left unspoken does not imply that the secondary characters do not exist. As to *S. transverse-taeniatum*, which has been redescribed at length by Attems, it is more astonishing that the Austrian author, whose writings rank amongst the best, should have neglected to mention the structure of the first pair of legs and of the fifth sternum. Are we to understand that these organs show no special feature, or are we to admit that, the specimens being curled up, these particulars have escaped his attention? The matter is not easy to decide; and should the first alternative prove to be the right one, it would become necessary to somewhat alter the above given diagnosis of the genus. For this reason, some of the characters mentioned therein, and namely the characters numbered three to seven, should not be entirely relied upon until they have undergone further test.

Thus far the genus *Australiosoma* includes six species, *i.e.*:—*A. transverse-taeniatum*, L. Koch, 1867, *A. bifalcatum*, Silvestri, 1898, *A. rainbowi*, *A. froggatti*, *A. kosciuscoragum* and *A. etheridgei*, spp. nov.

In all six cases the gonopods show the following particulars:—The coxa is crooked, with a prominent anterior surface adorned with some fleecy hairs (*cox.* Pl. xiv., figs. 14, 22); no trace of the anterior marginal process is to be seen; the inner hook is normally developed. The femur is distinctly outlined (Pl. xiv., figs, 9, 14, 18), the limits being often grooved; its surface is abundantly clothed with setæ, more dense and much longer in the vicinity of the proximal opening of the seminal duct. The tibia is generally condensed and the telopodit deeply split (less so in *A. kosciuscoragum*, which is a mountain dweller, and has evidently been differently affected by evolution); the tibial branch starts from the posterior (Pl. xiv., *tb.*, fig. 8), or from the outer (Pl. xiv., *tb.* fig. 14; Pl. xv., figs. 18, 21) surface of the telopodit.

Besides the seminal and the tibial branch, a third process is generally to be seen starting from the telopodit more distally than the tibial branch; and this has to be identified as a tarsal branch (Pl. xiv., *tab.* figs., 8, 13; Pl, xv., fig. 18). Yet its existence does not appear to be as constant as that of the

tibial branch; no trace of it is found in *A. etheridgei* (Pl. xv., fig. 21). As moreover the tibial branch assumes in this species a shape not met with in the other members of the genus *Australiosoma* (being widened and hollowed proximally so as to shelter the base of the seminal branch), it has been found necessary to isolate same and to erect a special sub-generic division for its reception.

The genus *Australiosoma* will, therefore, be divided into two sub-genera :—

1. AUSTRALIOSOMA *(sensu stricto)*, the gonopods of which are split into three branches.

2. DICLADOSOMA, the gonopods of which are split into two branches, the other generic characters remaining identical in both divisions.

Amongst the known continental *Australiosoma*, a species has been mentioned above, which has been ascribed by its author to the genus *Eustrongylosoma* :—*E. bifidatum*, Silvestri, 1898, from Cairns, Queensland. It has not been found convenient to use this generic name for the continental forms hereafter described, as:—1st, no full description has been given of the genus, and 2nd, while as much as can be understood from Prof. Silvestri's writings, the continental *Australiosoma* seem different from the New Guinea type specimen of *Eustrongylosoma*, *E. fasciatum*, Silv., 1894.

The name *Eustrongylosoma* was created by Prof. Silvestri[9A] in 1896. No description was given, as already stated; but, the genus being included in an analytical key of his Polydesmidæ,[10] it may be inferred, from the terms of the key, that its characters are the following:—

Pores opening sideways in the keels of the segments 5, 7, 9, 10, 12, 13, 15 to 19.

Keels small, linear, with posterior angle not produced; keels of second segment produced below the level of the keels of segments 1 and 3.

[9A] Silvestri—I Diplopodi; Parte 1, Sistematica. Ann. Mus. Civ. Stor. Nat. Genova, (2), xvi., 1896, p. 198.

[10] It is to be observed that Silvestri's family by no means answers the likewise named division of other authors.

Last segment more triangular (than in *Anoplodesmus* and *Leptodesmus*).

Tergites destitute of warts.

Sternite unarmed.

Warts of the anal sternite small, not exceeding the apex of the sternite.

Trochanter of ambulatory legs spineless; other joints subequal, the femur not being twice longer than the tibia.

Pleuro-sternal suture not keeled (this last character is supposed to separate *Eustrongylosoma* from *Strongylosoma*, Brandt).

Not a single word is said of the structure of the copulatory appendages, and the genus thus appears so doubtful, that Dr. Attems, in his well-known "System der Polydesmiden," was led to consider Silvestri's denomination as synonymous with *Strongylosoma*.

To *Eustrongylosoma* is ascribed, as type specimen, the New Guinea *Strongylosoma fasciatum*.[11] No figure of the gonopods was given, but it is said in the diagnosis:—"♂: pedum omnium articulus ultimus infra setosissimus; pedes copulativi simplices, apice multo recurvato circulum fere formante." The gonopods of *E. fasciatum* being undivided, "simplices," it is utterly impossible to place beside it the continental forms with condensed and split telopodit.

One more word is to be added concerning *Australiosoma*. Attems, when re-describing Koch's *A. transverse-taeniatum*, states:—"Die Copulationsfüsse erinnern durch die tiefe Spaltung eher an die von *Leptodesmus*." But a main criterion escaped Attems' attention, and that is how differently constructed are the coxæ of Strongylosomids and Leptodesmids. Nevertheless, a similarity exists in the telopodit and is to be held as a highly instructive case of parallelism. From it we learn that, in continental regions where a special group of Polydesmids seems to find the most and more favorable conditions for their existence, the evolution tends to complicate the gonopods by

[11] Silvestri—Ann. Mus. Civ. Stor. Nat. Genova (2), xiv., 1894-5, p. 642.

favouring the condensation of the telopodit and the growth of its processes. Whilst around such regions, taken as centres, in surrounding mountain ranges or in isolated lands and islands, the condition of life are different enough to slacken or alter the action of evolution. Yet it is to be expected that, under the latter conditions, forms will crop out more perfect under some other point of view still to be ascertained. Such is the case for Leptodesmids in South America, and will likely prove to be the case for Strongylosomids in the Australian continent and surroundings.

The following is an analytical key to the six known species of *Australiosoma* :—

1 (2)—Body with a transverse yellow stripe on the posterior half of metazonite.....*A. transverse-taeniatum*, L. K.

2 (1)—Body without transverse yellow stripes..... 3

3 (6)—Body of an uniform colour, or, should the dorsal part appear lighter, no definite longitudinal bands are seen.....4

4 (5)—Distal part of seminal branch of gonopods gradually thinning out into a spine-like apex; posterior branch two thirds the length of the seminal branch; end of anterior branch not expanded.....
A. bifidentum, Silvestri.

5 (4)—Distal end of seminal branch divided into three tines; posterior branch nearly as long as the seminal branch; end of the anterior branch spade shaped
A. froggatti, sp. nov.

6 (3)—Body with one or two defined light-coloured dorsal bands.....7

7 (8)—Anterior margin of coxal aperture of gonopods with a large, horizontal lap produced backwards; posterior margin without process; posterior (outer) branch of gonopods blade-like, curved outside the organ
A. kosciuskorogum, sp. nov.

8 (7)—Anterior margin of coxal aperture of gonopods without a lap; posterior margin with a strong tooth-like process directed downwards.....9

9 (10)—Gonopods divided into three branches; posterior branch not overhanging the femur proximally, gradually thinner, curled inside the organ ....
A. rainbowi, sp. nov.

10 (9)—Gonopods divided into two branches; posterior branch with broad base, overhanging the femur externally, expanded distally on the outer surface of the organ .....
A. (Dicladosoma) etheridgei, sp. nov.

AUSTRALIOSOMA FROGGATTI, *sp. nov.*

(Pl. xiv., figs. 8-12).

(a) ♂ type: length 47 m m; breadth of 12th tergite 4.20 m m, of 12th prozonite 3.10 m/m.

(b) ♂: length 48 m/m; breadth of 12th tergite 4.30 m m.

(c) ♀: length 42 m m; breadth of 12th tergite 4.25 m m.

Ground colour, a very dark brown, reddish on the dorsal surface and below the keels. Ventral side and the three proximal joints of the legs yellow-brown; the three distal joints of the legs reddish-brown to dark brown.

Head smooth, pilose behind the labrum, wrinkled and swollen behind the antennæ causing the vertex to appear flattened. Median sulcus distinct on the vertex, short not reaching the base of the antennæ, not branched. Lateral margins of the head much swollen below the antennal sockets. The latter not sunken, standing close together (0.73 m/m apart). Antennæ long and slender, reaching as far back as the suture of the third segment in the male, as the posterior margin of the second segment in the female; shortly pilose from the second joint; four sensory cones. Micrometrical measurements of the joints:—1st, 0.416 m/m; 2nd, 1.216 m/m; 3rd, 1.152 m/m; 4th, 1.056 m/m; 5th, 1.088 m/m; 6th, 0.992 m/m; 7th and 8th, 0.160 m/m; total length, 6.08 m/m.

Integuments smooth, dull on the prozonite, strongly shining on the metazonites, the latter with scarcely perceptible irregular wrinkles towards the posterior end of the body.

Tergites and keels similar in shape to *A. rainbowi*, transversely furrowed from the fifth to the seventeenth segment. From the fifth segment the body is flattened (Pl. xv., fig. 10) while it remain convex in *A. rainbowi*. The dorsal surface of the keels of second segment appears less hollowed. Suture

indistinctly granular. Pores as in *A. rainbowi*. Last segment leathery or wrinkled towards the apex, which is truncate; the usual setæ are not mounted on granules.

Valves globular, smooth or scarcely wrinkled in the angles, with shining, raised margins and a pair of setæ on each side. Anal sternite rounded with a pair of marginal setæ. Ventral plates unarmed, with some long fleecy hair inside the base of the legs, and with distinct transverse and longitudinal impressions. Pleuro-ventral ridges recognizable only on the third and fourth segments, simply swollen on the following.

Legs long; as long in the posterior end of the body as in the middle (tenth pair = 5.90 m/m; thirty-first pair = 6 m/m), shortly pilose. Third joint distinctly longer than the breadth of the corresponding sternite; last joint shorter than the third.

Male:—The brush which adorns the ventral surface of the tarsi of anterior legs is poorly furnished with setæ and quickly thins out after the seventh pair of legs. First pair thickened and provided with a blunt tooth below the third joint (Pl. xiv., *a* fig. 17 = *A. rainbowi*); claw rudimentary, rounded. Between the coxæ of the fourth pair of legs is to be seen a conspicuous perpendicular, sub-quadrangular lamella (Pl. xiv., figs. 11 and 12), growing broader distally, the margin of which is somewhat sinuate with rounded angles; the anterior surface is swollen and clothed with very short hairs, while the posterior surface is naked and bears two shallow impressions. The sternite of the sixth segment is hollowed to lodge the copulatory appendages at rest, the excavation being shallow and without definable limits.

The coxal aperture of the gonopods has its anterior margin feebly sinuate and without median angular plate; its posterior margin is destitute of any tooth-like process, being simply angular, the two coxal sockets thus communicating more broadly in the middle than in *A. rainbowi*.

Coxæ of gonopods (Pl. xiv., figs. 9 and 10) protruding out of the coxal aperture, more so than in any other species of the genus; telopodits also proportionally longer. Gonopods entirely independent from one another. Coxa longish, crooked above the middle, with its anterior surface flattened in its proximal half, adorned with numerous fleecy hairs in the distal half. No marginal process. Hook thick at the base and

gradually tapering. Tracheal stalk moderately long, flattened, curved.

Femoral part distinct; it is produced angularly on the posterior surface where it is clothed with numerous and long fleecy hairs.

Telopodit split into three branches, of which the posterior *(th.)* is, in its turn, divided into two thin rods almost straight and somewhat shorter than the other branches. Before preparing for microscopical examination, the two rods were so closely coupled that it was not possible to distinguish one from the other (Pl. xiv., fig. 8); the disjoining was realized through boiling in potash. The anterior branch *(tab.)* is flattened, ribbon-shaped, slightly sinuate and of equal breadth up to a point near the end where it is abruptly curved and expands into a short and wide, spade-shaped lamella. The seminal branch *(sb.)* is sinuate and swerved outwards in its proximal half; it is flattened and slightly widened afterwards, then it bends abruptly inward before the apex which is divided into three short tines; of these, two are acute, the third being sub-quadrangular; the seminal duct opens in the median spine-like tine.

Female:—The coxæ of the second pair of legs bear two granular warts placed side by side on the distal half of the posterior surface.

Three specimens from Mount Sassafras, Shoalhaven District.

AUSTRALIOSOMA RAINBOWI, *sp. nov.*

(Plate xiv., figs. 13-17; Fig. 26.)

(a) ♂ type: length 41 m m; breadth of 12th tergite 4.50 m m, of 12th pro-zonite 3.30 m m.

(b) ♀: length 41 m m; breadth of 12th tergite 4.80 m m.

(c) ♀: length 42 m m; breadth of 12th tergite 4.80 m m. (No. 22).

(d) ♀: length 43 m m; breadth of 12th tergite 5. m m.

(e) ♀: length 44 m m; breadth of 12th tergite 5.25 m m.

(f) ♀: length 43 m m; breadth of 12th tergite 5.20 m m. (No. 24).

Ground colour very dark, blackish; carinæ orange-yellow; two narrow dorsal yellow bands divided by a reddish-brown line begin at the posterior margin of the first segment and run through to the apex of the last segment. Legs brownish, growing darker towards the end.

Head smooth, except behind the labrum where the face is pilose and sometimes uneven, and also occasionally above the antennæ, where some tiny wrinkles may be seen; surface rather swollen behind the antennæ, wherefrom the vertex appears flattened; median sulcus wide in the middle, linear backwards and between the antennæ, where it disappears abruptly. Antennæ standing close together (0.80 m/m apart), long and slender, reaching the posterior margin of the third segment; pilose from the second joint, more densely towards the apex, which bears four sensory cones. Micrometrical measurements of the joints: 1st, 0.50 m/m; 2nd, 1.25 m/m; 3rd, 1.20 m/m; 4th, 1.15 m/m; 5th, 1.10 m/m; 6th, 0.95 m/m; 7th and 8th, 0.15 m/m; total length: 6.30 m/m.

Integuments smooth and scarcely shining, with more or less distinct, irregular, mostly branched striæ, lacking orientation, and, towards the posterior end of the body, with some irregular, longitudinal wrinkles. First tergite with a vague transverse median impression; anterior margin straight in the middle, oblique on each side; posterior margin scarcely concave; posterior angle rounded, with a marginal furrow. Second tergite with small but well characterized, sloping keels reaching below the posterior angle of the first tergite; margins raised, causing the surface to appear hollow; anterior angle rounded; posterior angle slightly produced and rounded. From the third segment the keels are considerably reduced and located rather low; anterior angle entirely rounded; posterior angle not produced beyond the level of the posterior margin of the segment, yet somewhat acute owing to the fact that the posterior margin is slightly excised; suture beset with a row of very fine granules. From the fifth segment to the seventeenth, the metazonites are divided into two subequal halves by a distinct transverse furrow. Pores opening sideways near the posterior angle of the keels of the segments 5, 7, 9, 10, 12, 13, 15 to 19. Last segment gradually narrowed, with apex truncate, smooth. Valves, globular, smooth, with shining,

raised margins and a pair of setæ on each side. Anal sternite rounded, with a pair of marginal setæ.

Ventral plates very hairy, showing a vague transverse impression and no spines. Pleurosternal suture ridged on the segments 2, 3 and 4, scarcely swollen and smoothed backwards, except perhaps on the sixth somite where the swelling is tipped with a tiny granule near the posterior margin of the segment. Stigmata opening in small yellow granules. Legs long, growing longer backwards; on a ♂ specimen a leg of the tenth pair measured 5.25 m/m, a leg of the thirty-first pair measured 6 m/m. Joints clothed below with fleecy hair; third joint longer than the breadth of the corresponding sternite; sixth shorter than the third.

Male:—Last joint of the legs furnished with a thick brush (Pl. xiv., fig. 17). Joints of the first pair thickened; the third joint is considerably swollen and is provided with a strong blunt tooth on its lower surface; claw, strong, acute. The fifth segment bears, between the coxæ of the fourth pair, a very prominent lamella slightly curved backwards (Pl. xiv., fig. 16), almost as wide as long, the anterior and posterior sides of which are hairy and the margin rounded and shining. The ventral plate of the sixth segment is widely excavated to shelter the copulatory appendages at rest.

The coxal aperture of the gonopods (fig. 26) is composed of two semicircles placed side by side and fused on the middle line. The anterior margin is upraised; it is almost straight, but is interrupted in the middle by a small triangular, horizontal plate pointing backwards. The posterior margin of the aperture is sinuate and bears on its median curve a very strong and long tooth placed perpendicularly, the proximal part of which dips in the coxal aperture while its distal end, compressed laterally, stands upright between the gonopods. The space left between the anterior triangular plate and the posterior perpendicular tooth is small indeed, as shown in fig. 26.

Fig. 26—*Australiosoma rainbowi*.—Side view of coxal aperture of gonopods. *st*. = Stigmata; *pg* = 9th pair of legs.

Gonopods entirely independent of one another. Coxæ longish somewhat crooked distally, with posterior distal margin slightly produced but without any marginal process: some fleecy hairs are seen on its anterior surface. Coxal hook of usual length and shape.

Tracheal stalk (Pl. xiv., fig. 14) moderately long, flattened, slightly curved. Femoral part of telopodit angularly produced on the posterior surface and very hairy. Telopodit (Pl. xiv., figs. 13 and 14) split in three branches of even length. Tibial branch *(th.)* moderately wide, gently arched, flattened distally, gradually tapering, then abruptly enlarged at the apex, which is rounded, except in its anterior angle which is produced into a short, acute spine. Tarsal branch *(tab.)* winding inwards, angular along its posterior edge near the base, slowly but regularly narrowed afterwards, and with an acute apex. Seminal branch *(sb.)* curved, gradually narrowed, with a short process below the middle of its outer edge *(x.)*

Female:—Coxæ of the second pair provided with a low, rounded, but strongly chitinized crest on the outer edge of its posterior surface.

Six specimens from Mount Sassafras, one male and five females.

AUSTRALIOSOMA KOSCIUSKOVAGUM, *sp. nov.*

(Plate xv., figs. 18-20; Fig. 27.)

(a) ♂ type: length 4.8 m.m; breadth of 12th tergite 5 m.m, of 12th prozonite 4.20 m.m.

(b) ♀: length 4.6 m.m; breadth of 12th tergite 5.60 m.m.

Colour as in *A. rainbowi*: dark red-brown background with a dorsal yellow-brown band extending from the anterior margin of the first segment to the apex of the last, divided into two stripes by a brown median line. Keels tipped with yellow. Pleural and ventral surface more reddish. Antennæ and legs dark.

Head smooth, except behind the upper lip where the face is rugose and hairy. Vertex swollen on both sides, not particularly flattened in the middle, with a median sulcus feebly impressed and indistinctly branched between the antennæ.

Antennal groove strongly wrinkled. Lateral margins strongly swollen outside the antennal sockets. Antennæ standing close together (♂ : 0.80 m m apart), moderately elongate, not reaching (♀) or scarcely over-reaching (♂) the posterior margin of the second segment, slender, shortly pilose, tipped with four sensory cones. Micrometrical measurements of joints : 1st, 0.480 m m ; 2nd, 1.152 m m ; 3rd, 1.280 m m ; 4th, 1.248 m m ; 5th, 1.216 m m ; 6th, 0.992 m m ; 7th and 8th, 0.256 m m ; total length, 6.624 m m.

The Tömöswary organ realises a growth so far unrecorded amongst Polydesmids ; it is to be seen as a pale yellow, transverse and transparent low swelling, in the shape of a crescent with rounded inner angle, located exactly behind the antennal socket ; in the other species, this organ is considerably smaller, dot shaped, and stands in the antennal fossa, behind and close to the antennal socket.

First segment smooth. Anterior margin straight in the middle, gently arched on each side ; posterior angle rounded and slightly thickened, with a marginal sulcus ; posterior margin feebly excised. Keels of the second segment very small, with rounded anterior angle (more rounded than in other species), reaching downward far below the posterior angle of the keel of first segment. The margins of the keel are somewhat incrassate, and its surface is not so strongly grooved as in *A. rainbowi*.

Integuments scarcely shining, with indistinct wavy sort of striæ lacking orientation. Keels considerably reduced, rounded anteriorly ; posterior angle rounded on the anterior segments and gradually less prominent backwards. Suture densely beset with minute longitudinal striæ. From the fifth segment to the seventeenth, the metazonite show a very shallow transverse impression and a thin sulcus growing fainter on the sixteenth and seventeenth segments ; yet the body is not flattened as in *A. froggatti* (Pl. xv., fig. 20). Pores opening sideways in the keels 5, 7, 9, 10, 12, 13, 15 to 19. Last segment of the usual conic shape, with as few setæ as in the other species. Valves globular, with no distinctly raised margins, but with a pair of low granules tipped with setæ on each valve. Anal sternite large, rounded, yellow, with a pair of marginal setæ.

Ventral plates spineless, hairy, with the usual cross-impressions well marked. Pleurosternal suture with a fine ridge on the segments four to seven, simply swollen on the following and growing more and more faint towards the posterior end of the body. Stigmata opening in small, dark coloured granules. Legs long; not longer at the posterior end than in the middle of the body; pilose; third joint longer than the breadth of the corresponding sternite (in the proportion of 3 to 2.5); last joint distinctly shorter than the third.

Male:—The last joint of all legs and the distal half of the fifth joint are furnished below with a thick brush. First pair of legs similar to that of *A. rainbowi*, thickened, and with a strong blunt tooth on the anterior surface of the third joint; claw normal, acute. The intercoxal lamina of the fifth sternite is similar to that of *A. froggatti*, large, filling all the space between the coxæ of the fourth pair, turned onwards, wider distally, but less thickened with distal angles, less rounded and somewhat more straight margin.

The coxal aperture of the gonopods has quite a special structure (fig. 27). The posterior margin is angularly produced, but shows no trace of a tooth as seen in *A. rainbowi* or *A. etheridgei*. The anterior margin, on the contrary, is upraised, excised on each side, angular outwardly, and provided in the middle with a large horizontal lap, the apex of which is rounded, overhanging the aperture and reaching as far back as the level of the posterior margin, so that, to a superficial observer, the coxal aperture might appear to be divided into two sockets.

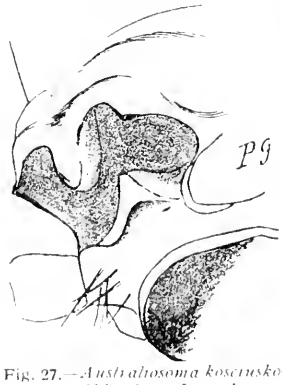

Fig. 27.—*Austrohosoma koscinskozagum.* Side view of coxal aperture of gonopods. *pg* = 9th pair legs.

Gonopods (Pl. xv., figs. 18 and 19) entirely independent from one another. Coxæ of normal shape; the posterior distal margin is feebly produced; no anterior distal process. Tracheal stalk moderately elongate, flattened, arched. Femoral part of the telopodit distinctly outlined all round, somewhat produced posteriorly, very hairy. The rest of the telopodit is not

deeply split, in order that a compressed tibial stem may be distinguished (Pl. xv., *T.* fig. 18), the outer angle of which ends into a short, scythe-shaped process *(th.)*, with acute apex turned inwards. Further on, the telopodit is divided into two more branches. The seminal branch *(sb.)* is lamellar and leaf-shaped, while the posterior branch *(tab.)*, gently arched inside, end into two long and slender horns.

Female :—Coxæ of the second pair of legs with posterior surface much swollen and strongly chitinized, but without crest or warts.

Two specimens, male and female, from Pretty Point, Mount Koscinsko.

AUSTRALIOSOMA (Dicladosoma) ETHERIDGEI, *sp. nov.*

(Plate xv., figs. 21, 22.)

♂ type : length 31 m m ; breadth of 12th tergite 3 m m, of 12th prozonite 2.70 m m.

Ground colour dark brown, with a pale brownish yellow band, contracted at the suture and enlarged towards the posterior margin of each segment, running through from the anterior margin of the first segment to the apex of the last. Pleuræ a dull red-brown ; legs dark madder.

Similar to the preceding species in many respects, such as shape of the first segment, form and development of keels, pore formula, male secondary characters ; yet of smaller size and with different copulatory appendages.

Head smooth, not shining ; upper lip hairy, but face almost naked ; lateral margins swollen ; vertex swollen on each side behind the antennæ, with well marked, not distinctly branched sulcus ; antennal grooves wrinkled. Tömösvary organ dot-shaped. Antennal sockets not sunken. Antennæ of moderate length, slender, shortly pilose, standing close together (0.51 m m apart), with four sensory cones. Micrometrical measurements of joints : 1st joint, 0.320 m m ; 2nd, 0.736 m m ; 3rd, 0.736 m m ; 4th, 0.704 m m ; 5th, 0.704 m m ; 6th, 0.672 m m ; 7th and 8th, 0.256 ; total length, 4.128 m m.

Integuments smooth ; prozonite dull, metazonite shining. Posterior angle of the first tergite rounded and with a marginal sulcus. Anterior angle of second tergite reaching below the

posterior angle of the preceding keel, only moderately rounded, and with a minute tooth pointing outwards; posterior angle somewhat overreaching the level of the posterior margin. Keels of the following segments very small, pad-shaped, thickened on the poriferous segments, completely rounded anteriorly, with posterior angle distinct as in *A. rainbowi*. Suture neatly sulcate, more coarsely than in *A. kosciuscoragum*, appearing granular. Metazonites five to seventeen somewhat flattened and divided by a well marked transverse sulcus, the bottom of which is punctured. Pores opening sideways at a small distance of the posterior angle of the keels 5, 7, 9, 10, 12, 13, 15 to 19. Last segment of the usual form. Setæ not mounted on granules. Valves globular, strongly shining, with thin upraised margins and a couple of low setiferous granules on each side. Anal sternite yellow, large, rounded, with a pair of marginal setæ.

Sternite of segments spineless, hairy, with well marked cross impressions. Pleurosternal suture adorned with a tiny arched ridge on the segments three, four and five, quickly disappearing backwards. Legs moderately long, almost naked above, pilose below. Third joint scarcely longer than the breadth of the corresponding sternite; sixth joint but a trifle shorter than the third.

Male:—The brush which adorns the ventral surface of the tarsi is dense and thins out only in the last pair of legs. First pair of legs thickened, with a blunt tooth on the anterior surface of the third joint; claw normal. The sternal lamella of the fifth segment is rectangular, not wider distally, slightly curved, pointing onwards and downwards; it is shortly pilose on its anterior surface. The sternite of the sixth segment is simply flattened, not excavated.

The coxal aperture resembles that of *A. rainbowi*, in being provided with a strong tooth projecting far out above the level of the body; yet the anterior margin is not as straight; it is strongly and angularly produced backwards, the aperture being thus considerably contracted on the middle line. In front of the outer angles of the aperture, thick ridges are to be seen directed obliquely onwards, the outer end of which is abruptly rounded while the inner die out before meeting on the middle line of the body. The legs of the ninth pair are strongly driven aside.

Distance between the gonopods much larger than in the preceding species. Coxæ and tracheal stalk of the usual form. Femoral part of the telopodit very distant. Tibia much condensed and enlarged, showing a rounded lap (Pl. xv., *a.* fig. 21) hanging down on the outer surface of the femur. The telepodit (Pl. xv., figs. 21 and 22) is deeply split into two branches of unequal length. The outer, tibial branch *(th.)*, the longest, is wide, hollowed at the base, with coiled margin; it is curved inwards at its distal third, and thins out in a conspicuous long horn the end of which is bent onwards; it furnishes a thin awl-shaped process in the middle of its anterior edge *(b)* and a short and acute triangular piece at the base of the distal horn *(c)*. Inner seminal branch *(sb.)* short and more slender; its base rests in the concavity of the tibial branch; it is curved inwards at its distal thirds; the end is lamellar and divided into rounded lobes at the side of which opens the seminal duct.

Female unknown.

One male specimen from Pretty Point, Mount Kosciusko.

IULOIDEA, Pocock, 1894.

SPIROBOLIDÆ, Bollman, 1893.

The species hereafter described may be tabulated as follows:—

1 (2)—Metazonites bearing eight to twelve strong ridges ending backwards in stout conic spines, symetrically disposed along the posterior margins..... .....
Acanthiulus blainvillei, Le Guillon.

2 (1)—Metazonites not spined along the posterior margin...3.

3 (6)—Sides of the first tergite reaching the ventral surface of the second segment. Prozonites marked with horse-shoe shaped punctures.....4.

4 (5)—Sides of first tergite triangular with blunt apex. Posterior gonopods connected by a bridge, the two joints standing at a right angle. Tracheal stalk of anterior gonopods short, directed upwards and reaching the base of the tibia .....
Spirostrophus digitulus, sp. nov.

5 (4)—Sides of first tergite nearly quadrangular with rounded outer margin. Posterior gonopods independent, the two joints standing in a line. Tracheal stalk of anterior gonopods long, dipping inside the body.....
Spirobolellus rainbowi, sp. nov.

6 (3)—Sides of first tergite falling short of the ventral surface of the second segment. Prozonites smooth, striate or sulcate, and, when punctured, the punctures are by no means horse-shoe shaped .....7.

7 (8)—Posterior margin of segments excised in correspondence with the scobinas of the following segment.....
Dimematocricus lanceolatus, sp. nov.

8 (7)—Posterior margin of segments not excised .....9.

9 (10)—Dimple of the scobina small, circular, not wider than long. Inner branch of posterior gonopod located immediately above the basal swelling. Ventral posterior margin of 7th segment upraised into a thick, prominent, transverse ridge.....
D. (Cladiscocricus) falcatus scobinata, subsp. nov.

10 (9)—Dimple of the scobina transversely developed, always distinctly wider than long. Inner branch of posterior gonopod located at a distance of the base of the joint nearly equal to its length.[12] Ventral ridge of 7th segment not thickened and less prominent.....11.

11 (12)—Dimples of scobinas entirely open frontwards and located on the anterior margins of the zonites which seems to be excised. Metazonite deeply sulcate dorsally, the sulci separated by low rounded ridges .....
Dimematocricus carinatus, Karsch.

12 (11)—Dimples of scobinas distant from the anterior margins of the zonites, closed frontwards.....13.

13 (16)—Distance between the dimples of the scobinas not exceeding once and a half the diameter of a dimple...14.

[12] The characters borrowed from the male organs could not be verified in *D. consimilis*, the only representative of which is a female.

14 (15)—Dimples of the scobinas twice as wide as long, rounded at its ends, the bottom being raised and convex; posterior zone without distinct striæ..... *Dinematocricus fasciatus*, sp. nov.

15 (14)—Dimple of the scobina nearly five times as wide as long, with acute ends and concave bottom; the posterior zone distinctly striate..... *Dinematocricus consimilis*, sp. nov.

16 (13)—Distance between the dimples at least three times the diameter of one of them ..... 17.

17 (20)—Distal process of the ventral plate of anterior gonopods as long as, or longer than the proximal part. Integuments without silky lustre ..... 18.

18 (19)—Legs chestnut. Posterior part of prozonite with a transverse dorsal sulcus. Valves not particularly prominent, and but slightly compressed. Distal process of ventral plate of anterior gonopods slightly narrowed at the base, rather linguiform. Four antennal sensory cones..... *Dinematocricus disjunctus*, sp. nov.

19 (18)—Legs dark. Posterior part of prozonite without transverse dorsal sulcus. Valves with a distinct premarginal impression, very prominent, with upper angles unusually thickened. Distal process of ventral plate of anterior gonopods gradually narrowed from the base to the apex. Fifteen antennal sensory cones ..... *Dinematocricus analis*, sp. nov.

20 (17)—Distal processes of the ventral plates of anterior gonopods half as long as the proximal part. Integuments densely beset with minute striæ, showing a silky lustre *Dinematocricus holosericeus*, sp. nov

Genus Acanthiulus, *Gervais*, 1844.

(? Syn.: *Polybunolobus*, Pocock, Ann. Mag. Nat. Hist. (7), xii., 1893).

Anterior gonopod somewhat as in *Trigoniulus*. The proximal part of the ventral plate (Pl. xv., *c*. fig. 23) extends laterally around the base of the organ; it is fused with its

outer lobe *(ol.)*; it is seen to end on the posterior face of the organ, where it meets the tracheal stalk. The latter is short, widened distally, its end being directed upwards and leaning against the base of the tibia. The coxo-femur *(cf.)* is shell-shaped with a concave posterior surface; when viewed from the anterior surface, it entirely conceals the tibia; its edges are folded back on the sides of the organ, but do not encroach on the posterior surface. The tibia *(t.)* is short and wide, lodged in the concavity of the preceding joint.

Posterior gonopods connected together by a chitinized bridge (Pl. xv., fig. 25). Each gonopod is two-jointed; the proximal joint is constructed as in *Trigoniulus* and shelters the basal, bladder-like swelling of the seminal duct, in which opens the so-called prostatic duct. The distal joint is a stout and comparatively short, feebly curved organ, the outer surface of which is strongly convex and smooth, while the inner is deeply excavated, thus offering some resemblance with a tablespoon. The concavity is lined with a soft membrane. The seminal duct is twisted above its basal swelling and is seen to wind its way in the membranaceous lining of the distal joint, and to open above the middle of the concavity of the joint. Tracheal stalks normal, as in *Trigoniulus*.

Labral dimples 2 + 2. Pores opening in the prozonite.

The Genus *Acanthiulus* was created by Gervais[13] with *A. blainvillei*, Le Guillou, as type specimen; no detailed description of the sexual appendages has ever been given.

The same species has been redescribed by E. Daday de Deés under the name of *Spirobolus dentatus*[14] but the figures given by the Hungarian scientist (Pl. iii., figs. 6 and 7) only represent the anterior gonopods and leave many particulars in the dark.

The author[15] endeavoured to analyse the copulatory appendages of a similar species, *Acanthiulus maindroni*, Bouvier; but the said species happens to belong to the genus *Eucentrobolus*, contemporaneously proposed by Pocock[16] for an Indian species, *E. tamulus*.

[13] Gervais—Ann. Sc. Nat., Zool. (3), ii., 1844.

[14] Daday—Term. Füz., xvi., 1893, p. 101.

[15] Brölemann—Le genre *Acanthiulus*, Ann. Soc. Entom. France, lxxii., 1903, p. 469-477, pl. viii.

[16] Pocock—Ann. Mag. Nat. Hist. (7), xii., 1903, p. 528.

The main difference between the two genera lie in the following particulars :—

1st. Whereas, in *Acanthiulus*, the joints of the posterior gonopods are entirely free (movable) as in *Trigoniulus*, in *Eucentrobolus*, both joints are fused together into a single piece, in which the place formerly occupied by the once existing articulation is marked by oblique folds.

2nd. The posterior gonopods of *Eucentrobolus* are poorly chitinized, compressed, sickle-shaped organs, not unlike the similar organs of *Epitrigoniulus*. On the contrary, in *Acanthiulus*, they are stout and strongly chitinized, spoon-shaped organs, which can be compared to none of the known gonopods of Spirobolids.

Another Indian species *A. murrayi*, originally ascribed to *Acanthiulus*[17] has later on been made the type of a third genus, *Polybunolobus*, by Pocock.[18] To this Pocock was led by Daday's statement that, in *Acanthiulus*, the pores open in the metazonite; since this statement proves to be erroneous (as will by seen hereafter), the validity of Pocock's genus has to be tested anew, and this will only be possible when the male of *A. murrayi* is known.

Acanthiulus blainvillei, Le Guillon, 1841.

(Plate xv., figs. 23-26).

Julus Blainvillei, Le Guillon, Bull. Soc. Philom. Paris, 1841, p. 80; Gervais in Walckenaer, Hist. Nat. Ins. Apteres, iv., 1847.

Trigoniulus Blainvillei, Silvestri, Ann. Mus. Civ. Stor. Nat. Genova, xxxiv., 1894, p. 95.

Spirobolus dentatus, Daday, *Loc. cit.*, 1893.

Acanthiulus Blainvillei, Gervais, *Loc. cit.*, 1844; Bollman, Bull. U.S. Nat. Mus. No. 46, 1893; Pocock, *Loc. cit.*, 1893 and 1903; Brölemann, *Loc. cit.*, 1903.

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[17] Pocock—Ann. Mag. Nat. Hist. (6), xi., 1893, p. 136.

[18] Pocock—1893, *Loc, cit.*, p. 531.

♂ mat.: length 125 m m; diameter 10.50 m m; 50 segments; one segment apodous; 91 pair of legs.

♂ juv.: length 95 m m; diameter 9.30 m m; 50 segments; one segment apodous; 91 pair of legs.

♂ juv.: length 77 m/m; diameter 7.40 m m; 50 segments; four segments apodous; 85 pair of legs.

The more striking characters of this species have already been recorded by Gervais *(Loc. cit.*, p. 70) and, more recently by Daday *(Loc. cit.*, p. 101) to whom we are indebted for the following diagnosis:—

"Mediocris, postice parum attenuatus; colore nigrescenti, "nitidens; antennis collum parum superantibus, flavidis; facie "rugoso, sulco mediano levi; clypeo utrinque foveis duabus; "oculis e seriebus 6 ocellorum utrinque 38-40 compositis, "ocellis evanescentibus; collo margine inferiore angustata, "postice producto angusteque rotundato, sulco marginali unico; "segmentis 49, excepto collo segmentoque ultimo, in margine "postica rugosis, dentibusque 8 validiusculis coronatis; dentibus "in superficie corporis tota in seriebus longitudinalibus 8 "ordinatis; scobinis nullis; segmento ultimo in processu "deplanato, parum producto, valvulas anales non superanti "exeunte; valvulis analibus compressis, late carinatis, carinis "ferrugineo-nigrescentibus vel nigris; foraminibus repugna- "toriis supra lineam medianam longitudinalem in annulo *tertio* "segmentorum positis; pedibus 91 paribus, ferrugineo- "nigrescentibus, articulo tarsali spinis 4-5 validiusculis "armato; gnathochilario organisque copulatoriis in figuris 1, "6 et 7 Tabulæ III delineatis. Longit. corp. 145-150 m m, "latit. maxim. 11-12 m m. Patria: Nova Guinea (Wilhelms- "land)."[19]

In the mature specimen examined, the head is smooth, shining; the labral dimples are small, the two median dimples stand nearer to one another than to the outer dimples. The mandibular pleuræ are angularly produced, without flat impressed surface.

[19] The figures referred to in the description have not been found worthy of reproduction.

Space between the eyes once and a half the diameter of an eye; ocelli 50, in eight rows (9+9 | 8+7+6 | 5+4+2). Antennæ rather long, reaching the posterior margin of the first segment, slightly thickened distally; the three proximal joints naked, the following gradually more pilose. Last joint tipped with four sensory cones remote from one another. Micrometrical measurements of joints: 1st joint 0.946 m/m; 2nd, 1.849 m m; 3rd, 1.376 m m; 4th, 1.333 m m; 5th, 1.247 m m; 6th, 1.075 m/m; 7th and 8th, 0.172 m m; total length 7.998 m/m. Diameter of 2nd joint 0.860 m/m; of 6th 0.989 m m.

Anterior part of prozonite with concentric sulci; on the posterior part, the oblique striæ are very fine and their lower margin is raised into a tiny ridge. The metazonites are said to bear eight strong teeth, which is correct for the posterior half of the body; but, on the anterior half, the main ridges are less regular and may number ten on the first segments, and, further back, nine (in this case, the odd ridge stands on the median dorsal line). Between the main ridges, minor irregular ridges are to be seen, very conspicuous on segments two to five and gradually decreasing backwards. Sutural sulcus obsolete dorsally, distinct below the pores though not strongly marked. The space immediately in front of the suture, in the dorsal region, is coarsely punctured; it is widely depressed so as to give rise, on the prozonite, to an abrupt ridge; this was mistaken by Daday for the suture and led him to erroneously state that the pores open in the metazonite. Pores beginning on the sixth segment, standing high in the sides, very small, pierced in the middle of a somewhat raised spot, in front of the suture.

The produced marginal angle of the last segment conceals the upper angles of the valves, but does not exceed the level of their outer margins; it is somewhat compressed laterally, slightly raised and separated from the rest of the segment by a deep wrinkle. Anal sternite very wide and very short, with almost straight posterior margin.

On all legs, the coxæ are slightly produced and rounded, the following two joints are compressed laterally and ridged below. Tarsi padded. Joints, except the last, with but one distal bristle below.

Copulatory appendages :—Anterior gonopods (Pl. xv., figs., 23, 24), with ventral plate slightly expanded proximad, sinuate above and ending in two diverging, blunt horns; its lateral expansions *(e.)* are curled back around the base of the organ and meet the tracheal stalk *(ts.)* in a line on the posterior surface. Coxofemoral plate *(cf.)* almost entirely exposed, as long as the ventral plate, ending in a widely rounded angle. Tibial plate *(T.)* irregularly circular or triangular, entirely lodged in the posterior excavation of the coxofemur; distal inner angle thickened and folded backwards; its proximal inner angle shows a sub-triangular, translucent, shrivelled-surfaced field, the meaning of which could not be ascertained.

Posterior gonopods (Pl. xv., figs. 25, 26), two-jointed. Proximal joint with its proximal and inner edges thickened and strongly chitinized, borne on an elongate and slender, distally widening tracheal stalk. Distal joint strongly chitinized; its sides are folded inwards, the inner surface being deeply excavated, wherefrom the joint gains its resemblance to a spoon. The hollowed surface is lined with membrane, forming an undulated crest in which opens the distal end of the seminal duct. The proximal end of the latter is swollen, bladder-like *(bl.)* and strongly twisted immediately above the swelling, where it crosses over from the proximal to the distal joint of the apparatus.

Three male specimens from New Guinea.

Genus Spirostrophus, *Sauss. and Zehntn.*, 1902.

Saussure and Zehntner[20] have deemed it necessary to create a sub-genus of *Trigoniulus*, termed *Spirostrophus*, for the reception of two species. A generic value has since been assigned to it by Attems.[21]

Spirostrophus differs from *Trigoniulus* in having the tarsi of the male not padded and the coxæ of the third to fifth pair provided with processes. The Australian species has, therefore, to be ascribed to the former genus. Yet *Spirostrophus* seems to lack the necessary homogeneity, as, in one of the species

[20] Saussure and Zehntner—In Grandidier, Hist. Phys. Nat. et Polit. Madagascar, 1897-1902.

[21] Attems—Myriopoden in Voeltzkow, Reise in Ostafrika, 1903-1905, 1910, p. 91.

mentioned by the said authors, *S. rubripes*, the seminal duct of the posterior gonopods is said to end in a pseudo-flagellum, which is wanting in *S. naresi*, the type specimen. Moreover, it is still uncertain if the characters chosen to distinguish the said genus are of positive generic value. Nevertheless, it seems highly probable that the known Australian Trigoniulids have to be isolated from *Trigoniulus* in a distinct genus, the characters of which have still to be tested.

SPIROSTROPHUS DIGITULUS, *sp. nov.*

(Plate xv., figs. 27-29; Plate xvi., figs. 30-32; with Figs. 28, 29).

♂ mat.: length 55 m/m; diameter 3.70 m/m; 50 segments; one segment apodous; 91 pair of legs.

♂ mat.: length 56 m/m; diameter 3.80 m/m; 54 segments; one segment apodous; 99 pair of legs.

♀ mat.: length 56 m/m; diameter 4 m/m; 52 segments; one segment apodous; 95 pair of legs.

♀ mat.: length 55 m/m; diameter 4 m/m; 53 segments; one segment apodous; 97 pair of legs.

Four specimens from Fraser Island, Queensland.

♀ mat.: length 69 m/m; diameter 4.40 m/m; 54 segments; one segment apodous; 103 pair of legs.

♀ mat.; length 66 m/m; diameter 4.40 m/m; 55 segments; one segment apodous; 105 pair of legs.

Two specimens from Condamine, Queensland.

Colour, a dark blackish-brown; the anterior part of prozonite (as far as exposed when the animal is curled up) ochre-yellow; the posterior margin-orange red. Legs and antennæ orange-yellow.

Head, smooth and shining, leathery along the posterior margin. Labral dimples four. Median sulcus thin in front, faint backwards, obsolete between the antennæ. Eyes rounded, divided by a space not twice the diameter of an eye; ocelli small, flattened yet distinct, arranged in seven to eight more or less curved series, from 5, 7, 8, 7, 6, 5, 2 = 40 to 8, 8, 8, 7, 6, 5, 3 = 45. Antennæ short, scarcely reaching beyond the middle of the first segments. The four proximal joints almost naked; fifth with but few distal setæ; sixth more pilose; last

joint with fleecy hairs and four sensory cones. Micrometrical measurements of joints: 1st joint 0.416 m m; 2nd, 0.640 m m; 3rd, 0.480 m m; 4th, 0.480 m m; 5th, 0.480 m m; 6th, 0.608 m/m; 7th and 8th, 0.032 m m; total length, 3.136 m/m. Diameter of 2nd joint 0.384 m m; of 6th, 0.480 m m.

First segment almost leathery. Sides reaching as far down as the second segment, narrowed and angular with blunt apex; the anterior margin excised and margined below the eyes, marginal sulcus well marked. The five following segments with ventral surface depressed and roughly striate. Anterior part of prozonite smooth or with hardly distinct concentric striæ. On a few anterior segments, the posterior part of the prozonite shows transverse striæ which, on a level with and below the pores, are bent backwards and encroach on the metazonite. Further back (Pl. xvi., fig. 30) the transverse dorsal striæ disappear, the prozonite being widely strewn with delicate horse-shoe-shaped punctures, always larger along the suture; traces of the striæ remain below the pores and venter; complete longitudinal striæ are only seen low down above the legs. Metazonite densely covered with minute longitudinal striæ, less distinct backwards. Suture indistinct between the pores, impressed and more or less clearly sulcate in the sides and venter. Pores start on the sixth segment; they are located high in the sides and on the prozonite; a longitudinal sulcus is seen on the metazonite in connection with the pore.

Last segment leathery, its posterior margin angularly produced, the angle being wide open and not concealing the upper angles of the valves. The latter are moderately prominent, rather globular at the base, slightly impressed; margins not thickened and without trace of marginal sulcus. Anal sternite wide and very short, with almost straight transverse posterior margin. Sterna of the other segments striate, more strongly in the middle. Stigmata small.

Legs shortish, with but one distal bristle below on the five proximal joints.

Male:—Legs of the first and second pair swollen. Coxæ of the 3rd and 4th pair with a strongly developed, distally rounded, spatulate (3rd pair, Pl. xxi., fig. 31) or bead-like, (4th pair, Pl. xvi., fig. 32) process; 2nd and 3rd joint of the

following legs longitudinally grooved below. Tarsi not padded. Seventh segment swollen ventrad, but without raised margin.

Copulatory appendages (Pl. xv., figs 27, 28) :—The ventral plate of the anterior gonopods *(V.)* appears on the anterior surface, as a transverse arched band, the ends of which are curled back and expand around the basis of the posterior surface of the organ ; the centre of the band is produced into a narrow, almost parallel sided plate, with moderately swollen base, tipped with a sub-triangular piece, the angles of which are rounded ; on the posterior surface the ends of the band meet the tracheal stalk *(ts.)* which are angularly directed upwards and inwards ; the tracheal stalks are bent at right angles, not unlike a pickaxe, their upper angles leaning against the inner angle of the femur as well as against the middle of the base of the tibia. The distal process of the coxa is slender, digitiform, somewhat longer than the ventral plate ; no endoskeletic process exists proximally. The femur *(Fem.)* is a broad, triangular, globular plate, sitting partly on the curled expansion of the ventral plate, partly on the outer branch of the tracheal stalk ; its outer edge is fused as usual with the coxal expansion ; its distal edge is emarginate. The tibia *(T.)* is a conspicuously developed triangular piece, the base of which is very broad ; it articulates with the distal edge of the femur on its outer half only, the inner half remaining free. The distal plate of the tibia is considerably enlarged so as to conceal the largest part of the tibia ; it extends far beyond the ventral plate and the coxal process ; its outer margin is sinute and its apex rounded.

Posterior gonopods (Pl. xv., fig. 29) composed of two joints placed at right angles. The basal joints of both gonopods are connected by an elastic bridge, the rigid ends of which hem inwardly the basal joints of the gonopods and meet the long and slender tracheal stalk. The basal joint shelters the usual bladder-like swelling *(V.)* of the seminal duct and its strongly twisted proximal part. The distal joint is elongate and constricted in the middle, where traces of an articulation may be seen along the outer edge *(x.)* ; the proximal half is gradually tapering from the base, and shows a rounded swelling along its inner edge ; the distal half is formed of two parallel lamellæ the shape of which will be seen in Pl. xv., fig. 29.

It is not easy to decide if the present species is distinct from *Trigoniulus burnettiens*, Attems,[22] as nothing is known of the sexual characters of the latter form, the type of which is a female. Attems' species seems to be larger.

Also *Trigoniulus comma*, Attems,[23] is only known from a female specimen; but the diameter is considerably larger and the description of the integuments do not correspond with those of *S. digitulus*.

S. digitulus probably bears much resemblance to *Trigoniulus targionii*, Silvestri, but may be readily distinguished by the presence on the prozonite, of the horse-shoe-shaped punctures, and by the shape of the first pair of copulatory appendages.

Silvestri's description is as follows[24]:—

"*Trigoniulus targionii*, sp. n. ♀ Color fusco-rufus, margine "postico somitorum, capite, antennis pedibusque rufo-pallidis. "Caput laevigatum, medium sulco in facie interrupto, circa "labrum poris 2 + 2. Oculi subcirculares ocellis c. 20 sat "distinctis. Antennae articulo sexto longiore et crassiore, "collum non superantes. Somita: collum lateribus angustatis "antice emarginatis, postice fere recte truncatis; somita "coetera tota laevigata sub poris tantum ante suturam striis "nonnullis. Pori permagni. Somitum anale cauda vix "angulata valvulas anales non superante, valvulis immarginatis, "sternito lato triangulari. Pedes sat breves. ♂ Pedes 1-2 "paris incrassati, infra spinosi; pedes paris 3-4 articulo primo "processu magno interne recte truncato, externe rotundato "acuto, pedes paris 5 articulo primo processu parvo instructo. "Organum copulativum (fig. 28) lamina ventrali lamina antica "vix longiore, lamina postica magis breviore apica triangulari "par internum (fig. 29). Somitorum numerus 52. Long. corp. "m m 70; lat. corp. m m 6. Hab. Cairns (Queensland)."

[22] Attems—In Semon, Zool. Forschungsreisen in Australien, 1898 p. 513.

[23] Attems—*Loc. cit.*, p. 513.

[24] Silvestri—Bull. Soc. Entom. Ital., xxix., 1897, p. 229.

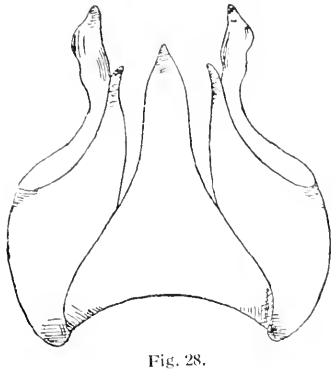


Fig. 28.

Fig. 29.

Genus Spirobolellus, *Pocock*, 1894.

Pocock, 1894; Silvestri, 1895. Nec. Brölemann, 1902 = *Epitrigonidus*; nec Attems, 1907, 1910 = *Pseudospirobolellus*; nec Pocock, 1898, Biol. Centr. Amer.

This generic division was proposed by Pocock in 1894,[25] with the following diagnosis:—

"Eyes large, sub-circular, widely separated. Antennæ "short, 1st segment as large as the 2nd (? always). Frontal "sulcus weak. Labral pores 4 + 4. Collum large, extend- "ing laterally as low as the second. The transverse sulcus "obsolete at least dorsally, its place taken by a groove which "is sinuated in front of the pore and gives the appearance "described as the pore being situated behind the sulcus; the "area behind the groove elevated. Sterna striate. Scobina "absent (? always). Last segment of the legs not padded in "the male. Type *S. chrysodirus*, nov."

Seven species were listed herein, but no description of copulatory appendages was given. Four more species were added by Prof. Silvestri,[26] in 1895 without any mention of sexual characters. Reference was made by the author[27] and by

[25] Pocock—In Weber, Reise in Niederländish Ost-Indien, 1894, p. 398.

[26] Silvestri—Ann. Mus. Civ. Stor. Nat. Genova (2), xiv., pp. 758-760.

[27] Brölemann—Zool. Anz., xxvi., 1902, No. 691, p. 180.

Attems[28] and Woeltzkow[29] but both references proved to be erroneous. Brölemann's *S. crucntatus* became the type species of *Epitrigoniulus*, and Attems' *S. bulbiferus* was made the representative of a new genus, *Pseudospirobolellus*, by Carl.[30]

Carl adds to our knowledge of *Spirobolellus*, particularly by means of excellent figures[31] the general features of which correspond with the copulatory appendages of the New South Wales species described hereafter. The examination of the latter affords the following complimentary details:—

Primary characters:—Copulatory appendages (Pl. xvi., figs. 35-38). Tracheal stalk *(ts.)* of anterior gonopods directed inwards, as in *Rhinocricus*. Coxæ produced proximally into long and slender endoskeletic rods *(esk.)*. Femur not covering any portion of the posterior surface of the organ; when the latter is viewed from the posterior surface, the femur is seen as a narrow external pad *(Fem.)*; its posterior, concave surface is almost entirely concealed by the tibia *(T.)*, which realises a development unrecorded in any other genus, being in contact proximally with the tracheal stalk, whilst its apex reaches or overreaches the summit of all the other parts of the organ.

Posterior gonopods entirely independent, somewhat similar to those of *Pseudospirobolellus*, but comparatively wider, compressed, poorly chitinized, with a short inner process; coxal joint not distinct. The seminal duct exists, being an open groove (Pl. xvi., *d.*, fig. 38) provided distally with an open, oval, bladder-like swelling *(bl.)*, the largest diameter of which is transverse; the duct is bent at a right angle, immediately above the swelling, but is not twisted, and opens distally at the root of the inner process. The ventral plate of posterior gonopods could not be traced.

Secondary characters:—First and second pair of ambulatory legs of male incrassate but without special features; coxæ of the following pairs, up to the seventh, more or less produced (Pl. xvi., fig. 34); tarsi not padded. Antennæ tipped with

[28] Attems—Mitteil. naturf. Mus. Hamburg, xxiv., 1907, p. 131.

[29] Woeltzkow—Reise in Ost-Afrika, iii., 1910, p. 92.

[30] Carl—Revue Suisse Zool., xx., 1912, p. 167.

[31] Carl *Loc. cit.*, figs. 25 to 27.

four sensory cones. Cap of gnathochilarium with its median plate rounded backwards (not forked). Second joint of mandibula with its dorsal expansion almost loose. The remainder as in Pocock's diagnosis.

In this genus, the copulatory appendages show a quite unusual structure. Most striking are the presence of the proximal endoskeletic process of the coxæ of anterior gonopods, and the growth of the tibia. Such features agree with no other genus, except perhaps *Paraspirobolus*.

The description of the latter genus[32] is evidently erroneous and imperfect; erroneous, while the coxæ of anterior gonopods have undoubtedly been mistaken for the posterior gonopods, owing to the resemblance of their endoskeletic process with a tracheal stalk; imperfect, while the posterior gonopods have been overlooked. Yet it is not likely that both genera should be synonymical, as *Paraspirobolus* is said to possess only 2 + 2 labral dimples (instead of 4 + 4) and as the tibia appears to be larger still than in *Spirobolellus*.

Turning to Pocock's genus, it is to be mentioned that a seminal duct and a bladder exist in the posterior gonopods, but these are different from the similar organs of *Trigoniulus*, for instance, in being simply open grooves. It is by no means surprising that they should have escaped Carl's attention as they are scarcely more chitinized than the gonopods themselves, and could only be detected by using oblique light.

SPIROBOLELLUS RAINBOWI, *sp. nov.*

(Plate xvi., figs. 33-38).

(a) ♂ mat.: length 40 m/m; diameter 3.50 m/m; 44 segments; three segments apodous; 75 pair of legs.

(b) ♀ mat.: length 51 m/m; diameter 4.50 m/m; 44 segments; one segment apodous; 81 pair of legs.

(c) ♀ mat.; length 43 m/m; diameter 4.30 m/m; 47 segments; two segments apodous; 85 pair of legs.

(d) ♀ mat.: length ?; diameter 4.50 m/m; 45 segments; two segments apodous; 81 pair of legs.

(e) ♀ mat.: length 42 m/m; diameter 4 m/m; 44 segments; two segments apodous; 79 pair of legs.

[32] Brölemann—Rev. Mus. Paulista, v., 1901, p. 183.

Black, with a narrow yellow margin around the first tergum and along the posterior edge of each segment, and with a yellow transverse band across the anal valves, the upper and the lower angles of the valves remaining of the dark ground colour.[33] Legs blackish brown.

Head smooth and shining even on the upper lip, which bears eight setiferous dimples; of these, the two median and the two external stand more closely together. The median sulcus is distinct on the upper lip, but soon dies out before reaching the level of the antennæ, and is scarcely recognisable on the top of the head. Eyes standing wide apart, the space being about two and a half to three times the largest diameter of an eye. Ocelli congregated on a sub-triangular field, nineteen to twenty-seven in number ($5 + 6 + 5 + 3 = 7 + 8 + 6 + 4 + 2$). Antennal fossæ shallow, the outer margin of the head being but feebly swollen. Antennæ very short, not reaching the posterior margin of first tergite; the three proximal joints almost naked, the distal joints more and more densely clothed with short setæ. Some minute sensory rods exist along the upper distal margin; four sensory cones at the end. Micrometrical measurements of joints: 1st joint 0.344 m/m; 2nd, 0.387 m/m; 3rd, 0.301 m/m; 4th, 0.258 m/m; 5th, 0.344 m/m; 6th, 0.387 m/m; 7th and 8th, 0.107 m/m; total length, 2.128 m/m. Diameter of 2nd joint, 0.322 m/m; of 6th, 0.365 m/m.

First tergite nearly smooth, moderately shining; its sides somewhat produced, perpendicular, slightly narrowed and rounded laterally, with a pre-marginal sulcus along the anterior and the lateral margins; no transverse sulci.

Following segments rather less shining, though lacking distinct sculpture. The dorsal part is entirely destitute of transverse suture; it may scarcely be said to be depressed below the pores, where, sometimes (on dried specimens), a shadowy gray line is to be witnessed dividing the pro- from the metazonite. Dorsally, the former is adorned with dainty horse-shoe-shaped punctures opened backwards (Pl. xvi., fig. 33); these grow larger sideways and, below the pores, transform into irregularly arched, oblique striæ which gradually encroach upon the metazonite and even cross it entirely on the ventral

[33] This band is missing in one of the female specimens.

surface. The metazonite is smooth dorsally. Pores very small, beginning on the sixth zonite and located in contact with and behind what has to be considered as the transverse suture. No longitudinal sulcus is seen on a level with the pore.

Last segment with posterior margin feebly produced, cut into a short and very wide angle, the rounded apex of which covers the dorsal angles of the valves, though falling short of the level of their posterior margins. Valves protruded, rather flattened, naked and smooth; margins not compressed and destitute of any pre-marginal sulcus, joining so as to give rise to a distinct, sharp groove. Anal sternite with straight, transverse posterior margin. Sterna of other segments covered with fine, dense transverse wrinkles. Stigmata sub-triangular, small.

Legs short, with one ventral bristle on each joint, except the last, which bears two; claw long, slender, acute, curved in the anterior legs.

Male:—Legs of first and second pair incrassate, but without any special particulars. Coxæ of the legs three to seven tipped with a feebly developed, thick, square protuberance (Pl. xvi., fig. 34). Tarsi not padded.

Copulatory appendages:—Anterior gonopods (Pl. xvi., figs. 35, 36): ventral plate *(V.)* triangular, with upraised, sinuate lateral margins and a notched summit. Tracheal stalk *(ts.)* long and slender. Coxa angularly produced distad beyond the end of the ventral plate, and ending proximally in a long endoskeletic rod *(esk.)*, as long as the tracheal stalk and of a similar appearance. Femora *(Fem.)* fused, as usual with the coxa along its entire inner margin, concealed on the posterior surface by the tibia *(T.)* which reaches as far down as the root of the tracheal stalk and notably exceeds distally the apex of the coxal expansion.

Posterior gonopods (Pl. xvi., figs. 37, 38) entirely independent, blade-like, slightly arched, with traces of articulation *(x.)* beyond its distal two-thirds, along the outer margin. The inner margin is lamellar with three tooth-like processes; one of them *(a.)* stands about in the middle of the concavity, the second *(b.)* opposite the trace of of articulation and the third *(c.)* more triangular, beyond the second. Seminal groove *(d.)* short,

provided proximally with an oval bladder *(bl.)*, the long axis of which is transverse; immediately beyond the bladder, the groove is angularly crooked and directed towards the base of the first inner process. Being rather shallow, this groove is difficult to observe. Tracheal stalk long, slender, curved near its end.

One male and four female specimens from Mount Sassafras, Shoalhaven.

Genus Dinematocricus, *gen. nov.*

Primary characters:—Gonopods as in *Rhinocricus*, with the difference that the distal joint of the posterior pair ends in one or two, more or less flagelliform, always gradually tapering processes (Pl. xvii., fig. 55; Pl. xviii., figs. 63, 69).

Secondary characters:—Labral setiferous dimples 2 + 2. Mentum not divided. Antennæ usualy short. First somite with rounded sides, falling short of the second somite. Scobina present or missing. Pores located in the prozonite, close to the transverse suture, which is more or less marked and may fail entirely. Last tergite generally not overreaching the upper angles of the anal valves. Sterna transversly striate. Stigmata small. Legs short, usually destitute of setæ except near their distal ends; usually padded in the male.

Type species—*Dinematocricus lanceolatus*, sp. nov.

The representatives of this genus are very numerous; they have hitherto been listed amongst the *Rhinocrici*, with which they have, indeed, the most striking resemblance. It has been found necessary to separate them generically on account of the primary character recorded above. Whereas, in *Rhinocricus*, the outer branch of the posterior gonopod gradually grows wider distally, being truncate at the apex, with more or less acute angles, in *Dinematocricus*, this same branch is gradully tapering from the base, flagelliform or, very seldom (only three aberrant cases known), digitiform. Moreover, the seminal duct seems to have a peculiar structure; in *Rhinocrici*, it is known to be located in the inner branch, along the edge facing the outer branch, and to be a groove the lips of which are scarcely developed and pressed tight one against the other; a section cut through the branch shows the duct to be circular. In *Dinematocricus*, the duct is similarly located, but its lips are larger, more lamellar and appear less tightly fitted together

(*D. holosericeus*, *D. lanceolatus*, Pl. xviii., fig. 64); or even the branch seems to be ribbon-shaped on its whole length (*D. falcatus*, *D. carinatus*). It has not been found appropriate to make use of these structures until their constancy shall have been verified on some larger material; they are mentioned here in order to draw the attention of specialists to this interesting point.

As far as can be understood from the descriptions issued by preceding authors, the species belonging to *Dinematoericus* are prevalent in the islands east of the Sunda Archipelago. Most of the *Rhinocrici* of the Celebes Islands recently described by Dr. Carl (1912) undoubtedly belong to the new genus; many more are known to inhabit the Moluccan Archipelago, the Kei and Aru Islands, the Australian continent and to reach as far east as Fiji; a single species, so far as known, is recorded from America, viz., *Rhinocricus caudatus*, Newport; and even this has to be held as an aberrant form, on account of its pre-anal segment being provided with a conspicuous spiniform process.

It has been found necessary to divide the new genus into three sub-genera, according to the presence or absence of the inner branch of the posterior gonopods, and to its position.

The sub-genus *Dinematoericus*, *sensu stricto*, will include such species in which the distal joint of the posterior gonopods is divided into two flagelliform (or at least gradually tapering) branches, the distance between the proximal swelling of the joint and the root of the inner branch being about equal to the length of the latter.

The sub-genus *Cladioericus* will be represented by the sole type species *D. (C.) falcatus*, in which the inner branch of the distal joint of posterior gonopods starts immediately above the proximal swelling.

The third sub-genus, *Acladoericus*, which might perhaps as well be given generic value, will be made to contain species similar to *R. pyrrholoma*, Attems (chosen as type), of which the posterior gonopods are composed of a single flagelliform branch, the inner branch missing. No further reference will be made to this third sub-genus, of which no representative was found in the collection of the Australian Museum. It would be highly interesting to know where, in such case, ends

the seminal duct, to which no author has ever alluded. The great majority of the species of *Acladocricus* inhabit the Celebes Archipelago.

In order to avoid repetition in exposing, after each description, the relationship of the new species with the forms already known, the species have been divided into four groups, according to regions, and an attempt has been made to tabulate them. Thus the tables are four in number, corresponding to the following areas:—I., Continental Australia; II., New Guinea; III., Bismarck Archipelago (including New Britain and New Ireland) to the Solomon Islands; IV., Fiji. The tables will be found at the end of the present memoir.

Dinematocricus (Cladiscocricus) falcatus (Silvestri, 1897).

(Plate xvi., figs. 29-44; with Figs. 30, 31).

Rhinocricus falcatus, Silvestri, 1897, Abh. Ber. K. Zool. Mus. Dresden, 1896-1897, vi., No. 9, p. 6.

Prof. Silvestri's description runs thus:—

"♂: Color brunneo-rufescens totus. Caput totum laeviga-
"tum. Antennæ ? Oculi subcirculares, ocellis distinctis c.
"40. Somita: collum lateribus sat angustatis, rotundatis;
"somita coetera tota laevia, subtus tantum striis nonnullis.
"Scobina in somitis 9-ad penultima. Somitum praeanale canda
"acuta, valvula anales vix vix superante. Somitum anale
"valvulis parum compressis, sternito triangulari, apice acuto.
"Pedes paris 3-5 articulo primo processu sat longo et lato aucto.
"Organum copulativum: par anticum (fig. 30) lamina antica
"minore longitudine quam illa laterum, apice minus attenuato,
"par internum (fig. 31) processu longo falciformi constituto,
"ad basim processu parvo acuto auctum. Somitotum numerus
"53. Long. corp. mm. 67; lat. corp. mm. 7. Hab. Nova
"Hollandia: Gayndah."

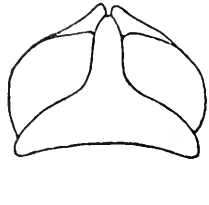


Fig. 30.

Fig. 31.

On account of some differences mentioned hereafter, the Gayndah specimens have been considered as a distinct sub-species, for which the name of *scobinula* sub-sp. nov. is proposed.

(a) ♂ mat.: length 70 m m; diameter 6.50 m/m; 56 segments; one segment apodous; 103 pair of legs.

(b) ♀ mat.: length 77 m m; diameter 7.50 m/m; 55 segments; one segment apodous; 103 pair of legs.

Gayndah, Queensland.

Chestnut, with darker metazonite. Legs and antennæ chestnut.

Head smooth, shining, with four subequidistant labral dimples; median sulcus almost obsolete. Eyes rounded, divided by two-and-a-half times the diameter of one of them; ocelli small, distinct, arranged in 6-7 series to 9+10+9+8+8+5 = 49 to 9 + 9 + 9 + 9 + 8 + 5 + 1 = 50. Antennæ very short, reaching the middle of the following segment, wide apart, the distance between the sockets (2.50 m m) equal to more than the length of the four proximal joints. The three basal joints almost naked, the following gradually more pilose; four sensory cones. Micrometrical measurements of the joints: 1st joint 0.602 m/m; 2nd, 0.688 m/m; 3rd, 0.559 m/m; 4th, 0.559 m m; 5th, 0.516 m/m; 6th, 0.473 m/m; 7th and 8th, 0.086 m m; total length 3.483 m m. Diameter of 2nd joint 0.537 m m; of 6th, 0.516 m/m.

Mandibular stem of male with the anterior angle acute, directed downwards.

First segment falling a good way short of the ventral surface of the second; surface almost smooth dorsally, less so on the sides; anterior margin straight, sides rounded or with a faint trace of a rounded angle. Marginal sulcus moderately long, scarcely reaching the inferior level of the corresponding eye. Second segment flattened and sulcate on the ventral surface, the sides of which are rounded, or even somewhat swollen.

Scobina from about the ninth to about the twenty-second segment very small, the first and the fourth to fifth last are dot-like; it is (accidentally ?) missing on the seventeenth segment. The distance between the dimples equal to about eight times the diameter of one of them. Dimples sub-circular, with smooth bottom; the striate area scarcely as long as the dimple, rounded, with very few striæ.

Anterior zone of the prozonite partly covered with irregular transverse striæ; posterior zone strewn with extremely fine, somewhat elongate punctures; metazonite still less distinctly sculptured, yet bearing along the suture some more strongly marked punctures; a few deep punctures also stand in front of the suture. Sutural sulcus almost obsolete dorsally, distinct elsewhere, crossed, on a level with the pore, by a longitudinal sulcus more shallow on the pro- than on the metazonite. Pores starting on the sixth segment, small, located high up in the sides, near the suture and below the above-mentioned longitudinal sulcus. The usual oblique and longitudinal sulci are only to be seen low down in the sides and above the legs, lower still in the posterior half than in the anterior half of the body.

Posterior margin of last segment produced into a very short conic, acute process just reaching over the superior angles of the valves. The latter are not prominent, moderately globular, scarcely depressed, with rounded margins and without any trace of pre-marginal sulcus. Anal sternite triangular, its length about two fifths of its breadth at the base; sides straight, apex cut at a right angle. Sternites of the other segments transversely sulcate. Stigmata small.

Legs short (about 3.50 m m), but with one distal bristle below on the five proximal joints.

Male:—Anterior pair of legs thickened but without tarsal pads. Second joint of the second pair showing inwardly a flattened surface giving rise to a sharp posterior edge. Coxæ of the third, fourth and fifth pair tipped with a long, but gradually decreasing digitiform process (Pl. xvi., fig. 39), the end of which is more or less rounded; besides, the second joint of the same legs is more or less warted below. Ventral margin of the seventh segment produced into a transverse thickened edge, notched mesially in front.

Copulatory appendages:—Anterior gonopods (Pl. xvi., figs. 40, 41); basal part of the ventral plate roughly hexagonal; proximal margin straight, angles cut off diagonaly, anterior-lateral sides straight. The distal part is a linguiform process, longer than the base, gradually narrowed, with straight sides

and rounded end. The coxal expansions *(cox.)* remain completely exposed; they are cut off at right angles distally and fall short of the summit of the ventral plate. Proximal endoskeletic process *(esk.)* long, spatulate. Femur *(Fem.)* wide; tibia *(T.)* in a line with the femur, short, conic, with a transverse undulate fold in the middle of the posterior surface (*a*, Pl. xvi., fig. 41), and a sub-quadrangular apical plate with rounded angles, about half as long as the stem of the tibia; the apical plates reach with all their length beyond the apex of the ventral plate. Posterior basal plate *(r. 2.)* very narrow, linguiform, twice as long as broad, with rounded apex.

Posterior gonopods (Pl. xvi., fig. 42) two-jointed. Proximal joint comparatively long; tracheal stalk long and slender. Second joint arched, oval in section in its basal two thirds, lamellar distally, the lamellar part being scarcely enlarged proximad and gradually tapering endwards. A short, straight, acute, inner branch is seen to start immediately above the rounded expansion of the base of the joint. The seminal duct seems to end at the root of the inner branch.

The female specimen shows scobinas from the ninth to the twenty-fourth zonite; the dimples are as wide apart as in the male, but the small dimples are a trifle more crescentic. The ocelli stand in five rows (9+10+9+8+5 = 41) on one side and six rows (9+9+9+8+6+5 = 46) on the other. The anal sternite is not as neatly triangular, the apex is rounded, as if worn off. Colour, chestnut as in the male.

One more female specimen exists in the Australian Museum, collected at the same locality, Gayndah, Queensland.

♀ mat.: length 72 m/m; diameter 7.50 m m; 54 segments; one apodous; 101 pair of legs. It has a uniform greenish-black colour. The face is slightly wrinkled; the median sulcus is more distinct especially between the eyes where it is impressed. The eyes are composed of forty-five ocelli arranged in six rows (9+9+9+8+6+4—9+9+9+8+73). Scobinas up to the twenty-fifth segment, punctiform as in the male. Anal sternite triangular (not worn out).

Prof. Silvestri states that his type possess scobinas from the ninth to the penultimate, which does not agree with the three specimens examined, and that the metazonites are smooth, no mention being made of punctures. Moreover, slight differences can be found between Prof. Silvestri's figures of the copulatory appendages and ours; the sides of the ventral plate of anterior gonopods are less angularly excised, the apex is more pointed; the distal, lamellar end of the outer branch of posterior gonopods is somewhat differently shaped. There is, therefore, hardly any doubt that the Gayndah specimens belong at least to a sub-species different from the Cairns form.

DINEMATOCRICUS (? Cladiscocricus) CONSIMILIS, *sp. nov.*
(Plate xvi., fig. 45).

♀ mat.: length 62 m/m; diameter 8 m/m; 52 segments; one segment apodous; 97 pair of legs.

The only specimen to hand so closely resembles the females of *D. falcatus*, that it has been deemed sufficient to note the differences. No importance can be given to the colour and to the length recorded as the animal is contracted having only recently cast its skin when captured, as is evident by the fact that the integuments are still soft.

The anterior margin of first segment is slightly emarginate on a level with the eyes, and not as broadly rounded. The scobinas are entirely different from those of *D. falcatus*; the dimples assume the shape of a deep transverse sulcus, and the space between them is hardly equal to the breadth of one of them. The posterior sulcate field is indistinct as the sulci are continued by the concentric striæ of the surrounding integuments (11th segment). Or else the dimples are more crescentic, the distance between them is equal to about one-and-a-half diameter of one of them, and the striate field is distinct (Pl. xvi., fig. 45, 21st segment).

The exposed posterior half of the prozonites cannot be described as punctured; or rather the punctures are strongly intermingled with striæ. The spots, the pores are pierced in, appear somewhat raised. The posterior margin of the last segment is angularly produced, but cut at right angles and not emarginate on each side of the apex, so that no distinct process is to be seen.

Male unknown. A single female from Gayndah, Queensland.

DINEMATOCRICUS *(sensu stricto)* FAUCIUM, *sp. nov.*

(Plate xvi., fig. 46; Plate xvii., figs. 47, 48).

♂ mat.: length 112 m/m; diameter 9.50 m m; 54 segments; one segment apodous; 99 pair of legs.

Dark blackish-brown, with an olivaceous shade, and a red-brown belt along the margins of the segments. Head blackish-brown, with brighter labrum. Last segment and valves bright brown red. Legs dark brown, with the proximal joints paler.

Head smooth, with two shallow indistinct impressions above the labrum and with minute transverse wrinkles or striæ, of which a pair more strongly marked is seen crossing the post-labral impressions. Four labral dimples. Median sulcus well marked on the labrum and on the back of the head, faint, thread-like, or even obsolete between the antennæ. Eyes sub-circular; the distance between them equal to twice the diameter of one of them. Ocelli distinct, though rather flattened, numbering about forty-one, arranged in six series (7+8+8+7+6+5 to 8+8+8+7+6+4). Antennal fossæ shallow; distance between the sockets equal to the length of the four proximal joints. Antennæ compressed as usual, extremely short, scarcely reaching beyond the middle of the first tergite; the four proximal joints bare, except a few distal setæ; fifth joint poorly beset with setæ, these being numerous on the last joint only. Four sensory cones. Micrometrical measurements of joints; 1st joint 0.832 m m; 2nd, 1.024 m m; 3rd, 0.928 m m; 4th, 0.832 m m; 5th, 0.832 m m; 6th, 0.640 m m; 7th and 8th, 0.128 m m; total length, 5.216. Diameter of 2nd joint 0.800 m m; of 6th, 0.704 m m.

Scobinas from about the eighth to about the thirty-sixth segment. Distance between the dimples equal to about one-and-a-half diameter of one of them. The dimple (Pl. xvi., fig. 46) is formed by a deep, circular sulcus enclosing an oval, transverse, polished wart; it is lying near the anterior margin and is distinct from it; behind the dimple is a very narrow crescentic field, about half the length of the dimple, the surface of which is dull but shows no distinct striæ.

First tergite smooth, shortened laterally; sides irregularly rounded, the posterior margin being more convex than the

anterior. Marginal sulcus very short and weak, running close to the margin. Ventral surface of second segment somewhat excavated, swollen on each side, with shallow sulci. Anterior concealed parts of prozonites covered with minute and dense striæ, yet shining; rest of the zonites punctured, more distinctly on the posterior part of the prozonite than on the metazonite, the punctures intermingled with faint longitudinal striæ. The latter are more numerous on the anterior six segments. The posterior parts of the prozonites show moreover irregular, wide and shallow wrinkles, two of which stand in front of the pores and are more deeply impressed. Distinct oblique and longitudinal striæ are to be found only far down below the pores. Transverse sutural sulcus completely obsolete on the back, scarcely visible above and below the pores as a tiny threadline.

Pores starting from the sixth segment, small, opening high in the sides, in the middle of a raised spot, wherefrom they appear to be margined. On a level with the pores is a very faint longitudinal sulcus, crossing the whole segment.

Last tergite with its posterior margin angularly produced: the process is feebly depressed at its base, and does not conceal the upper angles of the valves. Valves moderately prominent, scarcely globular, compressed in the vicinity of the margins, causing the latter to appear pad-shaped. Anal sternite rounded, very broad, its length equal to about one-fourth of the breadth, with a weak transverse sulcus near its base. Ventral plates of the other segments transversely sulcate; the sulci weak. Stigmata small.

Legs moderately short, rather slender, with but one ventral bristle on each joint except the last.

Male:—Femora of the second pair flattened inwardly, with gibbous posterior surfaces. Coxæ of third, four and fifth pair produced. Tarsi not padded.

Copulatory appendages (Pl. xviii., fig. 47, 48):—Ventral plate of anterior gonopods (V.) semi-circular, twice as wide as long, tipped with a digitiform, tapering process as long as the semicircular basis, with undulate sides and with apex not even half the breadth of its root. Distal angle of the coxal expansion scarcely reaching the middle of the process of the ventral

plate, rounded. Tibia *(T.)* in a line with the femur *(Fem.)*, its stem only a little longer than wide; the distal plate almost circular, more than half the length of the stem, not reaching the summit of the ventral plate. Posterior basal plate *(c. 2.)* evenly rounded distally, with concave sides.

Posterior gonopods two-jointed; the distal joint ending in two flagelliform, gradually tapering processes, of which the inner is shorter than the outer. Tracheal stalk long and slender, curved distally.

Female unknown. One male specimen from Thursday Island.

DINEMATOCRICUS, *sp.*

♀ mat.: length 108 m m; diameter 10.50 m m; 51 segments; one segment apodous; 95 pair of legs.

The single female specimen known is closely related to the preceding species, from which it had to be separated on account of the following particulars:—The last tergite, the valves and all the joints are of the same dark olive brown colour as the body. A large dimple is to be seen on the forehead between the eyes.

The anal stergite is triangular, with a broad base and slightly emarginate lateral margins, the length being more than one-third of the breadth. A deep transverse sulcus exist near the base of the sternite.

This specimen could have been identified with *Spirobolus fenichelí*, Daday,[34] had not the author stated that his species has no scobinas.

New Guinea.

DINEMATOCRICUS ANALIS, *sp. nov.*

(Plate xvii., figs. 49-52.)

♂ mat.: length 102 m m; diameter 8 m m; 49 segments; one segment apodous; 89 pair of legs.

♀ mat.: length 114 m m; diameter 9.50 m m; 49 segments; one segment apodous; 91 pair of legs.

[34] Daday—Term. Füzet., 1893, p. 102.

Dark olive brown, with the posterior margin of segments red-brown. Legs dark.

Head smooth, showing indistinct transverse wrinkles. Four labral pores. Two shallow impressions above the pores. Median sulcus weak, obsolete between the antennæ, where the head is rather flattened; a small dimple may be accidentally found between the eyes, the sulcus breaking off suddenly in the dimple, and re-appearing frontwards. Eyes rounded; the distance between them equal to about twice the diameter of an eye; composed of distinct, though flattened ocelli numbering forty-seven to fifty, arranged in seven rows (7+8+8+8+7+6+3—9+9+8+7+5+3). Antennæ very short, not reaching the posterior margin of the first tergite; the distance between the sockets equal to the length of more than four proximal joints; the four basal joints bare, showing only a few apical setæ; the setæ grow gradually more numerous on the last joints; fifteen sensory cones at the end. Micrometrical measurements of joints: 1st joint 0.544 m m; 2nd, 0.736 m m; 3rd, 0.576 m m; 4th, 0.480 m m; 5th, 0.448 m m; 6th, 0.416 m m; 7th and 8th, 0.096 m m; total length, 3.296 m m. Diameter of 2nd joint, 0.576 m m; of 6th, 0.512 m m.

First tergite smooth along the posterior margin and covered with more or less distinct, minute striæ on the remaining surface; the sides fall short of the following segment, and are somewhat irregular in shape; the anterior margin is generally straight, and the posterior gently convex, the latter showing occasionally a faint notch; the angle is more or less rounded, sometimes even truncate, both cases being liable to appear on the same specimen. The marginal sulcus is moderately impressed and located quite close to the margin.

Ventral surface of the second segment somewhat excavated, moderately swollen on each side.

Scobinas from the eighth to about the thirtieth or thirty-third segment. The dimple is reniform and very deep (Pl. xvii., fig. 51); the posterior field is more or less triangular, rather elongate and dull, though without distinct striæ.

Anterior, concealed part of the prozonite without concentric striæ, yet not smooth, showing under sufficient enlargement minute and short, irregular, transverse wrinkles or striæ. The

posterior part of the prozonite and, still more, the metazonite may be said to be dorsally devoid of any sculpture, as the striæ and punctures of the integuments are nowhere distinct. Laterally the striæ are more easily detected; moreover, below the line of the pores, or lower down still appear the usual arched striæ of the prozonite; these are never strongly marked even above the legs. The suture is represented by a shallow concentric impression without any sulcus. Pores begin with the sixth segment; they are small; they open in front of the sutural impression in the middle of a low flattened wart; on a level with the pore a sulcus crosses the metazonite, but it is not to be traced on the prozonite.

Last tergite short, adorned with a few faint wrinkles; its posterior margin is angularly produced, yet is far from concealing the upper angles of the valves. Valves strongly prominent (Pl. xvii., fig. 52); their upper angles are quite unusually thickened and produced backwards; their surfaces are scarcely globular and show narrow pre-marginal impressions, causing the margins to appear wide and thick; in the female specimen, the margins are still more prominent and even irregularly nodulous. Anal sternite in shape of a semi-circle (♀? abnormal) or of a rounded triangle, in both cases much shorter than broad at the base. Sternites of the other segments with comparatively few striæ. Stigmata small.

Legs moderately short, with but one distal bristle below on each joint except the last.

Male:—Femora of the second pair flattened inwardly, somewhat tubercular posteriorly. Coxæ of the third pair produced as in *D. fasciatus*; joints, second and third much swollen below, fourth and fifth gradually less swollen. None of the tarsi padded.

Copulatory appendages (Pl. xvii., figs. 49, 50):—Ventral plate of the anterior gonopods (*V.*) with reniform basis, more than twice as broad as high, ending into a stout, conic process, as long as half the breadth of the basal part; its apex is truncate. Distal coxal expansion angular, yet broad and almost concealing the tibia, reaching as far as the summit of the ventral plate. Proximally, the coxa is produced into an endoskeletic process (*esk.*) reaching the middle of the tracheal

stalk. Tibia *(T.)* in a line with the femur *(Fem.)*, nearly parallelsided, tipped with a sub-equilateral triangular piece, the length of which is about half the length of the tibial stem. Posterior basal plate *(r. 2.)* angular. Tracheal stalks slender, crooked.

Posterior gonopods of the usual form; distal joint ending in two flagelliform processes, of which the outer is not quite twice as long as the inner.

One male and one female from New Guinea.

Dinematocricus disjunctus, *sp. nov.*

(Plate xvii., figs. 53-57.)

♂ mat.: length 57 m m; diameter 5 m m; 54 segments; two segments apodous; 97 pair of legs.

Colour dull ochraceous with a slight olive shade; posterior margin of segments more chestnut; the line of pores on the last fourteen segments and the anal valves darkened. Head black. Legs chestnut.

Head smooth (or with tiny irregular wrinkles); four labral dimples; median sulcus distinct on the upper lip, very weak backwards, almost obsolete between the antennæ. Distance between the eyes equal to twice the diameter of an eye. Ocelli flattened, fairly distinct in the middle of the eye, but scarcely recognizable along the borders, numbering forty-five to forty-seven, arranged in irregular rows (1+5+6+7+3+7+5+5+6 or 1+3+5+5+6+7+7+7+6).

Antennal fossæ shallow. The distance between the antennal sockets equal to the length of the four proximal joints. Antennæ short, not reaching the posterior margin of the first tergite. The four proximal joints are almost bare; the setæ are rare on the fifth and more numerous on the last two joints. Four sensory cones. Micrometrical measurements of the joints:—1st joint 0.512 m m; 2nd, 0.608 m m; 3rd, 0.544 m m; 4th, 0.512 m m; 5th, 0.480 m m; 6th, 0.416 m m; 7th and 8th, 0.096 m m; total length, 3.168 m m. Diameter of 2nd joint 0.496 m m; of 6th, 0.416 m m.

First tergite smooth, shining. Its sides evenly rounded. Marginal sulcus very short, extending from the lower level of the eye to the middle of the curve of the sides.

Scobinas from about the fourteenth segment to about the thirtieth. The distance between the dimples is equal to almost four times the breadth of one of them. Dimple oval (Pl. xvii., fig. 56), distinct from the anterior margin of the zonite, though close to it. The posterior field is triangular, acute, dull, but not striate.

The integuments (Pl. xvii., fig. 57) are strewn with minute, longitudinal, widely spread striæ. The anterior concealed part of the prozonite, although not completely smooth, shows no distinct concentric sulci. The posterior part is adorned with arched oblique striæ; these grow gradually more perpendicular above the pores and turn into a transverse, dorsal, moderately impressed sulcus, as distant from the anterior smooth part as from the metazonite; this sulcus is interrupted dorsally on the segments two, three and four, and on a wider space on the second than on the other segments. Below the pores, the striæ assume a more and more longitudinal direction and gradually encroach on the metazonite. Immediately above the pore, the segment is crossed by a longitudinal sulcus which is situate on a level with the pore, where it meets the sutural sulci; on the metazonite, its course is directed diagonally upwards. The sutural sulcus is obsolete dorsally, faintly impressed laterally, less marked than the sulcus of the prozonite.

Posterior margin of last segment angularly produced, the apex leaving uncovered the upper angles of the valves. The latter are moderately prominent, slightly compressed and without any trace of marginal sulcus. Anal sternite triangular; its base is broad, about equal to twice the length of the sternite. Sterna of other segments transversely sulcate, the sulci thin and numerous. Stigmata small.

Legs short; from the fourth pair backwards, all the joints except the last are provided with but one ventral bristle.

Male:—Tarsi padded and coxæ of third, fourth and fifth pair produced as in *D. lanceolatus*; yet pads and processes are rather less developed. Femora of second pair flattened interally, gibbous posteriorly. Penis small, conical.

Copulatory appendages (Pl. xvii., figs. 53-55):—Tracheal stalk of anterior gonopods *(ts.)* slender, curved outwardly. Proximal part of the ventral plate in shape of a semicircle, bearing a digitiform process equal in length to the proximal part. Distal expansion of coxa wide and short, not exceeding the length of the ventral plate; the proximal angles produced into an endoskeletic process *(esk.)* about as long as half of the tracheal stalk. Tibia *(T.)* in a line with the femur *(Fem.)*, comparatively long, tapering, tipped with an equilateral triangular piece not quite one third of the length of the tibia, and projecting with its full length beyond the apex of the coxal expansion.

Posterior pair (Pl. xvii., fig. 55) of gonopods of the known form. The distal joint ends in two flagelliform, gradually tapering branches, of which the inner is less than half the length of the outer. Tracheal stalk long, slender, curved distally.

Female unknown.

New Guinea.

Dinematocricus lanceolatus, *sp. nov.*

(Plate xvii., figs. 58, 59; Plate xviii., figs. 60-64.)

(a) ♂ mat.: length 71 m m; diameter 7 m m; 52 segments; one segment apodous; 95 pair of legs.

(b) ♂ mat.: length 73 m m; diameter 7.50 m m; 51 segments; one segment apodous; 93 pair of legs.

(c) ♂ mat.: length 85 m m; diameter 8.50 m m; 51 segments; one segment apodous; 93 pair of legs.

Chestnut to brown, with black limbs. Head generally darker than the body, brown or blackish-brown, often showing a median band and some spots of the paler ground colour. Body cylindrical; posterior end gradually compressed. Integuments moderately shining.

Head smooth, with a very weak median sulcus. Four labral setiferous dimples. Ocelli small, congregated on a subcircular field, numbering about forty-four to forty-seven, arranged in six or seven series (8+9+8+8+6+5+7+8+8+8+7+6+3).

Distance between the eyes equal to about twice the diameter of one of them. Antennal fossæ shallow. Distance between the antennal sockets equal to the length of the three proximal joints. Antennæ short, not reaching (♂) the posterior margin of the first tergite. The three basal joints almost bare, the following gradually more pilose. Four sensory cones. Micrometrical measurements of joints: 1st joint 0.640 m/m; 2nd, 0.800 m/m; 3rd, 0.704 m/m; 4th, 0.672 m/m; 5th, 0.640 m/m; 6th, 0.512 m/m; 7th and 8th, 0.128 m/m; total length, 4.096. Diameter of 2nd joint 0.640 m/m; of 6th, 0.672 m/m.

The gnathochilarium, and particularly the chitinized cap which stands in front of the laminæ linguales, are identical with the sketch given by Vom Rath[35] of *Spirobolus phranus*. The middle plate of the cap is anchor-shaped; the mentum is composed of a single plate; the outer angles of the hypostoma are somewhat more quadrate than in Vom Rath's figure.

First tergite smooth; its evenly rounded sides do not reach the level of the ventral surface of the body; the marginal sulcus is short.

Scobinas present from about the tenth to about the thirty-ninth segment. The dimple (Pl. xvii., fig. 59) is very short and wide open anteriorly, being cut in the anterior margin of the segment; the posterior field is more or less conical with rounded end; it is covered with dense and minute transverse striæ. On the twenty-fifth zonite the distance between the dimples is about equal to twice the breadth of one of the striate fields. Posterior margin of segments shallowly excised in correspondance with the scobinas of the following segment.

The anterior concealed part of the prozonites is smooth; the posterior part is adorned dorsally with a microscopical network of minute, irregular striæ, which die out, although not entirely, on the metazonite. Under the microscope, the latter appears spread with scarcely distinct punctures. No tranverse suture is seen between pro- and metazonite. On the sides (Pl. xviii., fig. 60), the prozonite show distinct striæ, two or three of which reach above the pore; the upper striæ are more or

[35] Vom Rath *Loc. cit.*, fig. 33.

less curved and oblique; lower down they are straighter and encroach gradually more on the metazonite. Pores start with the sixth somite; they open in the prozonite, and they are surrounded upwards and backwards by a special, angularly curved sulcus, the perpendicular posterior branch of which is the only trace of transverse suture to be witnessed.

Last segment with posterior margin angularly produced; the process does not cover the upper angles of the anal valves. The latter are largely prominent, rather flattened; they are compressed near the margins, which, however, remain rounded and show no trace of marginal sulcus. Anal sternite triangular. Sternites of the other segments transversely striate. Stigmata small.

Legs very short, with but one or two distal bristles on the ventral surface of each joint, except the last.

Male:—Tarsi padded (Pl. xvii., fig. 58); the pads grow larger up to the seventh pair of legs, then become gradually smaller backwards; they disappear after the thirty-sixth zonite. On the five anterior pairs of legs, the ventral surface of joints, three to five, is warted, the warts being larger on the first two pairs than on the following. The second joint of the second pair is hollowed inwardly. The penis is a small membranaceous cone, not even as long as the coxæ of the preceding legs. Coxæ of the third (fig. 58) and fourth pair produced, the process growing smaller on the following pair.

Copulatory appendages:—Anterior gonopods (Pl. xviii., figs 61, 62):—basal piece of the ventral plate (*V.*) twice as wide as high, rounded laterally; its anterior margin is strongly sinuate and, from the middle, starts an elongate process, in shape of a spear-head, about equal in length to the basal part. Tracheal stalk (*ts.*) long and slender. The coxæ are not in contact on the middle line; they are simply connected together through the rounded posterior basal plate (*c.p.*); their distal expansion is triangular, narrow, and reaches at least the summit of the ventral plate; proximally they end in an oblique endoskeletic process (*esk.*) half as long as the tracheal stalk. Femur fused with the coxa. Tibia in a line with the femur, rather short slightly tapering distally, tipped with an isosceles triangular piece equal to four-fifths of the tibia, reaching somewhat beyond the coxal expansion.

Posterior gonopods (Pl. xviii., fig. 63) as in *Rhinocricus*, two-jointed. The distal joint is split into two flagelliform, gradually tapering branches, of which the inner is about half the length of the outer. Tracheal stalk long and slender, curved distally.

Female unknown.

Three specimens from New Ireland.

DINEMATOCRICUS HOLOSERICEUS, *sp. nov.*

(Plate xviii., figs. 65-69.)

♂ mat.: length 64 m m; diameter 8 m m (posteror third), or 7.50 m m (anterior third); 52 segments; one segment apodous; 95 pair of legs.

Dark chestnut brown; metazonites somewhat more reddish; head and legs brighter. Body stout, stonter backwards.

Head smooth, shining. Four labral dimples, of which the two median stand close together, while the two outer stand apart, outside the labral notch. Median sulcus weak, uninterrupted, although faint between the antennæ. Eyes rounded; the space between them nearly four times the diameter of one of them. Ocelli flattened, moderately distinct, arranged in seven series, to 6+7+7+7+5+4+2 = 38. Antennal sockets shallow; the distance between them nearly equal to the length of the five proximal joints. Antennæ short, reaching the posterior margin of the first segment. Joint one bare; joints two and three with but few distal bristles; joint four with few setæ on the surface besides the distal crown; on the remaining joints the setæ are more and more numerous; four sensory cones. Micrometrical measurements of joints: 1st joint 0.544 m m; 2nd, 0.608 m m; 3rd, 0.576 m m; 4th, 0.512 m m; 5th, 0.448 m m; 6th, 0.416 m m; 7th and 8th, 0.080 m m; total length 3.184 m m. Diameter of 2nd joint 0.480 m m; of 6th, 0.384 m m.

First tergite falling short of the ventral surface of the second, with indistinct striæ and a faint transverse, dorsal impression. Anterior margin slightly emarginate on a level with the eyes. Sides rounded, though showing traces of posterior angles; the marginal sulcus short. Ventral surface of the second segment flattened, not particularly swollen laterally.

Scobinas from the eighth to about the twenty-first zonite, nearly obsolete on the twenty-second. Dimples (Pl. xviii., fig. 65) divided by a space almost equal to five times the diameter of one of them. Dimples in the shape of a segment of a circle, open frontwards; the bottom gradually rises up to the level of the zonite. Posterior field rather long, narrowed and rounded at the end; striæ thin and numerous.

Concealed part of the prozonite smooth; integuments of the rest of the zonites entirely covered with tiny striæ, extremely dense on the posterior part of the prozonite, less so on the metazonites where the striæ are somewhat coarser; therefrom the integuments gain a silky lustre. On the exposed part of the prozonite, oblique striæ are seen which are much larger and deeper in the anterior part of the body than in the posterior. On the sixth segment, for instance, one of the sulci, starting above the pore, assumes a transverse direction, crossing entirely the dorsal region in front of, and close to, the sutural sulcus; below the pores are five truncate sulci, the posterior ends of which break off in the suture; lower down the sulci, when reaching the suture, assume a longitudinal course and cross the metazonite entirely; the latter striæ are confined to the ventral portion of the segments. The transverse pre-sutural sulcus is interrupted dorsally on segments two, three, four, and gradually shortened on segments eight and backwards, no trace of it being found after the sixteenth; also, the other sulci grow shorter and weaker backwards. Sutural sulcus entire, more distinct in the anterior half of the body than in the posterior half; it is slightly notched behind the pores. Pores begin on the sixth segment; they are located high on the sides, and open in the prozonite, in the centre of a small circular spot which is smooth and shining.

Last segment with its posterior margin scarcely produced, the angle being almost entirely rounded off, and just covering the upper angles of the valves. The latter are considerably reduced, nearly smooth, globular, each with a faint pre-marginal impression. Anal sternite triangular, its length about one-fourth the breadth at the base, its apex blunt. Sterna of other segments sulcate, the sulci few in number (about eight). Stigmata small.

Legs very short, about one-third of the diameter of the body, with but one bristle below on the proximal five joints.

Male:—Coxæ of legs three, four and five bearing a long, thick sub-quadrangular process with rounded distal margin (Pl. xviii., fig. 66). Tarsi not padded.

Copulatory appendages:—Anteror gonopods (Pl. xviii., figs. 67, 68):—basal part of the ventral plate *(v.)* semicircular, tipped with a stout process somewhat broader than long, not even half the length of the basal part, almost entirely rounded. Coxal expansion wide and short, with apex cut at a right angle, and reaching exactly the end of the ventral plate; proximal endoskeletic process *(esk.)* moderately produced, not reaching over one-third of the tracheal stalk. Tibia in a line with and as long as the femur, gradually narrowed distally, tipped with an equilateral triangular piece, with rounded angles, which reaches with its full length over the summit of the coxa. Posterior basal plate *(v.2.)* angular. Tracheal stalk *(ts.)* long, slender, arched.

Posterior gonopods (Pl. xviii., fig. 69) two-jointed; proximal joint as long as the undivided part of the distal joint. Inner branch of the latter not even half the length of the outer, grooved as in *D. carinatus*, the seminal duct seemingly ending in the fork between the branches.

Female unknown.

One male specimen from Fiji.

Dixematocricus carinatus, Karsch, 1881.

(Plate xviii., figs. 70-74).

Spirobolus (Rhinocricus) carinatus, Karsch, 1881, Zeitsch. Naturwiss., liv., p. 73.

Karsch's description runs as follows:—

"Scobina den grössten Theil der Ringe characterisirend, die "Deckenringe am Hinterrande niemals ausgerandet. Endring "die Analklappen nicht überragend. Clypeus schwach "eingeschnitten. ♀, caesio-fuscus, pedibus antennisque flavis, "collo flavo-limbato, anulis postice flavo-marginatis; facie "subglabra, sulco subpartita, clypeo foveolis utrinque 2; "anulis vix segmentatis, parte basali glabra, in anulis 9-23 "scobina, parte opaca postice acute producta, instructa, parte "media subglabra, subtus et lateribus paullo quidem supra "poros in tumulo quodam simulate partis posticae sitos.

"longitudinaliter sulcata, p. postica carinis longitudinalibus "sat altis ornata; collo lateribus margines annli secundi "ventrales fere attingentibus, sensim angustatis, rotundatis, "sulco marginali tenni; annlo ultimo submucronato, angulo "postico late rotundato, valvulis analibus convexis, marginibus "paullo compressis; antennis collum haud superantibus; "annlis 36. Viti Levu."

The specimens examined agree fairly with Karsch's description; yet doubt remains as to some particulars, such as, how far down do the sides of the first segment reach; how are the dorsal carinæ shaped; how numerous are they, and what the copulatory appendages look like? It has, therefore, been deemed advisable to issue a new description.

♂ mat.: length 32 m/m; diameter 3.70 m m; 34 segments; one segment apodous; 59 pair of legs (Fiji).

♀ mat.: length about 50 m m; diameter 5.50 m m; 35 segments; one segment apodous; 63 pair of legs (Fiji).

The great discrepancy between the measurements of both specimens is accounted for by the fact that the male is a small contracted animal and the female a large extended specimen.

Male:—Black, anterior margin and sides of the first tergite dark brown-red; valves dull brown-yellow; legs, antennæ and labrum ochre-yellow.

Head smooth, shining. Four labral, setiferous dimples. Median sulcus scarcely distinct backwards and even on the upper lip, obsolete mesially. Space between the eyes about twice the diameter of one of them. Eyes rounded, composed of moderately distinct ocelli, arranged in seven series to 7+8+8+7+6+4+2 = 42. Antennal sockets very shallow; distance between them about equal to four proximal joints. Antennæ short, reaching the posterior margin of the first tergite, compressed as usual, slightly thickened distally. The three proximal joints almost bare; fourth joint with but few distal bristles; fifth and sixth gradually more pilose. Four sensory cones. Micrometrical measurements of joints:—1st joint 0.384 m m; 2nd, 0.512 m m; 3rd, 0.416 m/m; 4th 0.352 m m; 5th, 0.352 m m; 6th, 0.448 m m; 7th and 8th, 0.096 m m; total length 2.560 m/m. Diameter of 2nd joint 0.336 m/m; of 6th, 0.384. Mandibular stem (pleurae) with the inferior angle somewhat pointed.

Scobinas from the eighth segment to about the twenty-fifth, located so close to the anterior margin of the zonite, that they might be mistaken for sinuations of the margin. Dimple (Pl. xviii., fig. 70) open anteriorly, very wide; the posterior field conic rounded, with comparatively few striæ (about ten). The space between the dimples not larger than the diameter of one of them.

First segment with scarcely distinct leathery surface, falling short of the ventral surface of the second segment; sides rounded; marginal sulcus very shallow; a secondary very shallow, incomplete sulcus is seen above the marginal sulcus (may be accidental, see female). Ventral surface of second segment neither concave nor swollen laterally, but crossed by well marked longitudinal sulci, four of which reach above the level of the angle of the preceding tergite.

Anterior concealed part of the prozonite of the following segments almost smooth, or at least without concentric striæ. Posterior part of prozonite striate; the striæ straight dorsally, growing more oblique laterally, and arched on the level of the pores; they again become straight below the pores, encroaching on the metazonite and reaching its posterior margin. The dorsal part of the metazonite (Pl. xviii., fig. 71) is slightly raised, *i.e.*, not on a level with the prozonite. It is crossed longitudinally by some fifteen (on the eighteenth segment), wide and deep grooves, more deeply impressed and closer together on the middle of the back than above the pores, the outer grooves being similar to the sulci below the pores. The grooves are not well outlined, their margins die away in the surface of the metazonite which is convex between the grooves. Sutural sulcus obsolete dorsally, scarcely marked on a level with the pore and below it; it is notched behind the pore, partly surrounding a feebly raised circular area in the middle of which the small pore is cut open. The latter is located rather high in the sides. It begins with the sixth segment. The second and third segment show no dorsal grooves; these are rare and weak on the fourth segment, but rapidly become more numerous and deeper backwards.

Last segment rather long; its posterior margin is angular and just covers the upper angles of the valves. Valves prominent, somewhat globular at the base, compressed near the

margins, which are not thickened. Anal sternite triangular with rounded apex; its length is about half of its breadth. Sterna of other segments transversely sulcate, the sulci are comparatively few. Stigmata small.

Legs rather long (3.20 m m), though not quite as long as the diameter of the body, slender, with but one bristle below on the two proximal joints, two on the third, three on the fourth, five on the fifth, and ten in two rows on the last (twenty-sixth pair of legs).

Male :—Tarsi not padded. Ventral surface of second joint of legs feebly excavated. Coxæ of the third, fourth, and fifth pair produced; the ventral surface of the two following joints nodular.

Copulatory appendages :—Anterior gonopods (Pl. xviii., figs. 72, 73); basal part of the ventral plate *(V.)* triangular, with straight lateral margins; its length not quite half it breadth at the base; upper angle produced into a spear-head-shaped process about as long as the basal part. Coxal expansion angular, acute distally, as long as the ventral plate or even perhaps a trifle longer; the coxa is produced proximally into a short endoskeletic process *(esk.)* about as long as half the tracheal stalk. Tibia in a line with the femur, rather long parallelsided and narrowed distally, tipped with a small subtriangular plate, with rounded apex, which reaches beyond the summit of the ventral plate. Posterior basal plate *(v. 2.)* subtriangular, emarginate laterally; apex blunt. Tracheal stalks *(ts.)* long, slender, crooked as usual.

Posterior gonopods (Pl. xviii., fig. 74) two jointed. Unfortunately the main outer branch is broken off on both gonopods. The inner branch is ribbon-shaped; its lamellar, neatly undulate margins are somewhat curled up towards the outer branch, thus forming a longitudinal groove. The seminal duct seems to open at the bottom of the fork of the distal joint, in between the two branches. Tracheal stalk long, slender, curved distally.

Female :—Ground colour grey-brown (evidently altered); labrum, antennæ, the margins of all segments, the apex of the last and the valves dull ochraceous. A broad band of the same

ochraceous colour adorns the dorsal part of the body, from the second to about the fifteenth segment; besides, the metazonites are marked between the pores with longitudinal black strokes, more dull on the posterior darker half of the body than on the lighter anterior half; these strokes are in connection with the sulci of the metazonites. Legs bright ochre-yellow.

Head strongly shining, as if varnished. Median sulcus weak scarcely interrupted between the antennæ. Ocelli disposed in seven rows (6+7+7+7+6+5+2 = 40 or 7+7+7+7+6+4+3 = 41). Micrometrical measurements of antennal joints:—1st joint 0.608 m m; 2nd, 0.736 m m; 3rd, 0.608 m m; 4th, 0.544 m m; 5th, 0.544 m m; 6th, 0.592 m m; 7th and 8th, 0.080 m m; total length 3.712 m m. Diameter of 2nd joint, 0.464 m m; of 6th, 0.480 m m.

Sides of the first segment without secondary sulcus above the marginal sulcus.

Grooves on the eighteenth segment thirteen in number (instead of fifteen).

Fiji.

? SPIROBOLUS, *sp.*

♀ mat.: length 62 m m; diameter 5 m m; 51 segments; one segment apodous; 95 pair of legs.

The absence of males prevents us from ascertaining the systematic position of this species. The shape of the first segment is similar to that of *Spirostrophus digitulus*. The prozonite shows transverse striæ instead of punctures. Scobinas absent. The tiny pores are located on the limit between pro- and the metazonite; but as the suture is indistinct and the metazonite extremely short, it seems that the pores open in the metazonite. The pores start from the sixth segment. The valves are prominent, globular, without any trace of premarginal depression.

The most interesting feature is the existence of 4+4 setiferous dimples on the upper lip, a character which agrees with none of the genera here recorded.

Three female specimens (of which only one adult) from Newcastle, New South Wales, and Queensland.

TABLE I.

AUSTRALIAN CONTINENT.

1 (2) 3+3 labral pores... ... *Spirobolus lugubris*, L. Koch.

2 (1) 2+2 labral pores ... 3

3 (4)—Scobinas wanting ... *Spirobolus coeruleodimbatus*, Daday.

4 (3)—Scobinas present ... 5

5 (6)—Very large species, diameter of body 20 m m, 61 segments ... ... *Rhinocricus fasciculatus*, Voges.

6 (5)—Medium sized species, diameter of body not over 8 m m, 44 56 segments... 7

7 (8)—Anal valves showing a deep pre-marginal sulcus. Transverse sutural sulcus of segments deep. Metazonites smooth ... *Rhinocricus brevipes*, Karsch.

8 (7)—Anal valves more or less compressed, but without pre-marginal sulcus. Transverse sutural sulcus weak or obsolete. 9

9 (12)—Exposed part of prozonite and metazonite smooth 10

10 (11)—Diameter of body 6 m m. Segments 43 44 in number. Scobinas in segments 12 to 30. Somerset, Cape York Peninsula, Queensland ... *Rhinocricus aquilatus*, Silvestri.

11 (10)—Diameter of body 7 m m. Segments 53. Scobinas in segments 9 to penultimate. Gayndah ... *D. (Chadiocricus) falcatus*, Silvestri.

12 (9)—Exposed part of prozonite and metazonite in some way sculptured (punctured, striate, &c.) 13

13 (14)—Exposed part of prozonite and metazonite entirely beset with tiny striæ ("tota rugis minimis obsessa"). Segments 44 in number ... *Rhinocricus sanct*, Silvestri.

14 (13)—Exposed part of zonites at least partly punctured, the punctures intermingled with striæ or not ... 15

15 (18)—Legs of male not padded 16

16 (17)—Distance between the scobinas equal to eight times the breadth of one of them . . . . .
D. (Cladisocricus) falcatus scobinula, sp. nov.

17 (16)—Distance between the scobinas hardly equal to the breadth of one of them . . . .
D. (Cladisocricus) consimilis, sp. nov.

18 (15) Legs of male padded[36] . . . . . .
Rhinocricus crepidatus (L. Koch), Karsch.

TABLE II.

NEW GUINEA.

1 (8)—Scobinas wanting 2

2 (5)—Segments dorsally smooth 3

3 (4)—Sides smooth ("segmenta in latere et supra glabris, politis"). Large species 107 to 110 m m
Spirobolus fenicheli, Daday.

4 (3)—Sides grooved ("parte postica late et plane longitudinaliter subcanaliculata, dorso ceterum glabro") . . .
Spirobolus adipatus, Karsch.

5 (2) Segments dorsally sulcate or striate 6

6 (7)—Sulci deep, wide and rare ("parte detecta sulcis sat latis et profundis, raris et inaequalibus, lateribus striatis"). Very large species, 170 to 180 m m. First tergite falling short of the second laterad.
Rhinocricus gravis, Silvestri.

[36] Karsch—(Zeitsch. Naturwiss., liv., 1881, p. 74) describing *Spirobolus (Rhinocricus) crepidatus*, adds in brackets "*Pelmatoiulus crepidatus*, L. Koch i litt.". This implies that the legs of male *crepidatus* bear tarsal pads, as Saussure's division, *Pelmatoiulus*, is precisely based on this sole character. Also it has been admitted that in *consimilis*, the male of which is unknown, the pads are missing as in *scobinula*, owing to the close relationship of both forms.

7 (6)—Sulci narrow and dense ("dorso striis subinaequalibus minutis, sat crassa et dense rugosis"). First tergite reaching as low down as the second ...
Spirobolus calatus, Karsch.

8 (1)—Scobinas present ... 9

9 (10)—Scobinas on segments 10 to 21. Segments said to be "lateribus inferne tantum striatis"..
Rhinocricus diros, Silvestri.

10 (9)—Scobinas more numerous, to be found after the 21st segment 11

11 (16)—Medium sized species, not exceeding 70 m m in length... 12

12 (13)—Scobinas up to about the 40th segment, in shape of an arched line ... *Rhinocricus dimissus*, Silvestri.

13 (12)—Scobinas not to be found behind the 30th segment ..14

14 (15)—Diameter of the body 6.50 m m. Scobinas from the 8th to the 30th segment.....
Rhinocricus montiragus, Silvestri.

15 (14)—Diameter of the body 5 m m. Scobinas from the 14th to the 30th segment.....
Diexiatocricus disjunctus, sp. nov.

16 (11)—Large sized species, over 100 m m in length.....17

17 (18)—Cephalic median sulcus obsolete. Ventral plate of anterior gonopods said to be "apice rectangulari longiore." Scobinas in segments 8 to 31. Coxa of 3rd and 4th pairs with "processu laminari, triangulifórmi." ..*Diexiatocricus loria*, Silvestri.

18 (17)—Median sulcus always present, at least behind the antennæ... 19

19 (20-21—Process of ventral plate of anterior gonopods said to be "subrhomboidali." Scobinas in segments 9 to 11.....*Diexiatocricus albertisi*, Silvestri.

20 (19-21)—Process of ventral plate with straight lateral margins and apex truncate. Scobinas in segments 8 to 30 33.....*Dinematoricus anulis*, sp. nov.

21 (19-20)—Process of ventral plate with sinnate lateral margins and narrowed, more or less blunt apex. Scobinas in segments 8 9 to 36 37.....22

22 (23)—Coxal expansion of anterior gonopods as long or a trifle longer than the process of ventral plate, acute. Segments without punctures along the sutnre. Sternites of the body deeply sulcate.....
Dinematoricus furcatus, Silvestri.

23 (22)—Coxal expansion of anterior gonopods scarcely reaching beyond the middle of the process of ventral plate, blunt. Segments punctured along the suture. Sternites of the body weakly sulcate.....
Dinematoricus faucium, sp. nov.

Table III.

BISMARCK ARCHIPELAGO to SOLOMON ISLANDS.

1 (2)—Scobinas wanting. First tergite reaching as low down as the 2nd.....*Spirobolus cedatus*, Karsch.

2 (1)—Scobinas present.—First tergite falling short of the 2nd. laterad... 3

3 (4)—Posterior margin of last segment produced into a short spiniform, downward curved process, overreaching the valves.....*Spirobolus rogesi*, Karsch.

4 (3)—Posterior margin of last segment more or less triangular, not reaching beyond the valves..... 5

5 (8)—Posterior margin of same segment excised in correspondence with scobinas of the following segment... 6

6 (7)—Legs black. Anal valves prominent..
Dinematoricus lanceolatus, sp. nov.

7 (6)—Legs reddish-yellow. Anal valves "scarcely at all produced beyond the level of the tergite."
Rhinocricus bilineisus, Pocock.

8 (5)—None of the segments with posterior margin excised 9

9 (10) - Back of the body ornamented with a pair of light coloured bands (red or yellow). Median process of ventral plate of anterior gonopods longer than the half-moon-shaped basal part
Rhinocricus cristobalensis, Pocock.

10 (9)—Back without longitudinal bands. Median process of ventral plate shorter than the basal part
Rhinocricus gazellensis, Pocock.

TABLE IV.

FIJI.

1 (2)—Anal valves granular
Spirobolus colubrinus L. Koch.

2 (1)—Anal valves smooth 3

3 (4)—Posterior margin of last segment ending in a well defined process, overreaching the level of the anal valves ..... *Spirobolus pictus*, L. Koch.

4 (3)—Posterior margin of last segment more or less angular or rounded, not overreaching the anal valves ...5

5 (6)—4+4 labial dimples... *Spirobolus deformatus*, Karsch.

6 (5)—2+2 labial dimples..... 7

7 (12)—Metazonites provided with longitudinal ridges or carinæ; when the latter are feebly developed, they are dense and encroach on the prozonite. 37 to 39 segments..... 8

8 (11)—Ridges to be found on the prozonites as well as on the metazonites 9

9 (10)—Legs and antennæ pale yellow
Spirobolus signifer, Karsch.

10 (9) Legs and antennæ at least partly black or blackish
Spirobolus costatus, L. Koch.

11 (8)- Rounded carinæ on the metazonites only
Dinematocricus carinatus, Karsch.

12 (7)—Metazonites bearing sulci or striæ, but without ridges or carinæ .. 13

13 (14)—Scobinas wanting. Concealed anterior part of prozonite with concentric striæ, exposed posterior part punctured *Spirobolus decoratus*, Karsch.

14 (13)—Scobinas present .. 15

15 (16)—Posterior margin of some segments excised in correspondence with the scobinas of the following segments *Rhinocricus undulatus*, Karsch.

16 (15)—None of the segments with posterior margin excised . . 17

17 (18)—Metazonites with distinct punctures *Rhinocricus excavatus*, Silvestri.

18 (17)—Metazonites smooth or with striæ 19

19 (20)—Metazonite and prozonite densely beset with striæ, showing a silky lustre. Distal joint of posterior gonopods ending in two flagelliform, gradually tapering branches, the inner of which scarcely reaches the half of the length of the outer . *Dinematocricus holosericus*, sp. nov.

20 (19)—Metazonite smooth, without lustre. Distal joint of posterior gonopods ending in two flagelliform branches of equal length; or else the outer branch grows wider distad, its apex being truncate and spined . 21

21 (22)—Sutural sulcus obsolete. Both branches of posterior gonopods are flagelliform, of subequal length. Large size, 115 m/m . *Dinematocricus micropygus*, Silvestri.

22 (21)—Sutural sulcus entire. Outer branch of posterior gonopods widened distad. Medium size, 60 m/m *Rhinocricus bicornis*, Silvestri.

APPENDIX.

Genus AMASTIGOGONUS, *gen. nov.*

We are mainly indebted to Attems for the knowledge we possess of the Inloid group of the Cambalidæ.[37]

This group is already represented on the Australian continent by the genus *Dimerogonus* of which the most striking feature is the presence, in the anterior gonopods, of a flagellum similar to that often met with in European Inloids.

Attems (1903) gave the following diagnosis of his genus *Dimerogonus* :—

"Ocellen zahlreich, mehreihig. Scheitelborsten fehlen. "Oberlippenrand 3 zähnig. Mandibel mit 9 Kammblättern. "Gnathochilarium wie bei *Glyphiulus* and *Agastrophus*: die "Stipites und die Zungenblätter sind durch das Mentum und "das davon geschiedene Promentum vollkommen getrennt. "Promentum ohne Längstheilung. Halsschild glatt; Rumpf- "segmente ohne erhabene Kiele; die Metazoniten sind nur "ventral fein längsgefurcht (etwa wie bei *Blaniulus*), sonst "glatt. Saftlöcher weit hinter der Quernaht gelegen, beginnen "auf dem 6. Segment. Analsegment ohne vorragendes "Schwänzchen. 1. Beinpaar des ♂ 6gliedrig. Einige "Basalglieder stark verbreitet, das Endglied klauenlos. Vor- "dere Copulationsfüsse, 2gliedrig; das Basalglied (= Hüfte) "gross, plattig, mit einem Flagellum; das 2. glied (= Schenkel) "kleiner, mehr lateral inserirt. Hintere Copulationsfüsse "mehr oder weniger deutlich 2gliedrig. Heimath: Australien, "Neuseeland."

From the description of the type specimen, *D. orophilus*, from Sydney, we learn besides that the anterior gonopods are provided with a distinct ventral plate.

The specimens preserved in the Australian Museum, and originating from Tasmania, decidedly show a relationship with Attems' genus, yet cannot be placed herein, as the ventral plate of the anterior gonopods is fused with the basal joint of

[37] Attems- Zool. Jahrb., xiii., Heft 2, 1890; *Ibid*, xviii., Heft 1, 1903.

the gonopods; and there is, indeed, a kind of flagellum, but it is very different in shape and position from what is shown in Attems' figures as well as in those of congeneric species described by Prof. Silvestri[38] as it is not attached to the base of the posterior inner edge of the proximal joint, but to the inner edge of the distal joint. Moreover the posterior gonopods are simple; they also bear a lateral process, but the latter is fused with the main stem of the organ.

A new genus has consequently to be created, for which the name *Amastigogonus* is proposed, with the following diagnosis:—

Primary Characters:—Anterior gonopods two-jointed. Ventral plate fused with the proximal joint of the gonopods, therefore not distinct. The distal joint bears a ribbon-shaped pseudoflagellum. Posterior gonopods single-jointed. Gnathochilarium as in *Dimerogonus*.

Secondary Characters:—Eyes present, composed of numerous ocelli. Labral notch filled with five teeth; setiferous dimples six to eight. Mandible with five (or six) pectinate lamellæ; male mandibular stem expanded. Segments without keels or tubercules; last segment without caudal process. Pores opening in the metazonite. First, second and third pair of legs of male as in *Dimerogonus*.

Type:—*A. tasmanianus*. Tasmania.

From the related genera *Agastrophus*, Attems, and *Hypocambala*, Silvestri, *Amastigogonus* is readily distinguished by the presence of the pseudoflagellum of the anterior gonopods.

AMASTIGOGONUS TASMANIANUS, *sp. nov.*

(Figures 32-37).

(a) ♂ mat.: length 53 m/m; diameter 2.90 m m; 63 segments; two segments apodous; 115 pair of legs.

(b) ♂ mat.: length ?; diameter 3.20 m m; 62 segments; two segments apodous; 113 pair of legs.

[38] Silvestri—Fauna Hawaiicnsis, iii., 1904.

(c) ♂ mat.: length 44 m/m; diameter 2.80 m m; 56 segments; three segments apodous; 99 pair of legs.

(d) ♀ mat.: length 45 m/m; diameter 3 m m; 61 segments; three segments apodous; 111 pair of legs.

Black, legs brown. Body cylindrical, moderately shining.

Head smooth. Labral notch wide, rounded, provided with five teeth; labral setiferous dimples 3 + 3 to 4 + 4. Median sulcus short, to be seen only on the back of the head, abruptly broken off on a level with the inner angle of the eyes. Eyes divided by a space about equal to the largest diameter of one of them; ocelli flattened, arranged in four or five series (9+8 +8+8 = 33 to 10+9+9+8+7 = 43). Distance between the antennæ equal to about the length of the three proximal joints. Antennæ reaching the posterior margin of the third segment, scarcely clavate, moderately pilose, tipped with four sensory cones. Micrometrical measurements of joints:—1st joint 0.172 m m; 2nd, 0.516 m/m; 3rd, 0.516 m/m; 4th, 0.430 m/m; 5th, 0.430 m/m; 6th, 0.473 m m; 7th and 8th, 0.086 m m; total length, 2.623 m m. Diameter of 2nd joint 0.301 m m; of 6th, 0.387 m/m.

First tergite fairly long dorsally. Its sides do not reach as low down as the second segment; in fact they are slightly angular, but, the outer margin being somewhat curled in, they appear rounded when seen in profile. Surface smooth dorsally; the sides bear five or six moderately deep sulci, of which three reach the level of the eyes, the remaining two or three being shortened. The anterior margin is not excised.

Anterior, concealed part of prozonite of other segments showing weak concentric striæ; the latter are marked now and then with minute, strongly shining granules, which become more numerous ventrally. The posterior, exposed part of the prozonite and the metazonite are somewhat uneven, yet without definite sculpture except some tiny longitudinal striæ irregularly disposed, but mainly to be found along the suture. Transverse sutural sulcus well marked all round, usually interrupted on a level with the first or second longitudinal sulcus of the metazonite; the following sulci remain

independant, their anterior ends being diagonally directed upwards and gradually dying out in the prozonite. The sulci are more strongly marked on the anterior than on the median or posterior segments; they are also more numerous there than here, and consequently reach nearer to the pore. The pores start from the sixth segment and open in the metazonite; they are located high on the sides and are scarcely nearer to the suture than to the posterior margin of the segment.

Last segment longish, with its posterior margin slightly produced, the angle being very wide, the apex rounded and the margin of the segment scarcely emarginate laterally; it just conceals the upper angles of the valves without overreaching them. The valves are not prominent; they are globular even along their margins, where some tiny, fleecy, pale hairs are to be seen. Anal sternite somewhat swollen, with almost straight posterior margin. Sternites of the remaining segments of the body smooth, not striate. Stigmata very small.

Legs moderately long; second joint with two rows each of three bristles on its ventral surface, and a crown of six bristles around its distal end (three anterior and three posterior).

Male:—The lower edge of the mandibular stem is strongly produced, rounded. Legs of the first pair (fig. 32) showing a free narrow plate at the base of the posterior surface, which has been considered as a ventral plate by Dr. Attems; a pair of basal joints *(1.)*, largely expanded laterally, said to be coxæ,[39] to which the tracheal stalks *(ts.)* are attached; finally a telopodit composed of five condensed joints *(2-6)*, of which the two proximal (joints two and three of the legs) are broader than the three distal joints; the last joint is globular, destitute of claw.

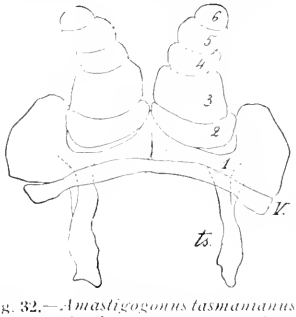


Fig. 32.—*Amastigogonus tasmanianus*, —First pair of legs posterior surface.

[39] The homology of ventral plate and coxæ is perhaps not quite correct, and will have to be submitted to further examination.

Legs of the second pair scarcely modified. The ventral plate is divided into two plates; the coxæ are elongate as usual; their base is excavated in the middle of the posterior surface, the space being filled by the chitinized openings of the seminal ducts; the telopodit is five-jointed, and the joints are normal.

Legs of the third pair similar to the preceding except that the posterior ventral plate is not divided; the coxal joint shows traces of the division, so that a transverse band is seen on the anterior surface expanding laterally around the base of the true coxal joints, the tracheal stalks being attached to the lateral expansions; and finally the distal end of the coxæ show an additional joint, more or less completely detached, which has to be considered as a trochanter.

From the fourth pair of legs backwards (fig. 33), the trochanter *(tr.)* is present, the second joint of all legs *(prf.)* is split open longitudinally on the distal half of its ventral surface; the cleft is closed by a soft membrane *(m.)* which, when normally evaginated, assumes the shape of a conical process, the apex of which reaches over the middle of the next joint. This membranaceous process becomes fully developed only on the legs of the eighth segment and does not disappear but on the last few pairs.

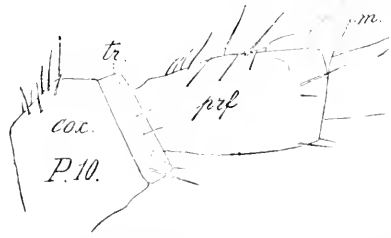


Fig. 33.—*Amastigogonus tasmantanus*.—Three proximal joints of a leg of the 10th pair. *tr.* trochanter; *m.* membranaceous process.

Coxæ of the seventh pair swollen, globular.

The seventh segment is broader than the preceding and the following segments; its ventral ends are twisted and protruded. The apices of the gonopods are seen to project out of the copulatory sac.

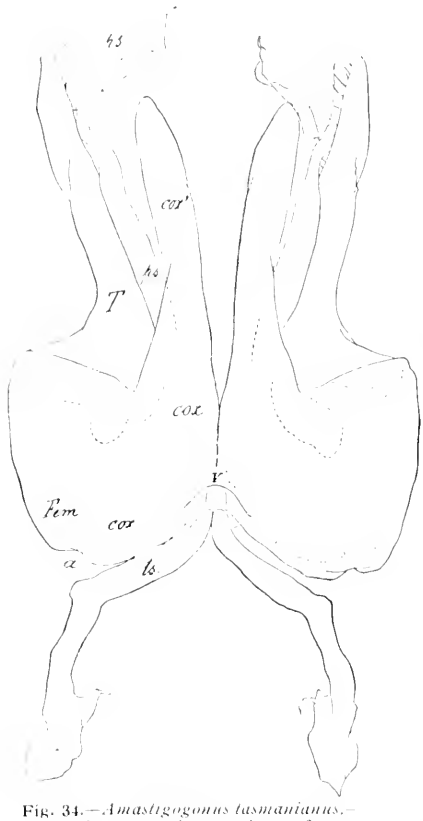


Fig. 34.—*Amastigogonus tasmanianus.*—Anterior gonopods, anterior surface.

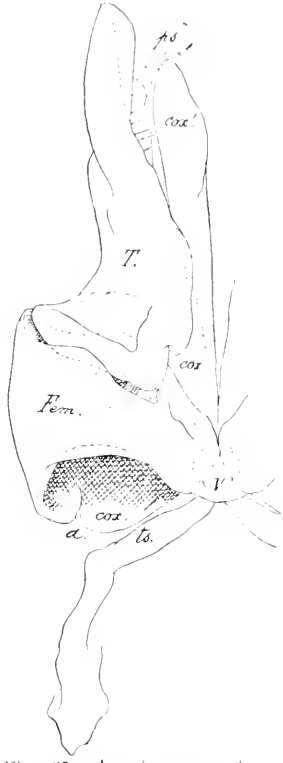


Fig. 35.—*Amastigogonus tasmanianus.*—Anterior gonopods, posterior surface. *a.* = notch between coxa and femur.

Copulatory appendages (figs. 34-37) :—Anterior gonopods two-jointed. The ventral plate *(V.)* is not free ; it is represented by a narrow, longitudinal, median thickening fused with the inner proximal margin of the proximal joints; the slender, crooked tracheal stalks *(ts.)* converge towards the anterior end of the thickening. Proximal joint cylindrical, short and broad, with its inner anterior angle produced into a long, spatulate process, with rounded apex *(cox')*. Along the anterior proximal margin of the joint a notch *(a.)* is to be seen, which leads us to infer that the proximal joint is the representative of both coxa *(cox.)* and femur *(Fem.)* (and not *only the*

femur, as suggested by Attems) fused together. The distal joint (*T.*, fig. 36), or tibia, is a flattened body, expanded at its base to articulate with the cylindrical part of the preceding joint (femur), bearing a row of bristles on its inner concave surface; its rounded apex reaches beyond the summit of the coxal process: its inner edge is folded back and is produced into a long, gradually tapering, ribbon-shaped pseudoflagellum (*ps.*)

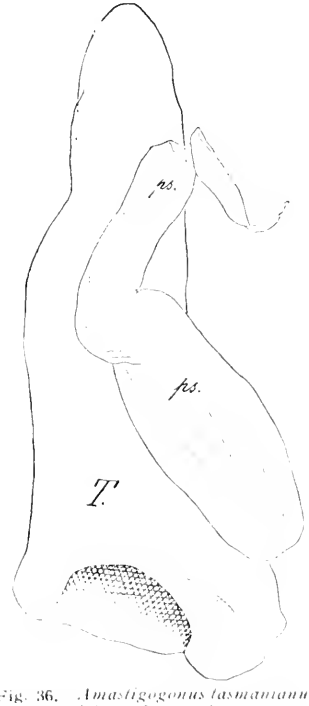


Fig. 36. *Amastigogonus tasmanianus*. Distal joint of anterior gonopod, inner view. *ps.* pseudoflagellum.

Fig. 37.—*Amastigogonus tasmanianus*.—Posterior gonopod.

The posterior gonopods (fig. 37) are entirely independant of one another. No ventral plate could be traced. The gonopod shows no trace of division, but is contracted in the middle. The distal half is lamellar, longitudinally folded at a right angle and truncate, and bears four or five apical bristles and an inner digitiform process. The proximal half articulates with the long and slender tracheal stalks of usual shape. Neither seminal duct nor bladder could be detected.

Tasmania.

EXPLANATION OF PLATES.

On all the figures the following signs have the same meaning:—

bl. = Seminal bladder (Spirobolids).
cf. = Coxo-femur.
cox. = Coxa or coxoide.
d. = Seminal duct.
esk. = Endoskeletic process of coxa (Spirobolids).
Fem. = Femur or femoroide.
ol. = Outer lobe of ventral plate of anterior gonopods (Spirobolids).
P4., P5., &c. = Leg of the 4th, 5th, &c., pair.
pd. = Prostatic duct (Spirobolids).
sb. = Seminal branch of gonopods (Polydesmids).
T. = Tibia.
tab. = Tarsal branch of gonopods (Polydesmids).
tb. = Tibial branch of gonopods (Polydesmids).
ts. = Tracheal stalk.
V. = Ventral plate (Spirobolids).
v2. = Posterior basal plate (Spirobolids).

EXPLANATION OF PLATE XIV.

Cyliosoma queenslandica, Brölemann.

Fig. 1. Posterior end of body of male, profile.
„ 2. Right half of anterior gonopods, setæ omitted.
„ 3. Left half of posterior gonopods.
„ 4. Posterior end of the body of female, profile.

Cyliosoma peurithensis, Brölemann.

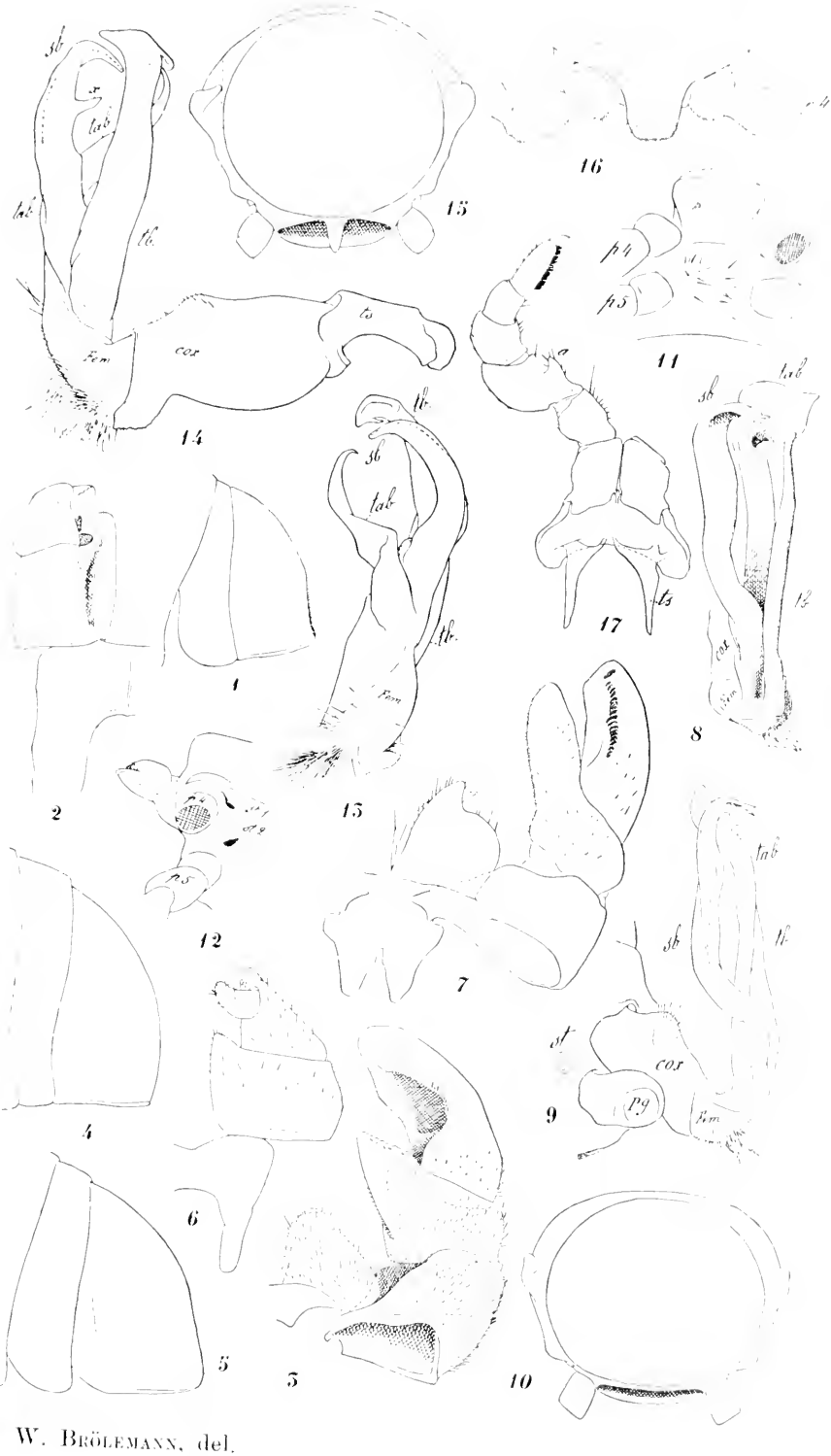
Fig. 5. Posterior end of the body of male, profile.
„ 6. Right half of anterior gonopods.
„ 7. Left half of posterior gonopods.

Australiosoma froggatti, Brölemann.

Fig. 8. Right half of copulatory appendages, viewed *in situ*.
„ 9. Right half of copulatory appendages, outer profile.
„ 10. Section of 7th zonite, with coxal aperture of gonopods.
„ 11. Sternal lamina of 5th segment, ventral view.
„ 12. Sternal lamina of 5th segment, profile. *st1* = anterior, and *st2* = posterior stigmata.

Australiosoma rainbowi, Brölemann.

Fig. 13. Left half of copulatory appendages, posterior-inner view.
„ 14. Left half of copulatory appendages, outer profile. *x* = process of seminal branch.
„ 15. Section of 7th zonite, with coxal aperture of gonopods.
„ 16. Sternal lamina of 5th segment.
„ 17. Leg of 1st pair, showing the tooth-like process of 3rd joint (*a*).



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EXPLANATION OF PLATE XV.

Australiosoma koscinskorayum, Brölemann.

Fig. 18. Right gonopod, viewed *in situ*. *T* = tibial stem.
,, 19. Telopodite of right gonopod, inner profile.
,, 20. Section of 7th zonite, with coxal aperture of gonopods.

Australiosoma etheridgei, Brölemann.

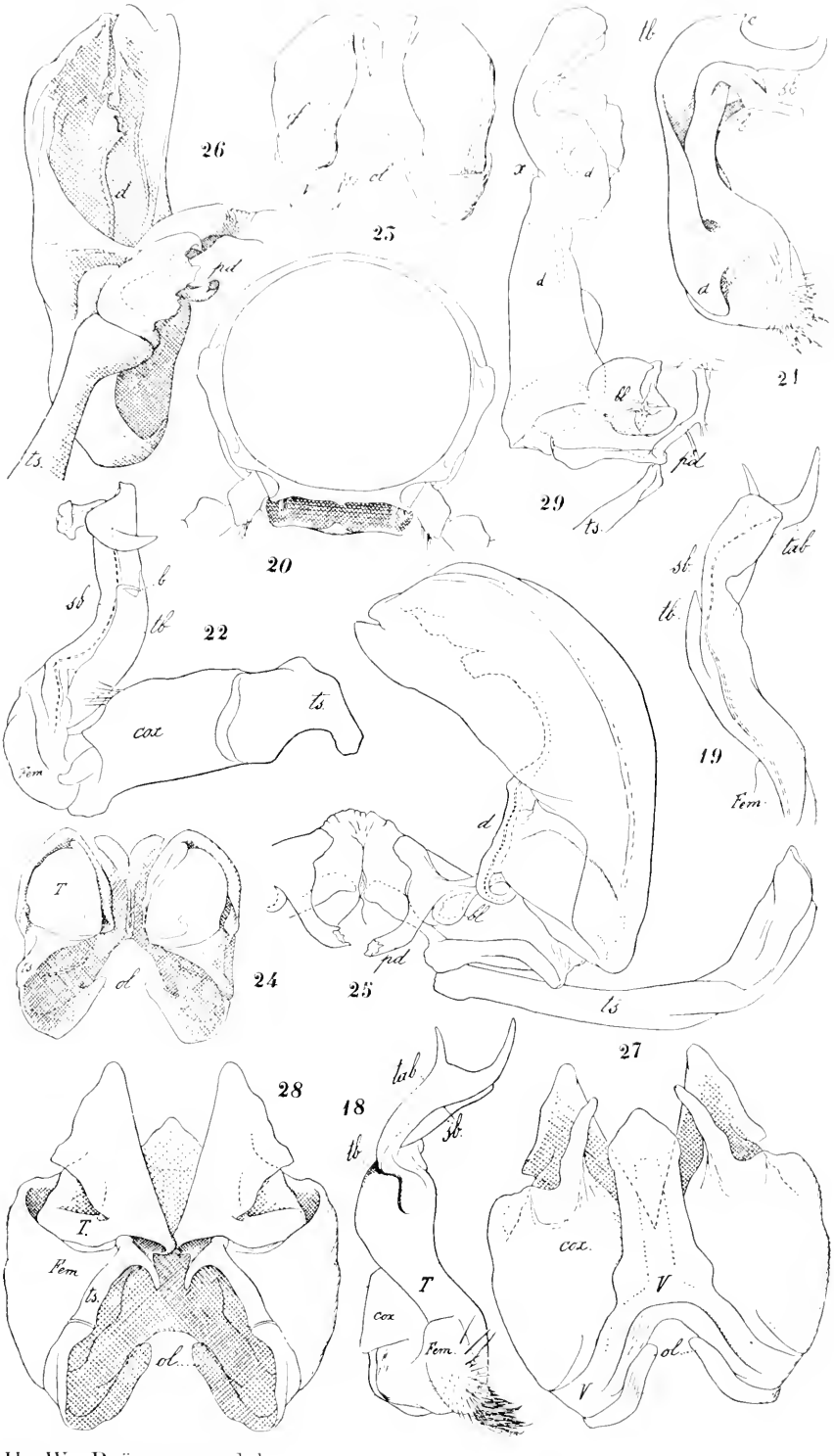
Fig. 21. Right gonopod, viewed *in situ*. *a* = outer lap of tibial branch; *b*, *c* = processes of tibial branch.
,, 22. Right gonopod, inner profile (same lettering as before.

Acanthiulus blainvillei, Le Guillou.

Fig. 23. Anterior gonopods, anterior surface.
,, 24. Anterior gonopods, posterior surface.
,, 25. Posterior gonopod.
,, 26. Posterior gonopod, inner view.

Spirostrophus digitulus, Brölemann.

Fig. 27. Anterior gonopods, anterior surface.
,, 28. Anterior gonopods, posterior surface.
,, 29. Posterior gonopod. *x* = trace of articulation.



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EXPLANATION OF PLATE XVI.

Spirostrophus digitulus, Brölemann.

Fig. 30. Integuments of 19th zonite, dorsal part, in profile.
„ 31. Leg of 3rd pair.
„ 32. Leg of 4th pair.

Spirobolellus rainbowi, Brölemann.

Fig. 33. Integuments of a zonite, dorsal part in profile.
„ 34. Leg of the 3rd pair.
„ 35. Anterior gonopods, anterior surface.
„ 36. Anterior gonopods, posterior surface.
„ 37. Right posterior gonopod. *x* = trace of articulation; *a*, *b*, *c* = processes.
„ 38. Proximal half of right posterior gonopod, much enlarged.

Dinematocricus (Cladiscocricus) falcatus, subsp. *scobinula*, Brölemann.

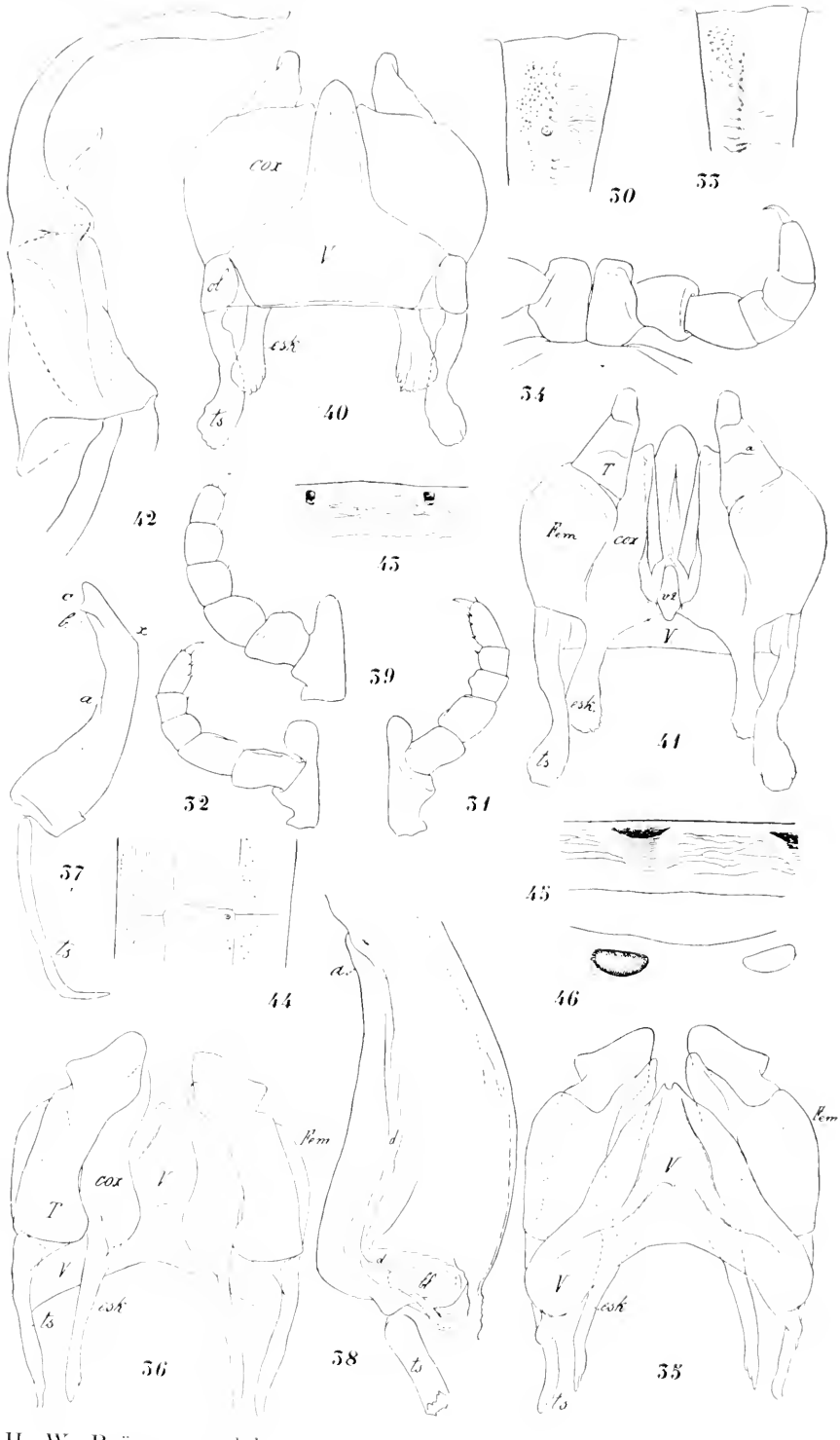
Fig. 39. Leg of 3rd pair.
„ 40. Anterior gonopods, anterior surface.
„ 41. Anterior gonopods, posterior surface. *a* = transverse fold of the tibia.
„ 42. Right posterior gonopod.
„ 43. Scobinas of 11th zonite.
„ 44. Integuments of 30th segment on a level with a pore.

Dinematocricus consimilis, Brölemann.

Fig. 45. Scobinas of 21st zonite.

Dinematocricus fasciatus, Brölemann.

Fig. 46. Scobinas.



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EXPLANATION OF PLATE XVII.

Dinematocricus fasciatus, Brölemann.

Fig. 47. Anterior gonopods, anterior surface.
„ 48. Anterior gonopods, posterior surface.

Dinematocricus analis, Brölemann.

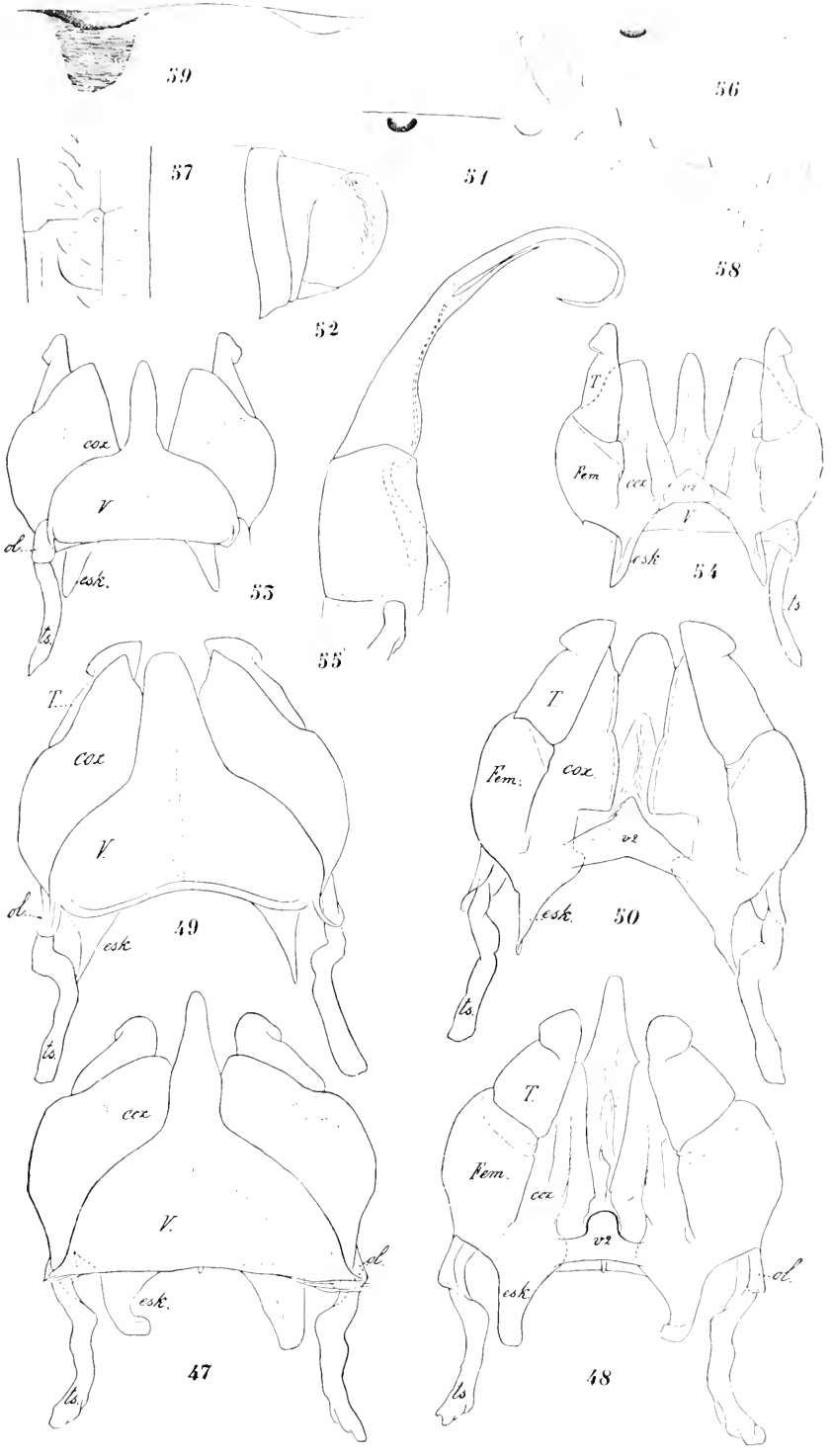
Fig. 49. Anterior gonopods, anterior surface.
„ 50. Anterior gonopods, posterior surface.
„ 51. Scobinas of 14th zonite.
„ 52. Posterior end of the body, profile.

Dinematocricus disjunctus, Brölemann.

Fig. 53. Anterior gonopods, anterior surface.
„ 54. Anterior gonopods, posterior surface.
„ 55. Posterior gonopod.
„ 56. Scobinas of 14th zonite.
„ 57. Integuments of 24th segment, on a level with a pore.

Dinematocricus lanceolatus, Brölemann.

Fig. 58. Leg of the 3rd pair.
„ 59. Scobinas of 25th zonite.



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EXPLANATION OF PLATE XVIII.

Dinematoscirus lanceolatus, Brölemann.

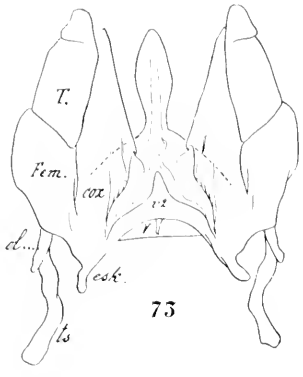
Fig. 60. Integuments of a segment of the middle of the body, on a level with a pore.
„ 61. Anterior gonopods, anterior surface.
„ 62. Anterior gonopods, posterior surface.
„ 63. Left posterior gonopod. *x* = place where the section shown on the following figure has been cut.
„ 64. Section cut through the inner branch of the posterior gonopod.

Dinematoscirus holosericeus, Brölemann.

Fig. 65. Scobinas of 16th zonite.
„ 66. Leg of 3rd pair.
„ 67. Anterior gonopods, anterior surface.
„ 68. Anterior gonopods, posterior surface.
„ 69. Posterior gonopod.

Dinematoscirus carinatus, Karsch.

Fig. 70. Scobinas of 18th zonites.
„ 71. Dorsal part of 18 segment, profile.
„ 72. Anterior gonopods, anterior surface.
„ 73. Anterior gonopods, posterior surface.
„ 74. Posterior gonopods; the end of the outer branch is broken off.



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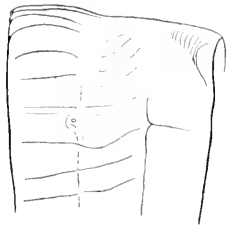

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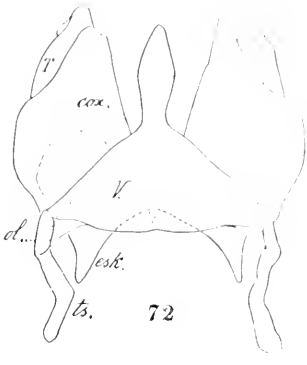

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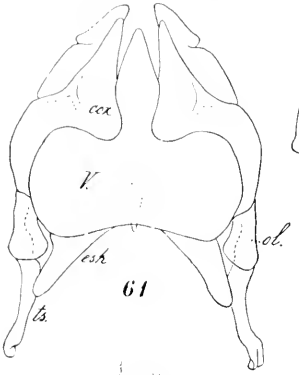

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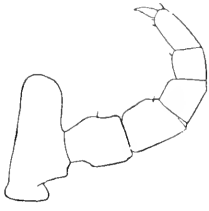

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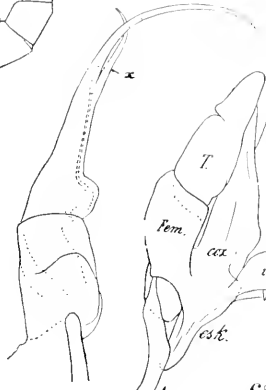

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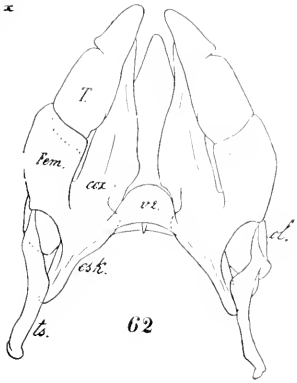

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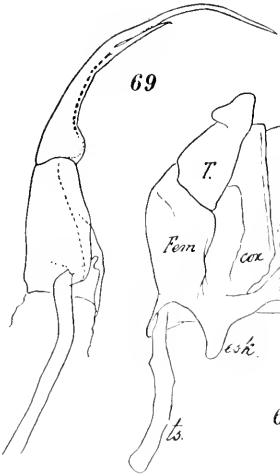

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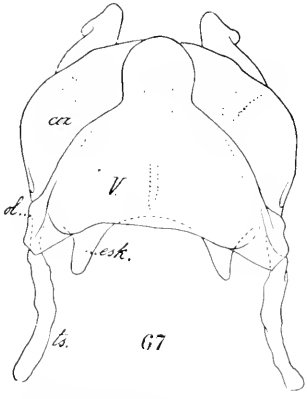

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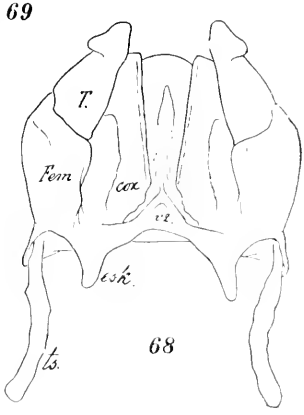

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H. W. BRÖLEMANN, del.

On the STATUS of CHELONIA DEPRESSA, *Garman*.

By Dene B. Fry, Junior Assistant.

(Plates xix-xxii., and Figs. 38-49.)

The recent species of marine turtles represent the few surviving forms of a once flourishing group, which reached its zenith probably in late Mesozoic times. There no longer exist such gigantic and diversified monsters as *Archelon*, *Protostega*, and *Miolania*, but such a uniformity of structure prevails that only four allied genera are admitted. It is natural that three of these, which occasionally visit the European coasts, should have been known to Linnæus, but it is surprising that the remaining two, *Colpochelys kempii*, Garman, and *Chelonia depressa*, Garman, should have remained unknown to naturalists till comparatively recently, showing that even now we cannot safely consider our knowledge of the marine turtles as complete.

Fig. 38.—Map showing the areas from which the various marine turtles have been recorded. The true habitats are rather more restricted. The thickly dotted area shows the distribution of *Chelonia mydas*, *Caretta caretta*, and *Eretmochelys imbricata*. The sparsely dotted region = *Chelonia japonica*, *Caretta olivacea*, and *Eretmochelys squamosa*. Horizontal strike = *Colpochelys kempii*. Perpendicular strike = *Chelonia depressa*. Oblique strike = *Caretta remivaga*. (a supposed species needing confirmation).

Of the five[1] marine turtles, the Green, Hawksbill, and Loggerhead are almost cosmopolitan in habitat, the other two being peculiarly restricted (fig. 38). *Colpochelys kempii* is recorded only from the Gulf of Mexico and as far north as

[1] A sixth species of turtle has been described by Dr. Hay (Proc. U.S. Nat. Mus., xxxiv., 1908, p. 194, pl. x., fig. 1-3, pl. xi., fig. 5) as *Caretta remivaga*, from the Gulf of Tehuantepec, Western Coast of Mexico. It is founded on two skulls, one of which was earlier referred by Dr. Baur (Amer. Nat., xxiv., 1809, p. 487) to *Lepidochelys olivacea*, Esch., and it certainly needs confirmation.

Atlantic City, New Jersey, on the Atlantic Coast of the United States, while *Chelonia depressa* is known from the East Indies, Northern and North Eastern Coasts of Australia and Torres Strait.

The limited habitats of *Colpochelys* and *C. depressa* suggest that (1) these two species are more recent specialisations,[2] and (2) that they are weaker swimmers, lacking the nomadic instincts of the better known forms. The distribution of each points to their having arisen in the two great coral-reef areas of the world, the former from a *Caretta*-like ancestor in the West Indies, and the latter from a *C. mydas*-like stock in the tropics of the Eastern Hemisphere.

Dr. R. E. Coker[3] points out that, as *Colpochelys* breeds considerably before *Caretta*, in fact in the winter instead of the summer months, this difference in breeding habit may suggest the possible means of isolation of the two forms in past times. This cannot be said of *C. depressa* however, for it breeds all the year round, but peculiarly with a slight falling off in the months August to November which chiefly form the breeding season of *C. mydas*. Nevertheless, that *C. depressa* is a weaker swimmer than *C. mydas* is evident, for the flippers are much smaller and not so well supported by hard, horny plates, while the reflexed margins and broader body cannot be so well suited to a speedy passage through the water. It is quite possible then, that the former character, arising through some local influence, may have been a factor in the past separation of *C. depressa* from a *C. mydas*-like ancestor.

The Green, Hawksbill, and Loggerhead turtles have by some authors [4], [5], been recognised as each constituting two species, one confined to the Atlantic Oceans and the other to the Pacific and Indian Oceans. No clear definitions of the Pacific species have yet appeared, the Atlantic forms being

[2] The presence of highly developed areolae (see post), which I regard as a specialised advance on the "larval shields" of *C. mydas*, and a slight reduction in the extent of the temporal roof (see post), lend support to this view.

[3] Coker—Bull. N. Carol. Geol. Surv., 14, 1906, p. 60.

[4] Garman—Bull. Mus. Comp. Zool., v., 1880, p. 123, and Bull. U.S. Nat. Mus., 25, 1884, p. 301.

[5] Stejneger—Bull. U.S. Nat. Mus., 58, 1907, p. 506.

regarded as the true Linnean species, and on this account I regard the division as one needing confirmation, although, to show the significance of such a separation, their distribution is illustrated in fig. 38 as though it was an established one.

Chelonia depressa is a species founded by Mr. Samuel Garman[6] in 1881, on some young and adult specimens in the Museum of Comparative Zoology at Havard University, from the East Indies and North Australia. In his "Catalogue of the Chelonians in the British Museum," published in 1889, Dr. G. A. Boulenger[7] considered this species as synonymous with the Green Turtle, *Chelonia mydas*. In May 1890, Dr. George Baur[8] examined the type specimen and came to the conclusion that, not only was Dr. Boulenger's transference wrong, but that in his opinion Garman's species was generically distinct. Later, in 1908, Mr. A. R. McCulloch[9] described a new genus and species of turtle from Port Darwin, North Australia, under the name of *Natator tessellatus*. At the time he had only a young example possessing very distinctly areolated scutes, quite absent in Garman's older specimens, and which, without an intermediate series, certainly appeared very different. I am now able to show that, as McCulloch's type otherwise agrees with Garman's specimens, they must be considered as belonging to the same species, for the areolæ prove to be present in the juvenile condition only. It is mainly with the young stages resembling McCulloch's type that this paper deals.

Chelonia depressa was, until quite recently known from Garman's type specimens only. Then Mr. McCulloch described *Natator* whose identity of course was not recognised. While arranging the Chelonians in the Australian Museum I discovered two other young examples, one of which was just hatched, and the other an intermediate stage between this and the type specimen of *Natator*. Another turtle, about twice the size of the type of McCulloch's genus, was collected by Messrs. C. Hedley and A. R. McCulloch at Murray Island, and differs from the type of *Natator* in having soft scutes which are quite smooth and altogether free from areolæ. The general

[6] Garman—Bull. Mus. Comp. Zool., vi., 1881, p. 124.

[7] Boulenger—Brit. Mus. Cat. Chelonia, 1889, p. 182.

[8] Baur—Amer. Nat., xxiv., 1890, p. 487.

[9] McCulloch—Rec. Austr. Mus., vii., 1908, p. 126, pls. xxvi-xxvii.

resemblance, however, was very striking, and on placing the four side by side in order of age, it became evident that it was only an older form than the type specimen. This largest specimen, about ten-and-a-half inches in length, appears to be comparable to Garman's youngest ones. *Chelonia depressa* then, emerges from the egg with each scute covered by a "larval shield" which, as the animal grows, becomes an areola almost identical with that found in land tortoises; this is finally shed before the turtle reaches maturity, leaving the smooth scutes described by Garman and figured on Pls. xxi-xxii. As far as I can ascertain these areolæ are unique amongst marine turtles.

Whilst recently at the Queensland Museum in Brisbane Mr. McCulloch was shown some young turtles which he recognised as his *Natator tessellatus*. Mr. H. A. Longman informed him that they were the specimens referred to by Mr. J. Douglas Ogilby[10] as possible hybrids between *Eretmochelys imbricata* and *Caretta caretta*. Later, four other specimens were found, and three of them were kindly forwarded to me by the Director, Dr. R. Hamlyn-Harris, which, with the four Australian Museum examples, make ten specimens in all. Seven of these I have been able to examine, and, with all their data, they are as follow :—

Specimen 1—(Pl. xix., fig. 1 and figs. 39 a-b, 44a).

Loc.—Port Darwin, Northern Territory, North Australia. Collected by Mr. Hugh W. Christie, Lighthouse-keeper at Point Charles. This specimen is evidently just hatched, and is in the Australian Museum.

Specimen 2.

Loc.—New Guinea ? Lent by the Queensland Museum, Evidently just hatched.

Specimen 3.

Loc.—New Guinea ? Lent by the Queensland Museum. Slightly older than the above.

Specimen 4—(figs. 39 c-d and 44b).

Loc.—Torres Strait. Collected by Mr. Alex. Morton, March 1879. Slightly older than specimen No. 3. In the Australian Museum Collection.

[10] Ogilby—Proc. Roy. Soc. Q'land., xix., 1905, p. 17 (footnote), Keppel Bay, Queensland.

Specimen 5—(Pl. xix., fig. 2).

Loc.—New Guinea? Lent by the Queensland Museum. Slightly older than the preceding one.

Specimen 6—(figs. 40 a-b and 44c).

Loc.—Port Darwin, Northern Territory, North Australia. Collected by Mr. Hugh W. Christie, in June, 1908. This specimen is the type of *Natator tessellatus*, McCulloch, and is in the Australian Museum Collection.

Specimen 7—(Pls. xxi-xxii., and figs. 41 a-b, 42, 44d, 45b, 46b, 47 a-b, 48a, 49f).

Loc.—Murray Island, Torres Strait. Collected by Messrs. C. Hedley and A. R. McCulloch, in September, 1907. This specimen is more than twice the size of the type specimen of *Natator tessellatus*. The head has been cast and skeletonised. In the Australian Museum Collection.

I wish to express my thanks to the following gentlemen who have in various ways assisted me in the preparation of the these pages:—Dr. G. A. Boulenger, of the British Museum; Dr. H. L. Kesteven, of the University of Sydney; Dr. R. Hamlyn-Harris, Director, and Mr. H. A. Longman, of the Queensland Museum, Brisbane; and lastly Mr. A. R. McCulloch, whose kindly interest and advice has been a great help to me.

An early reference to CHELONIA DEPRESSA.—Mr. C. Hedley very kindly called my attention to a note made by John Macgillivray in his "Narrative of the Voyage of H. M. S. 'Rattlesnake,'" which almost certainly applies to this species:—"Turtle forms an important article of food, and four different kinds are distinguished at Cape York and the Prince of Wales Islands. Three of these can be identified as the Green, the Hawksbill, and the Loggerhead species, and the fourth is a small one which I never saw."[11] This information was given to Macgillivray by the natives who were known to be very keen discriminators between even closely allied forms. The specimen of *Chelonia depressa* figured on Pls. xxi-xxii, was bought from the natives of Murray Island, who also recognised it as distinct from the Green Turtle. As we now have an authentic

[11] Macgillivray—Narr. Voy. "Rattlesnake," ii., 1852, p. 21.

specimen of *C. depressa* from Cape York and another from Murray Island near by, there seems to be little doubt that Macgillivray must be credited with the first reference to this species.

Notes on habits, etc.—It is of interest here to note that the Murray Island specimen of *C. depressa* was fed by the natives on herrings, which it ate freely. It appears however, that this need not necessarily be its natural food, for Mr. R. L. Ditmars[12] has recently recorded *Chelonia mydas*, which we have been wont to regard as exclusively herbivorous, feeding freely in captivity on fish, mussels, etc. He writes:—"All showed a preference for fish over other food; they would also eat mussels, oysters and clams—after the mollusks had been removed from their shells; an occasional turtle would nibble at sea-weeds, but immediately left such food when a dead fish was thrown into the tank. Without doubt, while in a wild state, the Green Turtle necessarily feeds largely on marine vegetation." I have examined many yards of Green Turtle intestine in quest of Entozoa, and, although animal food abounded in the vicinity, nothing of that nature was found. As the form of the jaws differs very little[13] from that of *C. mydas*, it is more than probable that under natural conditions *C. depressa* is also herbivorous, which is certainly borne out by Mr. H. W. Christie's remarks quoted below. Throughout the animal kingdom there is no lack of evidence of animals in captivity preferring, and even thriving on a diet that is absolutely strange to them in a natural state.

Mr. Hugh W. Christie, is very firm in his belief as to the distinctness of *C. depressa* from *C. mydas* and forwards the following very interesting notes:—"*C. depressa* is purely a vegetarian so far as my observations go, as also are *C. mydas* and *Eretmochelys imbricata*, whereas the blacks say *Caretta caretta* eats shell-fish, but I have had no chance of observing it. *C. depressa* lays its eggs on all the sandy beaches round here and on some of the islands, namely—Indian, Baresund, Quail

[12] Ditmars—Reptiles of the World, 1910, p. 47.

[13] In a paper by Dr. Baur on various turtles he notes what he considers an important difference in the lower jaw of *C. depressa* (Amer. Nat., xxiv., 1890, p. 487). In the young skull at my disposal the differences are very slight (see post).

and West Peron. On the last mentioned island, possessing five miles of beach, I counted thirteen nests within a space of twenty yards. They come and lay on the beach near the lighthouse, usually at spring-tide. The next spring-tide they return and lay very near the same spot, and so on, for five or six months. They do not seem to have any particular breeding season, but towards the end of the dry season, in the months of August, September and October, there is, if anything, a little slacking off. The females usually lay at night time, and with the aid of a hurricane lamp, of which they take not the slightest notice, I have often watched them preparing their nests and laying their eggs. They twist about so as to harden the surface somewhat before commencing to dig. The hind flippers alone are used in excavating and are worked alternately, being turned outwards like a scoop, a sharp jerk throwing the sand a yard away. The hole made is eight or nine inchs in diameter and one foot or more deep. She then moves her vent over the hole and fifty or sixty eggs are laid in about five minutes. The average number of eggs laid is fifty; the greatest number I have seen is seventy-eight, and the smallest twenty-four. The hole is then filled in and a large mound scraped over it, the front flippers being used for this—thus the eggs are eighteen to twenty-four inches from the surface. She then makes for the sea. The period of incubation is about six weeks. When leaving the nest the young do not run together but spread out and run fan-wise to the water, as I have counted fifty-two separate tracks. The eggs and meat are a great source of food to the blacks; I have eaten hundreds of the eggs but find the meat disagreeable and not nearly so good as that of *C. mydas*.[14] I never saw these turtles basking in the sun. They are apparently a nervous creature in the water but when up on the beaches laying they take notice of nothing and will crawl over a sleeping black or through his camp fire. *C. depressa* is much flatter than *C. mydas* and is shell-less—that is, there are no hard plates, but a leathery skin only envelops the bony skeleton. *C. depressa* is known to the Larrakeyah tribe of blacks as 'Adymer,' to the Bierly tribe as 'Ballan,' and to the Wogite tribe as 'Ingering.'"

[14] This may perhaps be the secret of the absence of this species from the turtle market, and thus, indirectly, the reason for its having been overlooked for so long.

The identity of NATATOR TESSELLATUS *with* CHELONIA DEPRESSA.—I have little doubt that *Natator tessellatus*, McCulloch, founded on a juvenile specimen, is only the young stage of the turtle described by Garman, from adult material, as *Chelonia depressa*. Nevertheless, when McCulloch's description is compared with Garman's, numerous discrepancies will be noticed. To a great extent these are accounted for by one or the other of two reasons. (1) McCulloch's type seems younger than any of the specimens mentioned by Garman as "young"; (2) Garman's types, according to Baur, are dried specimens, whilst McCulloch's type, and indeed all the specimens known to me, are spirit or formaline specimens. The first would account for Garman's statement that the plates are smooth in both the young and adult. The second for the remark that the paddles are indented between the digits, which is easily understood, as they are covered by soft wrinkled skin instead of hard horny supporting plates as in *C. mydas*; this last character seems to have escaped Garman's notice. I am at a loss to understand his statement that in the young the carapace has three low ridges. There is certainly no trace of them in my specimen, but perhaps this too can be accounted for by the shrinkage due to drying.

The status of the genus NATATOR, *McCulloch.*—Garman[15] described *Chelonia depressa*, of which *Natator tessellatus*, McCulloch,[16] becomes a synonym, as a new species only. On examining the type specimen, nine years later, Dr. Baur[17] made the following remarks: —"*Chelonia depressa*, Garman, which is considered by Boulenger as a synonym of *Chelonia mydas* . . . does not belong to the genus Chelonia at all .....The lower jaw has a greatly developed hook very much like *Lepidochelys kempii*, Garman, but there is a median ridge on the symphysis, something like *Lepidochelys olivaceus*, Eschsch. Until the skull of this species is known it is impossible to decide whether it belongs to Thalassochelys, Lepidochelys, or, what I think probable, to a new genus." If *Chelonia depressa* really represents a distinct genus, therefore, Mr. McCulloch's name *Natator* must be used to designate it, but as shown by the following pages, a final judgment is best reserved until the adult skull has been studied.

[15] Garman—Bull. Mus. Comp. Zool., vi., 1881, p. 124.
[16] McCulloch—Rec. Austr. Mus., vii., 1908, p. 126.
[17] Baur—Amer. Nat., xxiv., 1890, p. 487.

McCulloch[18] separated the genus *Natator* from *Chelonia* as follows: "From that genus, however, it is separated by the different arrangement of the shields of the head, and the distinctly paired nuchal. Also the upper shields of both head and body have each a large symmetrical areola placed rather behind their centres." The most important of these characters, the paired nuchal, we now know to be inconstant. It is not present in any of Garman's examples. In the four Australian Museum specimens it is divided in the type alone, while Mr. Longman informs me it is paired only in two cases out of the six in the Queensland Museum. The head shields do not differ fundamentally from those of *C. mydas*, the most important differences being the larger supraocular in *C. depressa* and the presence of only three[19] postocular scales instead of four or five. The areolated shields of the young, and the soft, integumentary covering of the half-grown specimen, are good distinguishing characters, and may prove of generic value when further adult material comes to light. The rounder outline, the deeper nuchal bay, and the reflexed marginals, together with the predominance of wrinkled skin on the flippers, are, without any knowledge of the adult condition, good specific characters only. The differences noted in the jaws of the two forms by Dr. Baur[20] are not present[21] in my specimens. The single young skull available to me (see post and figs. 47a-b, 48a, and 49f) diverges considerably from that of *C. mydas*, but here again we are in ignorance of the true adult characters. It will thus be seen that the re-discovery of the adult is very desirable, for on its condition hinges the whole question of the validity of the genus *Natator*. Meanwhile, however, in the absence of any established features on which to characterise that genus, it seems best to regard it as synonymous with *Chelonia*. In this view Mr. McCulloch concurs with me.

[18] McCulloch—Rec. Austr. Mus., vii., 1908, p. 126.

[19] Garman—Bull. Mus. Comp. Zool., vi., 1881, p. 125 gives the "postorbitals" as 3-4.

[20] Baur—Amer. Nat., xxiv., 1890, p. 487.

[21] I think it is possible that the produced horny sheath of the lower jaw, which would be present in a stuffed specimen, is the real cause of Dr. Baur's remarks. On the removal of this however, the jaws are almost identical with those of *C. mydas*.

Key to the two species of CHELONIA :—

(a)—Young with distinct areolæ. Three postocular shields. Carapace bow-shaped in transverse section. Limbs covered mainly by wrinkled skin ....
C. depressa, Garman.

(b)—Young with only very thin scales covering the scutes. Four or five postoculars. Carapace tectiform in transverse section. Limbs covered by hard horny plates.....
C. mydas, Linnæus.

Re-description and Synonymy of CHELONIA DEPRESSA.—The dried condition of Garman's specimens has been the cause of several misleading statements. On this account I have not intercalated his remarks in the re-description which follows :—

CHELONIA DEPRESSA, *Garman*.

(Plates xix., xxi., xxii. ; Figs. 39, 40, 41a and b, 42, 44, 45b, 46b,47 a and b, 48a, 49f).

Chelonia depressa, Garman, Bull. Mus. Comp. Zool., vi., 1881, p. 124.
Chelonia ? depressa, Baur, Amer. Nat., xxiv., 1890, p. 487.
Chelone mydas, Boulenger, Brit. Mus. Cat. Chelonia, 1889, p. 183 (part).
Natator tessellatus, McCulloch, Rec. Austr. Mus., vii., 1908, p. 126, pls. xxvi-xxvii.

Head (figs. 39, 40, 41a-b) :—Very much like that of *C. mydas* ; once and one quarter (in very young specimens) to once and one third as long as broad. Præfrontals only as long as the supraocular, longer than the parietal ; separated from the maxilliary sheath antero-laterally by an area of smooth skin which connects the fleshy nasal region with the soft-parts surrounding the eye. Frontal pentagonal, longer than broad ; three-quarters (in very young examples) or two-thirds the length of the præfrontals ; as long as or slightly shorter (in the oldest specimen) than the parietal. Parietal broader than long, pentagonal or octagonal, smaller than in *C. mydas*. A single narrow band-like post-parietal which may be divided into three, is present in the young specimens ; in the oldest specimen it is much broader, owing to the backward growth of the parietal bone which it covers, but is still divided into three. In *C. mydas* I have noted the same variation in growth but in that species it is almost always paired, in one case only

have I seen it divided into three. One, sometimes two temporal shields in contact with the parietal. Below the supraocular three scales (postoculars) border the orbit posteriorly, the lower, situated in such a position as to be designated a subocular, is very pointed anteriorly. Posterior to these are seven to nine small shields while in *C. mydas* there are twelve to fourteen, or even more. In very young examples all the scales have areolæ, but in the oldest specimen they are quite smooth. The areola covers the whole scale in newly hatched examples, becoming situated within the border in older specimens owing to the peripheral growth of the scute.

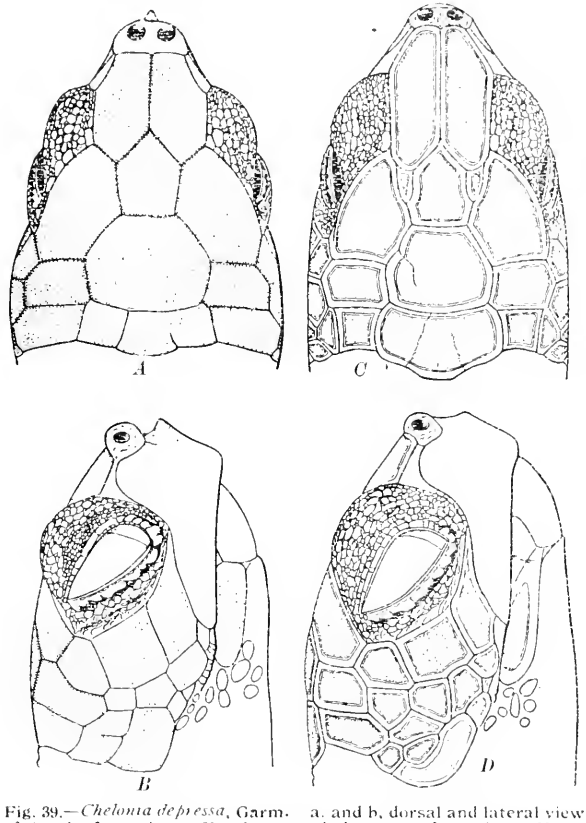


Fig. 39.—*Chelonia depressa*, Garm. a. and b, dorsal and lateral view of head of specimen No. 1. c and d, same of specimen No. 4 (enlarged).

The upper jaw is nicked at the tip in young specimens, but it gets gradually shallower with age. Owing to this A-shaped bay the biting edge presents a slightly sigmoid curve. Lower jaw with the horny sheath produced at the tip into a rather strong, hooked, beak-like process. Not serrated in the young, or only faintly so.

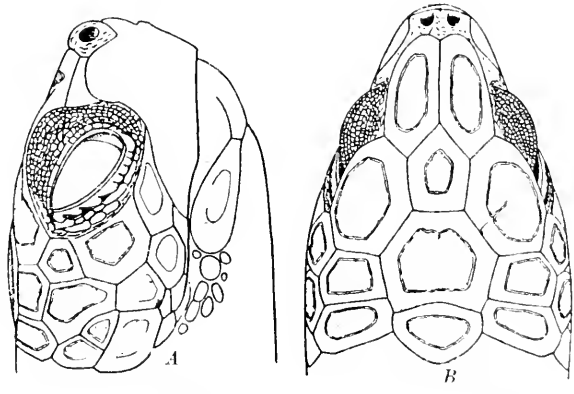


Fig. 40.—*Chelonia depressa*, Garm. Lateral and dorsal views of the head of the type specimen of *Natator tessellatus*, McCull. (Specimen No. 6 enlarged).

The head differs mainly from that of *C. mydas* in the following points:—The præfrontals do not form a suture anteriorly with the maxilliary sheath, and are not longer than the supraocular. There are only three instead of four or five postocular scales. The post-parietals are never symmetrically paired, being undivided or three in number. Areolæ present in the young.

Carapace (figs. 42-44): — Slightly arched, broadly oval but never shield-shaped, only slightly narrower behind than in front; lateral edges reflexed; strongly serrated and spined in the specimens in which areolæ persist, but less strongly serrated in the oldest specimen. In transverse section the carapace presents the lines of a bow. Nuchal slightly emarginate in very young examples but very deeply concave in the oldest specimen; paired in three out of the ten specimens. Marginals strongly reflexed in the oldest specimens, but deflexed in the younger ones; in twelve pairs, the first of which are rarely in contact with the first vertebral shield;

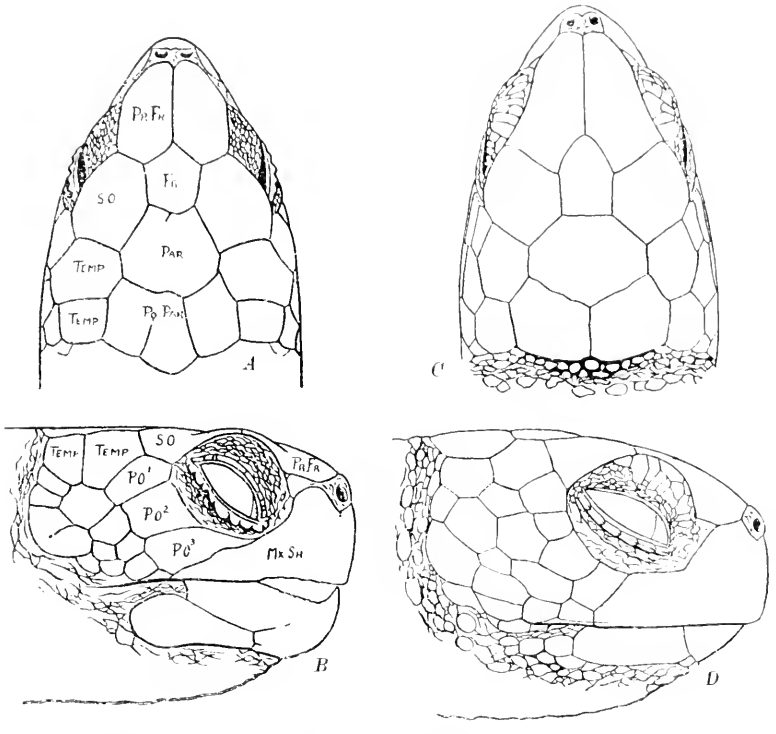


Fig. 11. *a*, and *b*, dorsal and lateral view of head of *Chelonia depressa*, Garm. (specimen No. 7). *c* and *d*, same of *Chelonia mydas*, L. from a specimen of approximately the same size as that of *C. depressa*.

PR. FR.—*praefrontal*. FR.—*frontal*. SO.—*supraocular*. PAR.—*parietal*. TEMP.—*temporal*. PO. PAR.—*post-parietal*. MX. SH.—*maxillary sheath*.

those of the posterior half, as long as or slightly longer than broad; each with the areola situated towards the postero-lateral border and produced into a spine. Costal shields in four pairs; the areolæ when present, placed towards the inner and posterior borders. Vertebrals five in number, much broader in the younger than in the older specimens (fig. 44), with the areolæ placed nearer the posterior than the anterior border.

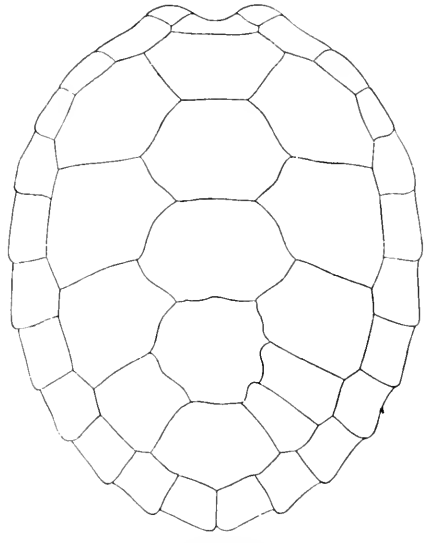


Fig. 42.—*Chelonia depressa*, Garm. Carapace of specimen No. 7.

In the type specimen (No. 6) the shields are rather soft but distinctly horny, and exhibit distinct concentrically arranged tortoise-shell markings. In the five younger ones they are covered by the strongly pitted areolæ to such an extent as to prevent a satisfactory examination of this character. In the largest one however (No. 7), in which the areolæ have presumably been shed, the boundaries are marked by very fine furrows, while they are quite soft, almost fleshy to the touch, and not at all horny.

The carapace then, differs markedly from *C. mydas* in the following points:—Instead of being tectiform in transverse section, owing to the reflexed marginals it presents the curves of a bow. It is also more depressed in the median line. The outline is an almost even broad oval, but slightly longer than broad, with a much deeper nuchal bay. The nuchal shield is sometimes divided. The marginals are strongly reflexed except in very young specimens whose rotundity is no doubt due to their recent accommodation within the egg. Areolæ are present in very young examples.

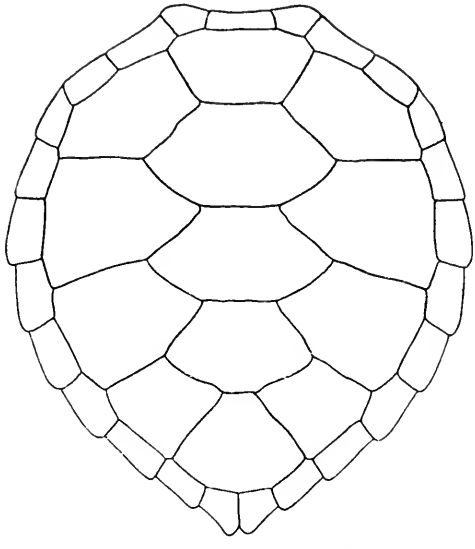


Fig. 43.—*Chelonia mydas*, Linn. Carapace of a specimen about 200 m.m. long, from Queensland.

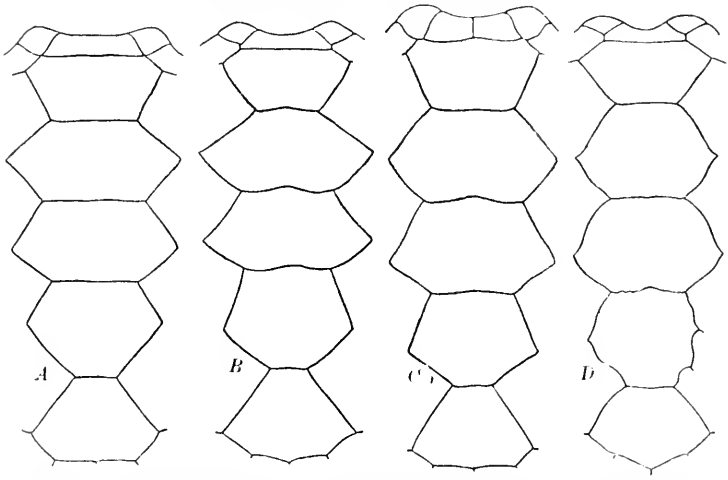


Fig. 44.—*Chelonia depressa*, Garm. Vertebral shields showing variations due to age. *a*, specimen No. 1; *b*, specimen No. 4; *c*, specimen No. 6; *d*, specimen No. 7. For the respective lengths of these specimens see the table on p

Plastron (fig. 45b) :—With strongly sloping sides in the region of the bridge, and with pronounced plastral ridges in the young. Of the median sutures that of the femorals is the longest. A distinct (7th) pair of small plates wedged in between the hinder part of the anals is present in all the specimens. Inframarginals sub-equal, in four pairs ; a single shield between the first one and the humeral, but no distinct row of plates (brachials) bordering the pectorals, humerals and gulars as in *C. mydas* (figs. 45a and b). Areolæ ill-defined, smooth and most prominent on the median series of shields, the plastral ridges passing through them.

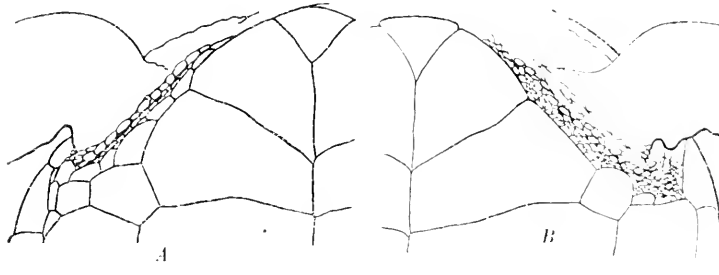


Fig 45. *a*, *Chelonia mydas*, Linn. Axilla and anterior half of plastron *b*, *Chelonia depressa*, Garm. Axilla and anterior half of plastron of specimen No. 7.

The plastron differs from that of *C. mydas* chiefly by the presence of a small pair of shields posterior to the anals, and in the strongly sloping sides, due to the reflexed margin of the body. The absence of a ring of small brachial plates bordering the shields in the axilliary region is also characteristic.

Soft-parts : The soft-parts of the head and neck have a very different appearance to those of *C. mydas*, being very finely wrinkled and of a fine leathery texture. In *C. mydas* the skin is very coarsely wrinkled and folded, and is beset with numerous small, roundish, horny plates, on the eyelids and in the nuchal, mental, and tail regions.

Fore-limbs (fig. 46b) : Somewhat weaker and smaller than those of *C. mydas*. They are covered by a finely wrinkled skin except in the following places. The anterior margin bears a row of squamniform arched plates ; the upper posterior border has a series of thin, flexible, spatulate scutes, the proximal ones being slightly separated from one another; a row of weak plates

mark distinctly the position of an underlying phalanx. Under-surfaces like the upper but lacking the posterior row of horny plates, the wrinkled skin extending to that margin. There are sometimes indications of two claws but generally only one is distinct.

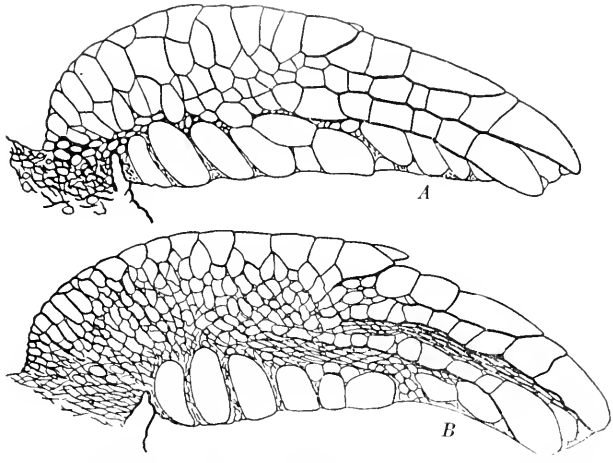


Fig 46.—*a*, *Chelonia mydas*, Linn. Dorsal view of right flipper. *b*, *Chelonia depressa*, Garm. Dorsal view of right flipper of specimen No. 7.

Hind-limbs :—The hind-limbs resemble the anterior pair in being covered by wrinkled skin instead of horny scales as in *C. mydas*. There are only one or two plates indicating the underlying digits. A single, well developed claw is present.

The limbs are markedly weaker than in *C. mydas*, and, in correlation with the other soft parts, are covered by a finely wrinkled integument which is not beset with juxtaposed horny scutes as in that species (figs. 46a and b).

Colour :—The scutes of the upper surfaces of the young specimens are uniform brown, in one case showing distinct tortoise-shell markings in concentric rings ; the areolæ are of a somewhat lighter brown, and when frayed or worn, peel off in mica-like flakes. The flippers have light yellowish borders and a dark grey or blackish patch on the distal half. The oldest specimen is drab-grey above, with greenish-olive flippers. Head shields sometimes bordered with yellowish. Lower temporal plates and under surfaces uniform light yellowish-olive.

Measurements in millimetres.

Specimen Number.	1	2	3	4	5	6 Type	7
Length of carapace	62	62	71	73	75	115	258.
Width of carapace	48	48	64	62	68	100	212.
Length of head to postparietal ...	22	22	24	24	24	29	65
Width of head ...	18	17.5	18	18	18.5	23	50
Length of fore-limb	50	48	54	53	50	78	145
Length of hind-limb ...	34	33	36	34	33	43	100
Length of tail, from anus	6	6	6	6	6	6.5	13

Locs. :—The Australian Museum possesses specimens from Port Darwin, Northern Territory; Cape York, Queensland; and Murray Island, Torres Strait. In the Queensland Museum are three examples from Keppel Bay, Central Eastern Queensland. From Macgillivray's note quoted above (p. 163), it appears that this species occurs at Prince of Wales Island near Cape York; this is certainly to be expected. Garman gives the type localities as East Indies and North Australia. The present known distribution may be stated as the East Indies, northern coast of Australia, islands of Torres Strait, and eastern coast of Queensland (fig. 38).

"*Larval shields*" *or areolæ; their structure, variation, and growth* :—What are here termed "larval shields" are the temporary superficial scales which, during the infancy of the turtle, cover more or less completely the real scutes of the head, carapace, and plastron. As the underlying scute extends its area peripherally the larval shield withdraws from its edges, those of the carapace and plastron becoming situated eccentrically, rather behind the centre of the scute. At this stage the larval shields are comparable to the so called "areolæ" of land tortoises (particularly those of the family Testudinidæ) described by Agassiz[22] and Coker.[23] The areolæ of tortoises are stated by Gadow[24] to become added to year by year by a layer of horn, and, in some forms, although they are periodically shed, the last formed stratum of horn serves as the

[22] Agassiz—Nat. Hist. U.S., i., p. 259.

[23] Coker—Bull. N. Carol. Geol. Surv., 14, 1906, p. 26.

[24] Gadow—Cambr. Nat. Hist., Reptiles, 1901, p. 326.

base of a new one beneath which are developed other layers, preserving the shape and size of the original areola. The areolæ of these tortoises then, would appear to serve some definite function throughout life and cannot in a true sense be regarded as "larval" characters. In the case of the turtle however, at the time of hatching, these shields have reached their maximum development, and from then onwards, owing to the wear and tear to which they are naturally subjected, they become gradually reduced, till little more than a flakey, tissue-paper-like remnant remains. They are then shed, leaving the bare scute of the adult.

These "larval shields" occur in both *Chelonia mydas* and *C. depressa*, but differ considerably in their degree of development, and in no stage of the former can they be called areolæ. The figures on Pls. xix. and xx. represent almost identical stages of the two species and a comparison shows that in *C. mydas* they are much thinner and devoid of the deep pits shown in the other species. The material in the Australian Museum leads me to the conclusion that the larval shields are shed much earlier in the common Green Turtle than in *C. depressa*.

The reduction due to erosion of the areolæ in *Chelonia depressa* is very noticeable when the specimens are placed in order of age. This can be followed by examining in turn the newly hatched example (Pl.xix.), the somewhat older specimen beside it, McCulloch's figure[25] of his type, and the semi-mature specimen on Pls. xxi. and xxii. Figs. 39 to 41a and b show this reduction of the areolæ on the head shields of specimens Nos. 1, 4, 6, and 7. The newly hatched examples possess thick, deeply pitted larval shields which become gradually reduced along the series of older specimens till, in the type example they are reduced to the thickness of paper with frayed, mica-like edges, and on which the granulations remain as the faintest impressions. At some stage between that of the type example and specimen No. 7, the areolæ are shed, leaving the smooth, almost leathery scute.

Although the areolæ of *C. depressa* differ from those of Testudinian Tortoises in the absence of any trace of post-embryonic growth, they must be considered as morphologically homologous, and, whatever may be their use in the land tortoises, there seems little doubt that in *C. depressa* they function in the young stages simply as a protection for the underlying scutes, which are of an unusually soft nature.

[25] McCulloch—Rec. Austr. Mus., vii., 1908, pls. xxvi. and xxvii.

Notes on the skull of CHELONIA DEPRESSA:—The single skull of *C. depressa* at my disposal belonged to the largest specimen, measuring 258 m.m. along the carapace (Pls. xxi. and xxii). Although this example possesses most of its adult characteristics it is, of course, still a very young one. In the Museum collection there are only three skulls of *C. mydas*. However, Dr. H. L. Kesteven has supplemented my poor material by kindly allowing me to examine the four specimens used in the preparation of his paper[26] on the "Anatomy of the Head of the Green Turtle, Part i., The Skull."

Measurements:—The following are the measurements, in millimetres, of the skull of *C. depressa* and of a small specimen of *C. mydas* of approximately the same size.

	C. DEPRESSA	C. MYDAS
Length, to tip of supraoccipital blade	63.	52.
Width (greatest) from squamosal to squamosal	45	33.
Width, medianally between the orbits	15	20
Depth, at quadrate condyle	32	27
Depth, from lower edge of postfrontal to quadrate condyle	17	14
Length of parieto-squamosal suture	1	4
Length (greatest) of parietal	29	25
Width (greatest) of parietal	14	12.
Length of frontals along their suture	14	12.
Width of frontal, along the fronto-parietal suture ...	9	8
Width (greatest) of frontal, at the outer-angle	9	11
Length (greatest) of postfrontal	30	22
Length of orbit...	24	22
Height of orbit...	18	16
Length from orbit to posterior margin of skull	20	17

[26] Kesteven—Proc. Roy. Soc. N.S. Wales, xliv., 1910, pp. 368-400, pls. xx.-xxxiii.

Osteology :—With only a single skull of *C. depressa* it is not practicable to compare the bones in detail as disarticulation would be necessary, so that only the more striking and tangible characters are dealt with.

In general outline the skulls of *Chelonia mydas* and *C. depressa* are not strikingly different, but the former is slightly broader and much wider in the supraorbital region.

The parietal bones of the two species differ somewhat. In *C. mydas* they form a suture of considerable length (an inch or more in adult specimens) with the squamosal. Even in the very young specimen this is quite distinct, but naturally increases in extent with the backward growth of the parietal. In *C. depressa* however (figs. 47 and 48a), the post-frontal extends so far back as almost to enter the hinder border, allowing only a mere splinter of the parietal, about a millimetre in width, to connect with the squamosal. In *C. depressa* (fig. 47a) the fronto-parietal suture is tranverse, whereas in the common Green Turtle it is in the form of an arc, the convexity of which is directed forwards.

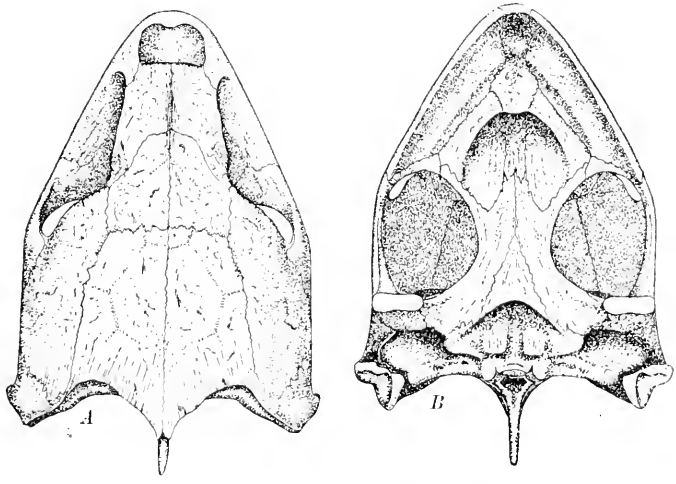


Fig. 47.—*Chelonia depressa*, Garman. Dorsal and ventral views of skull of specimen No. 7. Reduced slightly.

The frontals in *C. depressa* (fig. 47a) do not enter into the formation of the upper border of the orbits. In all but one of the examples of *C. mydas* available to me, they do. In one specimen, however, lent me by Dr. Kesteven,[27] the præ and postfrontals meet in suture laterally excluding the frontal completely on each side from the orbital rim. This variation, which is certainly the exception rather than the rule, has been recorded by Dr. G. A. Boulenger[28] who has noticed it in both *C. mydas* and *Caretta caretta*. He records that in one specimen of *C. mydas* "the præ and postfrontal bones were in contact, excluding the frontal from the periphery of the orbit; in another the frontal separated the prefrontal from the postfrontal; whilst in a third, the former disposition was shown on the right side and the latter on the left."[29] This character has, by Dr. George Baur[30] and Dr. O. P. Hay[31] been allowed generic value, but with peculiar inconsistency on the part of the former author. He characterises the genus *Chelonia* as having the "orbit formed by: prefrontal, frontal, postfronto-orbital, jugal, maxilliary." Just below this definition however, he overlooks its generic value and unites *Colpochelys*, Garman, in which the frontals enter the orbital rim, with *Lepidochelys*, Fitzinger, in which the orbit is described as being bounded by the "prefrontal, postfronto-orbital, jugal, maxilliary." Dr. Hay[32] in his fine Monograph of the "Fossil Turtles of North America" recognises *Colpochelys* as synonymous with *Lepidochelys* after Dr. Baur, but later still[33] he regards it as distinct. He remarks[34] "Baur again referred to this species (*Colpochelys kempii*) in 1890 and

[27] This specimen was obtained from an hotel in Sydney and the locality is unknown. No record of its shield characters have been kept so that it is necessary to presume that it was otherwise identical with *C. mydas*. It is a coincidence too, that in this specimen the jugal meets the squamosal in suture as mentioned *ante* p. 181, an exceptional condition.

[28] Boulenger—Proc. Zool. Soc., 1890 (1891), p. 618.

[29] Hay—Proc. U.S. Nat. Mus., xxxiv., 1908, p. 196, records this last condition in *Caretta remivaga*, sp. nov.

[30] Baur—Amer. Nat., xxiv., 1890, p. 486.

[31] Hay—Proc. U.S. Nat. Mus., xxxiv., 1908, p. 183.

[32] Hay—Foss. Turtles N. Amer., Carnegie Inst., pub. 75., 1908, p. 8-10 and 16.

[33] Hay—Proc. U.S. Nat. Mus., xxxiv., 1908, p. 194.

[34] Hay—Proc. U.S. Nat. Mus., xxxiv., 1908, p. 184.

assigned it to the genus *Lepidochelys*; but it fails to meet the requirements of this genus, as he defines it, in having the frontals entering the rim of the orbit." Thus we find this character allowed generic importance although Dr. Boulenger had earlier shown that it was just as variable in the allied *Caretta* as in the genus *Chelonia*. Dr. Hay[35] himself writes: "Boulenger has noted that occasionally in the loggerhead (*Caretta*) the frontal on one side or the other enters the rim of the orbit. Doubtless it will be found that sometimes the frontals of the bastard-turtle (*Colpochelys*) are excluded from the orbit; but such variations hardly affect the specific value of the character." It is indeed remarkable that such a variation should occur in two of the three well-known recent species of turtles, and, that in the two others less perfectly studied, the exceptional condition should occur, that in which the frontals do not enter the orbit. With further material it is very probable that not only the generic value (which I am not prepared to agree exists) but the specific value of this character will also disappear.

In *C. depressa* (fig. 47a) the length of the fronto-parietal suture equals the greatest width of the frontals, but in *C. mydas* the greatest width *i.e.* the width in the region where the frontal enters the orbital border, is almost half as great again. The greatest length of the frontals in *C. mydas* (not their length along the median suture) is also slightly longer. Owing to the broader interorbital region in the common Green Turtle and the extension (generally) of the frontal into the orbital border, they have a very different outline to those of *C. depressa*.

The quadratojugal not infrequently fails to meet the postfrontal in suture in *C. mydas*, and this is the condition of the bones in *C. depressa* (fig 48a). I have only seen one example of *C. mydas* in which the squamosal and jugal come into contact, thus separating the two bones, and that, peculiarly, is the specimen lent me by Dr. Kesteven, in which the frontal does not enter the orbital rim. In my smallest specimen (fig. 48b), the quadratojugal and postfrontal meet in suture on both sides, and, as the frontals enter the periphery of the orbits to comparatively the same extent as in adult specimens, neither of these characters can have anything to do with age, but must

[35] Hay—Proc. U.S. Nat. Mus., xxxiv., 1908, p. 191,

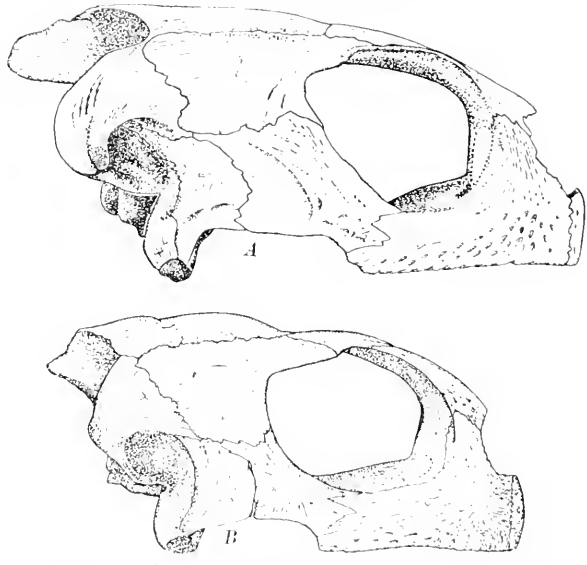


Fig. 48.—*a*, *Chelonia depressa*, Garm. Lateral view of skull of specimen No. 7. Enlarged slightly. *b*. *Chelonia mydas*, Linn. Lateral view of skull of a specimen approximately the same size as that of *C. depressa*.

be individual variations. This condition is apparently very uncommon, and was perhaps first recorded by Sir Richard Owen[36]—"In *Chel. mydas* the malar approaches the mastoid very closely and sometimes touches it by the posterior angle, thus separating the squamosal from the postfrontal." In recent osteological nomenclature the malar becomes the jugal, the mastoid is our squamosal, while Owen's squamosal is our quadratojugal. In the Green Turtle the anterior (jugular) flange of the quadratojugal is bayed ventrally to a lesser extent than in *C. depressa*, making the quadrate pedicle appear longer in the latter species.

It is in the basicranial constituents that the most reliable points of difference between the two species can be noticed. In some of these characters *Chelonia depressa* shows unmistakable resemblance to *Colpochelys kempii*, which has been beautifully figured by Dr. Hay.[37]

[36] Owen—Hist. Brit. Foss. Rept., i., 1849-84, p. 33.

[37] Hay—Foss. Turtles N. Amer., Carnegie Inst., publ. 75, 1908, pl. i., figs. 1-4, pl. ii., and Proc. U.S. Nat. Mus., xxxiv., 1908, pl. vi., pl. vii., figs. 2-4, pl. viii., fig. 2, pl. ix., figs. 2 and 4.

The pterygoids in *C. mydas* (fig. 49e) are medio-laterally emarginated by a large sulcus for the passage of the pterygo-mandibularis muscle. This is entirely absent in the skull of *C. depressa* (figs. 47b and 49f) giving a flatter and broader appearance to the roof of the pharynx. It will be very interesting to note the correlated modification of the pterygo-mandibularis muscle to suit this condition, which, judging from Gadow's[38] and Hay's[39] figures, prevails in *Caretta caretta* also (fig. 49b). In this species however, the pharyngeal roof is not so broad.

Fig. 49.—Pterygoid bones showing the variation of the pterygo-mandibular sulcus in the various marine turtles.

a. Colpochelys kempii, Garm. *b. Caretta caretta*, Linn.
c. Caretta remivaga, Hay. *d. Eretmochelys imbricata*, Linn.
e. Chelonia mydas, Linn. *f. Chelonia depressa*, Garm.

The basisphenoid of *C. depressa* (fig. 47b) extends much further anteriorly and separates the pterygoids along their median suture for a correspondingly greater extent. Although this varies a little with age in the Green Turtle it is never so pronounced in that species as in *C. depressa*. In this character it is approached by *Eretmochelys imbricata*[40] and *Colpochelys kempii* in both of which the basisphenoid is anteriorly more pointed than in *Chelonia mydas*. In the Green Turtle the basisphenoidal ridge is almost transverse and but slightly

[38] Gadow—Cambr. Nat. Hist., Rept., 1901, p. 379, fig. 84.

[39] Hay—Proc. U.S. Nat. Mus., xxxiv., 1908, pl. viii., fig. 1.

[40] Boulenger—Brit. Mus. Cat. Chelonia, 1889, p. 181, fig. 45.

convex anteriorly. In *C. depressa* (fig. 47b) this ridge is A-shaped and is more distinctly marked on the basi-pterygoid process of the bone (*processus basipterygoidens ossis basisphenoid* of Dr. Kesteven[41]). In this respect it bears a closer resemblance to all the other recent turtles than to *Chelonia mydas*. Ventrally the basioccipital has a strong median sulcus (fig. 47b) as in *Colpochelys kempii*, Garman, and the fossil *Chelone cuneiceps* of Owen. Regarding the latter Owen writes[42]—"The basioccipital is remarkable for the strong development of the tubercles for the insertion of the 'recti capitis antici' and for the depth of the groove between them." This describes almost exactly the condition exhibited by *C. depressa*, which resembles that of the bastard-turtle more than any other recent form.

In my specimen of *C. depressa* (fig. 47 and 48a) there is a slight but distinct reduction in the extent of the temporal roof. This is not due to a reduction in the length of the parietals but to an emargination in the region of the parieto-squamosal suture, which allows the somewhat larger post-frontal of *C. depressa* to actually extend slightly behind the deepest part of this bay. The oldest known fossil Chelonians possessed a well developed temporal roof, the significance of which has been masterfully explained by Dr. Hay,[43] who, with Baur, Cope, and others, regard it as probably handed down to them by their Cotylosaurian ancestors. These archaic Cheloneformes also possessed true nasal and lacrymal bones, which no longer persist in living marine turtles, though they are present as separate ossifications in some living members of the order. We find the recent Chelonidæ then, to be a peculiar mixture of the retention in some cases, and loss in others, of their most primitive characteristics.[44] If this character holds good in the adult skull it will be very interesting to note this slight reduction of a typically primordial condition in a living form, a specialisation suggested by Dr. Hay[45] to be correlated with the evolution of the Pleurodiran neck.

[41] Kesteven—Proc. Roy. Soc. N.S. Wales, xliv., 1910, pl. xxviii., fig. 42.

[42] Owen—Hist. Brit. Foss. Reptiles, i., 1849-1884, p. 33.

[43] Hay—Foss. Turtles N. Amer., Carnegie Inst., publ. 75, 1908, p. 19.

[44] Dr. Gadow (Cambr. Nat. Hist. Reptiles, 1901, p. 380) holds the opposite view, that the Chelonidæ are a specialised offshoot of the Cryptodira and that there is nothing primitive about them, except the complete series of inframarginal shields.

[45] Hay—Foss. Turtles N. Amer., Carnegie Inst., publ. 75., 1908, p. 19.

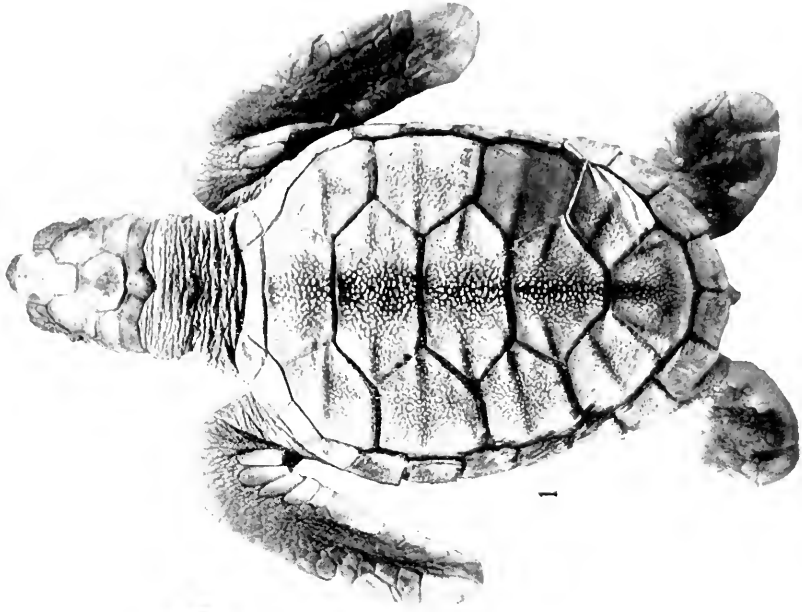
Resumè of the chief differences between the young skulls of both species of *Chelonia*.

CHELONIA DEPRESSA.	CHELONIA MYDAS.
Interorbital space, at the outer angle of the frontal, one third (·33) of the greatest width of the skull.	Interorbital space, at the outer angle of the frontals, two thirds (·60) of the greatest width of the skull.
Parieto-squamosal suture extremely small.	Parieto-squamosal suture always quite distinct, in adults up to $1\frac{1}{2}$ inches in length.
Fronto-parietal suture transverse.	Fronto-parietal suture strongly arched.
Length of the fronto-parietal suture equals the greatest width of the frontals.	Length of the fronto-parietal suture, two-thirds to three-quarters the greatest width of the frontals.
Pterygoids not constricted by a deep pterygo-mandibular sulcus on each side.	Pterygoids deeply constricted on each side by an oblique pterygo-mandibular sulcus.
Basisphenoidal ridge ∧-shaped and not deeper medially than laterally.	Basisphenoidal ridge ⌒-shaped, always straight and deepest in the median line.
Basioccipital ventrally with two strong tubercles separated by a deep median groove.	Basioccipital ventrally with a shallow open concavity right across the bone, the tubercles hardly discernable and widely separate.

EXPLANATION OF PLATE XIX.

Fig. 1. *Chelonia depressa*, Garman. A young specimen (No. 1) from Port Darwin, North Australia, regarded as just hatched. About natural size.

Fig. 2. *Chelonia depressa*, Garman. An older example (specimen No. 5) from New Guinea? About natural size.



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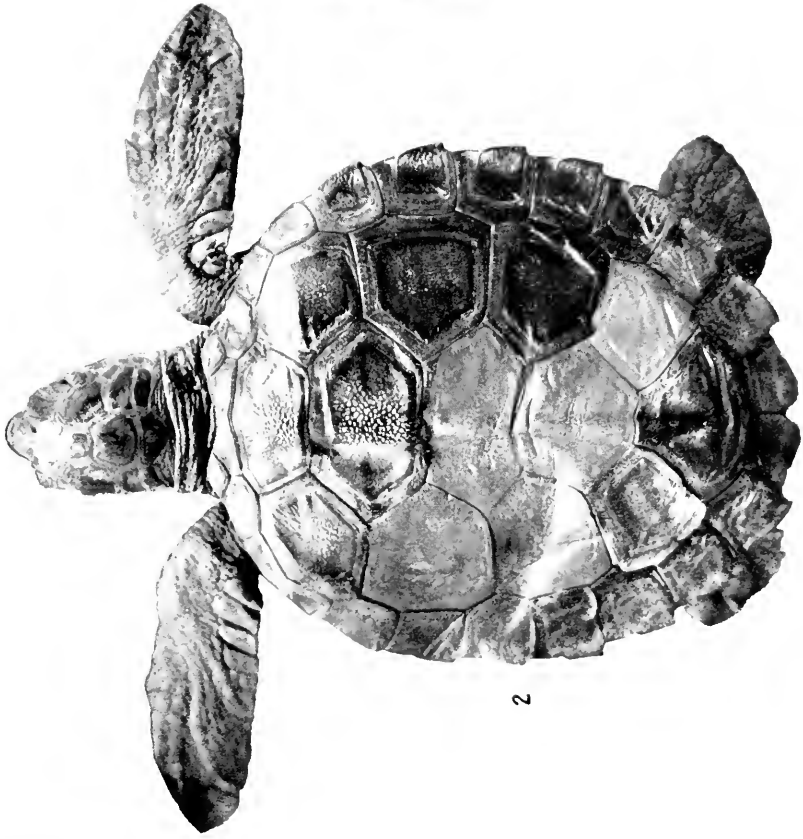

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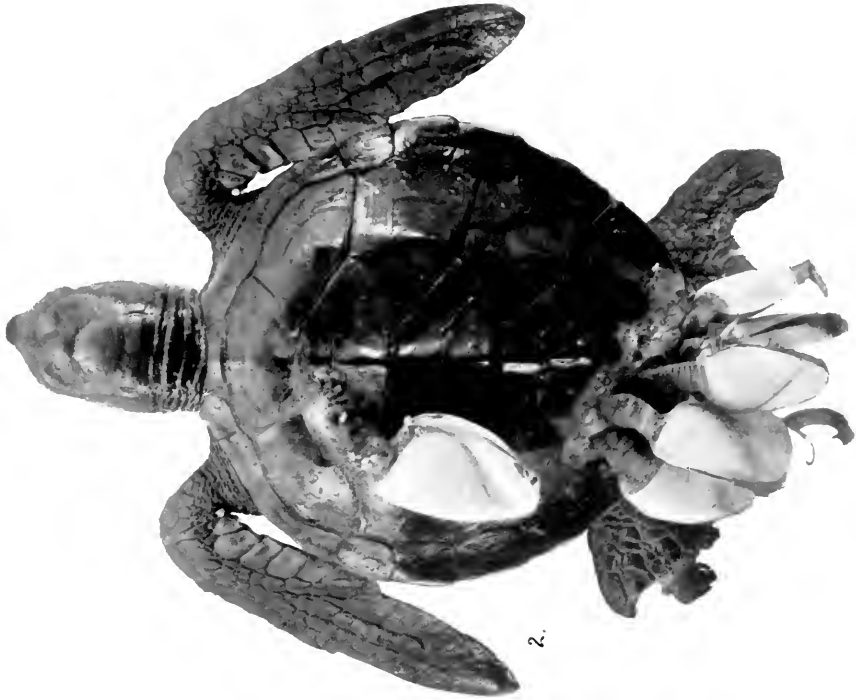
C. CLUTTON, Austr. Mus., photo.

EXPLANATION OF PLATE XX.

Fig. 1. *Chelonia mydas*, Linn. From a specimen regarded as just hatched, from Flint Island, Central South Pacific Ocean. About natural size.

Fig. 2. *Chelonia mydas*, Linn. From a specimen captured at Botany Bay, near Sydney, New South Wales. About Natural size.



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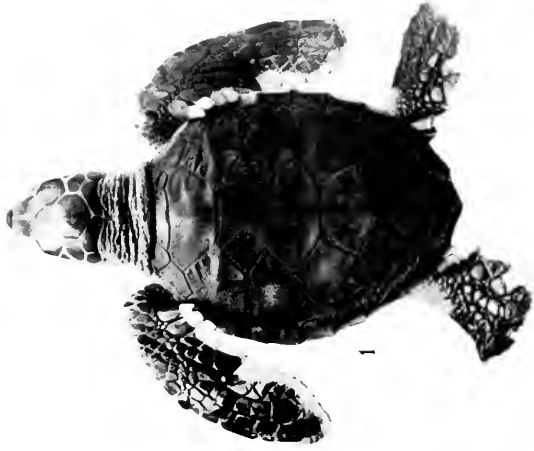

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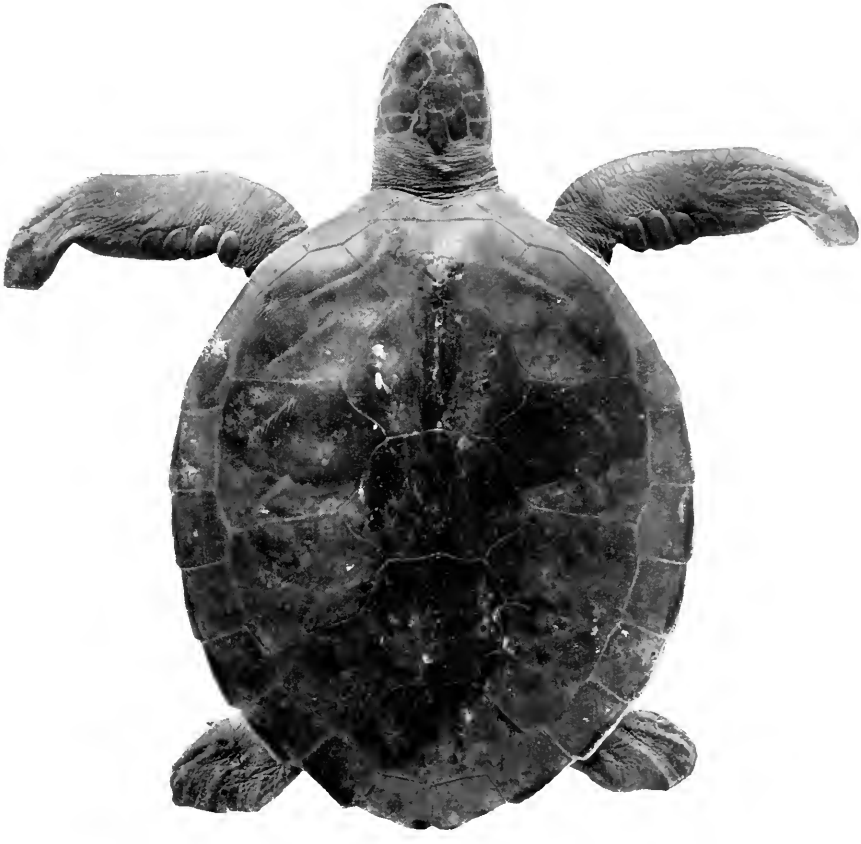
C. CLUTTON, Austr. Mus., photo.

EXPLANATION OF PLATE XXI.

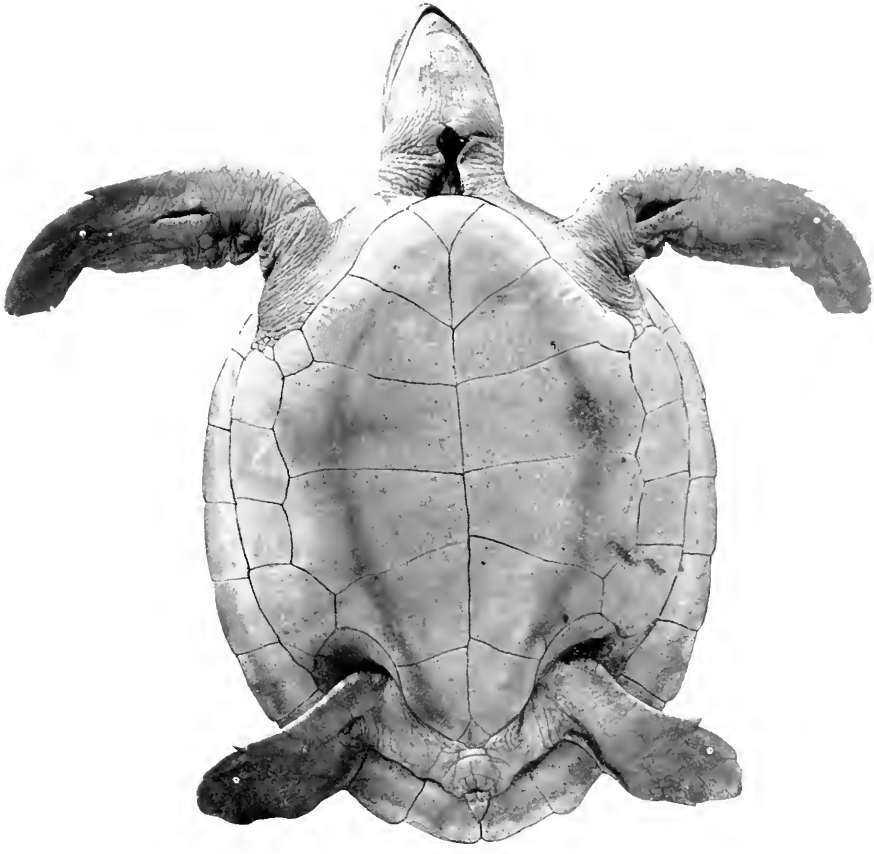
Chelonia depressa, Garman. From a specimen (No. 7) $10\frac{1}{2}$ inches long, from Murray Island, Torres Strait.



H. BARNES, JUNR., Austr. Mus., photo.

EXPLANATION OF PLATE XXII.

Chelonia depressa, Garman. From a specimen (No. 7) $10\frac{1}{2}$ inches long, from Murray Island, Torres Strait.



H. Barnes, Junr., Austr. Mus., photo.

STUDIES IN AUSTRALIAN ARANEIDÆ—No. 6.

THE TERRETELARIÆ.

By W. J. Rainbow, F.E.S., Entomologist.

The principal work dealing with Australian Terretelariæ is that published by Mr. H. R. Hogg, M.A., in 1901[1] under the title of "On Australian and New Zealand Spiders of the Sub-order Mygalomorphæ," and the supplement thereto in the following year, "On Some Additions to the Australian Spiders of the Sub-order Mygalomorphæ."[2] These two papers, although some additional species have been described in the interval—chiefly by M. E. Simon—form an excellent basis for the student.

Usually, whenever specimens or collections of Araneidæ are forwarded by amateur collectors to a Museum, they are found to consist almost wholly of arborial forms. Now and again a Mygalomorphid is included, but it is the exception and not the rule. Among collectors who have contributed Trap-door Spiders to our cabinets, from time to time, are Dr. Thos. Bancroft, of Eidsvold, Queensland; Mr. A. A. Girault, of Nelson, North Queensland, and Mr. S. J. U. Morean, of Sydney. The present paper contains descriptions of species collected by each of these gentlemen, in addition to other material accumulated from time to time. When in Adelaide on official business a short time ago, my friend Dr. R. Pulleine kindly took me to spots on the Mt. Lofty Ranges, where certain Aviculariдæ occur, and to him I am indebted for the opportunity of collecting with ease and facility, spiders and nests for the Museum collection. From Eidsvold per favour of Dr. Bancroft, examples of nests, together with their architects, have also reached this Museum.

The measurements given of the cephalothorax of the different species in the following pages are from clypeus to posterior angle, and so do not include the falces.

[1] Hogg—Proc. Zool. Soc., 1901, pp. 218-279.

[2] Hogg—*Loc. cit.*, 1902, pp. 121-142.

For the determination of species treated in this paper, I have made a series of diagrams, illustrating in each case the scheme of dentition. The system adopted is a new one, and it is curious to note that a somewhat similar idea of elucidating species was adopted by Mr. John Hewitt[3] in his paper, "Descriptions of New Species of Arachnida from Cape Colony." Before Mr. Hewitt's paper, dated September 10th, 1913, arrived in Sydney, the MS. and diagrams reproduced below were awaiting attention at the hands of the printer. At the same time, I wish it to be understood that this system of delimiation appears to me to be so obvious and natural, that I do not claim any merit for originality, even if such exists.

Family AVICULARIDÆ.

Sub-family MIGINÆ.

Group HOMOGONEÆ.

For the reception of the species described below, I venture to propose a new group or section and a new genus to be known respectively as Homogoneæ and *Homogona*. The species appears to be a very anomalous one, presenting, as it does, features that make it difficult to harmonise with any existing genus, and yet at the same time displaying unmistakeable affinities to several. The contour (especially when viewed in profile) is sugestive of *Missulena*, Walck., by the elevation of the cephalic segment, but it differs widely therefrom in the disposition of the eyes, which in *Homogona* is much more compact. Again, the genus just quoted, and described hereunder, suggest affinities, both in form and armature, to Simon's South American genus *Calathotarsus* and Hogg's Tasmanian genus *Heteromigas*, and also by the presence of the peculiar large and erect bristle immediately in front of the anterior median eyes. But from both these genera *Homogona* differs in repect of its eyes. The points will be apparent to the student if he will compare the figures submitted hereunder with those of Simon[4] and Hogg.[5] Again, in *Heteromigas* the thoracic fovea is described as being "straight or slightly procurved,"[6] but in *Homogona* it is strongly procurved.

[3] Hewitt—Rec. Albany Mus., ii., 6, p. 470.

[4] Simon—Hist. Nat. des Araign., ii., 1897 (1903), p. 879.

[5] Hogg—Proc. Zool. Soc., 1902, p. 123.

[6] Hogg—*Loc. cit.*

The following table will assist the student in the elucidation of the genera :—

A—Front row of eyes slightly procurved, rear row recurved ; lip equally as broad as long, rounded at apex, not spined ; upper angle of maxilla spined ; thoracic fovea slightly procurved . . . . . *Heteromigas*, Hogg.

B—Front row of eyes very slightly procurved, rear row recurved ; lip equally as broad as long, rounded at apex, apex spined ; maxilla spined ; thoracic fovea straight at the middle, angles recurved . . . . . *Calathotarsus*, Sim.

C—Front row of eyes strongly procurved, rear row recurved ; lip rather longer than broad rounded at apex, apex spined ; maxilla spined ; thoracic fovea strongly procurved . . . . . *Homogona*, Mihi.

Genus Homogona,[7] *gen. nov.*

Cephalothorax.—Longer than broad. *Pars cephalica* elevated (somewhat as in *Missulena*). Sides rounded and compressed ; truncated in front ; *ocular area* broader than long. *Pars thoracica* slightly arched, retreating to posterior angle ; *thoracic fovea* deep, straight.

Falces.—Large, massive ; margins of the furrow of each falx armed with strong teeth ; there is also an intermediate row of small (granular) teeth near the base. No *rastellum*.

Eyes.—Eight, arranged in two rows ; front row procurved ; rear row recurved.

Legs.—Moderately long, strong, tapering, strongly bespined ; no true tarsal scopulæ ; claws, three. Relative lengths : 4, 1, 2, 3.

Palpi.—Long, strong, bespined.

Maxillæ.—Powerful, divergent, arched, armed with numerous tooth-like spines.

Labium.—Coniform, free, armed at apex with strong tooth-like spines.

[7] ὁμόγοτος, related, akin.

Sternum.—Arched, broadest at coxæ of third pair of legs; anterior angle procurved; posterior angle terminating in an obtuse point between coxæ of fourth pair of legs; sigilla large and removed from margin.

Abdomen.—Obovate.

Spinnerets.—Four. Inferior mammillæ very short, removed from each other at their base by a space equal to once their individual diameter; superior mammillæ short, stout, three-jointed; basal joint broad; second rather shorter and narrower; third longer than second, but shorter than first; conical.

HOMOGONA PULLEINEI,[8] *sp. nov.*

(Figs. 1-5.)

♀ Cephalothorax, 12.5 mm. long, 9.2 mm. broad; abdomen, 17.5 mm. long, 10.6 mm. broad (fig. 1).

Fig. 1.—*Homogona pulleinei*, Rainb., Profile.

Cephalothorax.—Dark-brown, shining, longer than broad, surface uneven. *Pars cephalica* strongly arched, compressed laterally, adpressed at rear of ocular area, sides declivous, descending sharply from apex to thoracic fovea, numerous small depressed, scale-like hairs or setæ at sides; there is also a long median line of the latter extending from ocular area to base of cephalic segment; the setæ constituting this line are placed closely one behind the other in single file; in addition to the adpressed setæ here referred to, there are a number of short, erect bristles or hairs scattered over the surface; *clypeus* pale, deep, broad, sinuous in outline, with a few erect setæ immediately below the eyes; *ocular area* broader than long, distinctly raised, arched, furnished with adpressed spines or bristles; in addition to the latter there is, immediately between the two front lateral eyes a long, strong, erect, slightly curved spine. *Pars thoracica* slightly arched, deeply depressed in vicinity of radial groove; numerous lines of adpressed scale-like hairs or setæ radiate from near thoracic fovea to lateral and

[8] In honour of my friend, Dr. R. Pulleine, of Adelaide.

posterior angles; the setæ constituting these radial lines are closely placed one behind the other exactly like those constituting the median line on the cephalic segment referred to above; in addition to these setæ there are a number of others scattered over the surface; lateral angles sinuous in outline; posterior angle recurved; *thoracic fovea* deep straight; *marginal band* broad, concolorous with surface; the band not fringed; there are, however, upon it a number of very small adpressed hairs.

Eyes.—Poised upon a tubercular eminence, and disposed as in figure (fig. 2); the tubercular eminence broader than long; the four eyes constituting the anterior row, which is strongly procurved, are decidedly the largest; the anterior lateral pair are separated from each other by a space equal to four times that of the diameter of one of the front median eyes, and the latter again from each other by a space equal to once their own individual diameter; the rear row is recurved, and arranged in pairs; the posterior lateral eyes are the largest of this series, though smaller than those of the preceding group; each is elliptical in form, seated obliquely and separated from each other by a space equal to about five times the diameter of one of the front median eyes; the inner eyes of the posterior row are the smallest of the entire series, and these are separated from each other by a space equal to slightly more than three times the diameter of one of the median eyes; they are also elliptical in shape and poised obliquely.

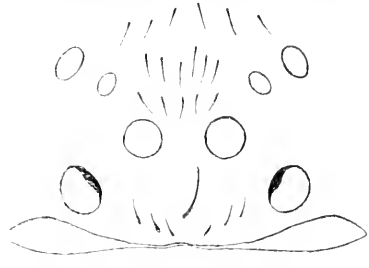


Fig. 2.—*H. pulleinei*, Rainb., Eyes.

Legs.—Strong, moderately long, tapering, concolorous with cephalothorax, clothed with hairs and bristles; coxæ of legs i. and ii. have on rear inner angles a cluster of short tooth-like spines somewhat similar to those on maxillæ; femur of leg i. bowed; patella i. armed with one spine near apex on the inner-side; tibia i. armed on inner side with one spine near to apex,

and one on the outerside just on the apical angle; tibia of leg ii. has four long, strong spines on the underside; tibia of leg iii. has a number of spinelike bristles; while tibia iv. has one strong spine on the outerside at its apex; metatarsus of leg i. has two stout spines seated one behind the other on the outerside near the base, four on the inner angle (also placed one behind the other), and one at the middle of the apical angle; metatarsus ii. has four strong spines on the outer angle, and two on the inner; metatarsus iii. has a row of four stout spines on the apical angle on the underside; metatarsus iv. has two strong spines, one behind the other, on the angle near the base, and two on the apical angle on the underside; each tarsus armed with two strong spines. *Claws* long and powerful, the superior ones armed each at base with two strong teeth; ungual tufts long, thick, obscuring claws. The following are the leg measurements in millimeters:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	5.2	11	11.2	8.6	36
2	4.8	9.8	8.5	7.7	30.8
3	4.3	8	7	6.8	26.1
4	4.5	11	11.6	9.6	36.7

Palpi.—Long, strong, similar in colour and clothing to legs, armed with numerous powerful spines, and terminating with a single powerful tarsal claw at the base of which there is an exceedingly large tooth; femur, bowed. Measurements in millimeters as follows:—Coxa, 5.2; trochanter and femur, 9; patella and tibia, 7.8; tarsus, 5.6; total, 27.6.

Falces.—Black, shining, porrected, curving downwards, arched, transversely wrinkled on upper surface, where each is armed with several large and powerful and numerous short, strong spines (fig. 3). The larger spines are slightly curved and finely striated; apices surrounded with a fringe of long, stiff, red bristles; inner margin of the furrow of each falx armed with nine strong, coniform teeth, and the outer margin with seven; in addition to these a few small, granular teeth form an intermediate row near the base (fig. 4), outer margins fringed with long red hairs; *fangs* black, shining, powerful.

Fig. 3.—*H. pulleinei*, Rainb., Left falx.

Fig. 4.—*H. pulleinei*, Rainb., Scheme of dentition.

Maxillæ.—Reddish-brown, shining, arched, divergent, sparingly clothed with long black bristles; inner angles thickly fringed with long red hairs, a number of small, coniform teeth distributed over the surface; the teeth are largest and more thickly clustered at the base (fig. 5).

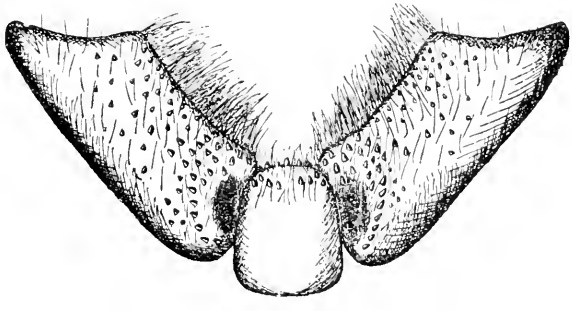


Fig. 5.—*H. pulleinei*, Rianb., Maxillæ and labium.

Labium.—Concolorous, coniform, longer than broad, arched, free, sparingly clothed with reddish bristles, armed at apex with a series of coniform teeth (fig. 5.)

Sternum.—Concolorous also, arched, longer than broad, narrowest at apex; apical angle procurved, lateral angles sinuous, basal angles excavated: a few long, reddish bristles are spread over the surface; basal angles, where the colour is somewhat lighter, fringed with long, strong bristles; basal sigilla only present, and these are removed from outer angles.

Abdomen.—Obovate, slightly overhanging base of cephalothorax, strongly arched, yellow-brown, pubescent, though not thickly so; a few short, black bristles present on superior surface; integument wrinkled.

Spinnerets.—*Vide* description of genus *(ante)*.

Hab.—Lismore, New South Wales.

Sub-family CTENIZINÆ.

Group AGANIPPEÆ.

This group has, so far, consisted of only four Australian genera, namely *Idiosoma*, Auss., *Aganippe*, O. P. Cambr., *Anidiops*, Pocock, and *Blakistonia*, Hogg. Of these, the first three embrace one species each. *Blakistonia* also, was only known by one representative, but another is described hereunder. Simon, in his great work[9] has given excellent diagrams in elucidation of the eye-formula of each of these genera, and to these the student is directed for comparison with the figure (fig. 7) submitted below of a species which I propose to make the type of a new genus to be known as *Gaius*. A study of the eye-formulæ of *Anidiops* and *Blakistonia* suggests to my mind that *Gaius* must fall between them, and there I place it. There are, of course, other generic differences, and these the student will note by comparing the descriptions of the four older genera with that defining the one now proposed.

A superficial glance at the form hereunder described with that figured by Koch[10] would seem to suggest *Aname pallida* of that author, owing to the presence of the dark, tapering, median abdominal band. Such a determination, however, is out of the question, not only on account of its superior size, but from the primary fact that the last-named species has no rastellum, which *Gaius* has.

[9] Simon—Hist. Nat. des Araign., ii., 1903, p. 901, figs. A, B, C, D.

[10] Koch—Die Arach. des Austr., i., 1873, pl. xxxv., figs. 8, 8*a*.

Genus Gaius,[11] *gen. nov.*

Cephalothorax.—Longer than broad. *Pars cephalica* elevated, though not quite so strongly so as in *Missulena*; sides declivous, truncated in front; *clypeus* deep, sharply and strongly indented at centre; *ocular area* broader than long. *Pars thoracica* sloping; *thoracic fovea* deep, procurved.

Falces.—Large, massive, curving downwards, provided with a *rastellum*; margins of the furrow of each falx armed with strong teeth, in addition to which there is also an intermediate row of smaller teeth near the base.

Eyes.—Eight, arranged in three series, reading from the front, of 2, 2, 4 (fig. 7); rear row procurved.

Legs.—Short, powerful, moderately spined, hairy; metatarsi and tarsi of legs i. and ii. scopulated; no true scopulæ on corresponding joints of legs iii. and iv.; claws, three; relative lengths: 4, 1, 2, 3.

Palpi.—Long, powerful; metatarsi and tarsi i. and ii. scopulated.

Maxillæ.—Long, powerful, divergent.

Labium.—Short, broad, free.

Sternum.—Long, narrowest in front; sigilla large.

Abdomen.—Ovate.

Spinnerets.—Four; short, robust. Inferior mammillæ, very short and placed closely together; superior mammillæ three-jointed; first joint considerably longer than second; the third exceedingly minute.

GAIUS VILLOSUS, *sp. nov.*

(Figs. 6-8.)

♀ Cephalothorax, 16 mm. long, 13 mm. broad; abdomen, 20.7 mm. long, 15 mm. broad (fig. 6).

[11] *Nom. prop.*, from Scripture. Meaning of name: "A lord; an earthy individual." The name here given from the habit of the animal excavating burrows in the soil.

Cepalothorax.— Longer than broad, shining, chocolate - brown, smooth, clothed with short, scattered, black hairs. *Pars cephalica* strongly arched, sides declivous, sloping to thoracic fovea, and furnished with a few short black bristles; *ocular area* slightly raised, broader than long, black, with long black bristles between front pair of eyes; *clypeus* very deep, white, slightly tinged with brown below front pair of eyes, at which point there are also a few short, fine, dark hairs; transversely wrinkled, deeply depressed and excavated at centre. *Pars thoracica* arched, gently sloping, the surface somewhat undulating; radial grooves deeply depressed and irregular in outline; margins thinly fringed with short black hairs; *thoracic fovea* strongly procurved, deep; *marginal band* broad, sinuous in outline, white, sparingly clothed with short, fine hairs.

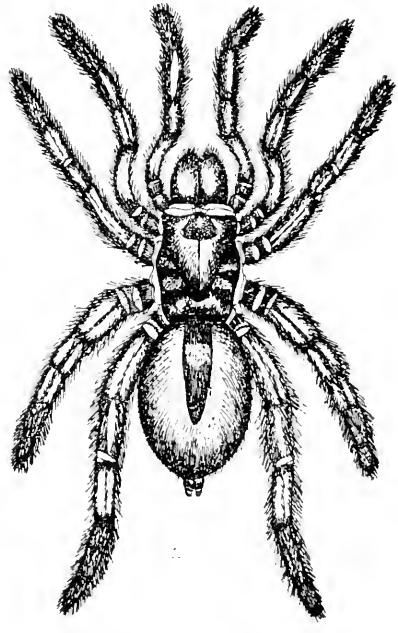


Fig. 6.—*G. villosus*, Rainb.

Eyes.—In three series, reading from the front, of 2, 2, 4; of these the intermediate pair are slightly smaller than their anterior neighbours, while the inner pair of the posterior row are the smallest of the group; the two front eyes touch the edge of the clypeus (fig. 7), and are separated from each other by a space equal to twice their own individual diameter; rear row of eyes procurved; lateral eyes of this row about four times their individual and longitudinal diameter apart.

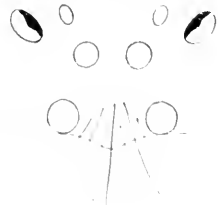


Fig. 7.—*G. villosus*, Rainb., Eyes.

Legs.—Short, robust, concolorous with cephalothorax, densely hairy, but having long naked areas on all joints save metatarsi and tarsi; the last named joints of legs i. and ii. thickly scopulated; scopulæ obscuring claws; metatarsi and tarsi of legs iii. and iv. thickly clothed, but not provided with true scopulæ; ungual tufts extending beyond tips of claws and obscuring them; tibiæ i. and ii. have each eight long spines on the underside; tibia iii. armed with four, while tibia iv. has about a dozen bristle-like spines; metatarsus i. has four strong spines, and metatarsi ii. and iii. have each nine, and metarsus iv. about a dozen long, bristle-like spines; all tarsi armed with a few short stiff spines mingled with and obscured by the hirsute clothing. Leg iii. is not only the shortest, but the stoutest; and leg iv. the most tapering. Superior claws have two very long teeth at their base. Measurements in millimeters as follows:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	6.8	13.4	11.2	7.9	39.3
2	6.3	13.1	10.8	7.9	38.1
3	5.5	11.3	10	7.8	34.6
4	6	13.4	14.5	13	46.9

Palpi.—Concolorous with legs, hairy, scopulated, and terminated with a single claw; tibia armed with about a dozen long spines. Measurements in millimeters as follows:—Coxa, 7.7; trochanter and femur, 10.7; patella and tibia, 8.10; tarsus, 5.9; total, 33.9.

Falces.—Concolorous with cephalothorax, shining, powerful, porrected, curving downwards, smooth near clypeus, but otherwise thickly clothed with hairs and bristles. Outer margin of the furrow of each falx armed with five strong teeth and four small ones, the latter near the fang; the inner margin has six strong teeth; in addition to these there is a short intermediate row of four smaller teeth near the base (fig. 8); margins fringed with long, reddish hairs; *fangs* black, shining, long, and powerful.

Fig. 8.—*G. villosus*, Rainb., Scheme of Dentition.

Maxillæ.—Long, reddish-brown, powerful, arched, divergent, the heel rounded, very hairy, inner angles fringed with long golden and reddish hairs.

Labium.—Short, broader than long, arched, red, apex slightly procurved. Surface hairy, submerged beneath bases of maxillæ.

Sternum.—Pyriform, broadest at posterior extremity, concolorous with maxillæ, arched, surface uneven, densely hairy, sigilla six, submarginal.

Abdomen.—Ovate, slightly overhanging base of cephalothorax, arched, pubescent, superior surface yellow-brown, ornamented with a broad, dark, tapering band, commencing at anterior extremity, and running for about two-thirds the length; within the band, towards anterior extremity there is a small light-coloured patch; inferior surface yellow-brown, pubescent; the chitinous plate above the *rima epigasteris* dark-brown at the middle, sides yellow-brown, the surface hairy; on each side of the medium dark-brown patch there is a large sigilla, while the overhanging lip is orange-red.

Spinnerets.—Short, stout, hairy; inferior mammillæ short, separated at the base by a space equal to not more than once their transverse diameter, apices directed inwards and touching; superior mammillæ about twice the length of the inferior, three-jointed; first joint about one-and-a-half times the length of the second; third joint minute, rounded.

Obs.—I have received the following note from Mr. W. B. Alexander, B.A., of the Western Australian Museum, from whom the spider described above was also received:—

"The tube is practically straight and descends to a depth of nine inches below the ground; its diameter is about one inch, and looks much too narrow to house such a large spider with any comfort; there is no special enlargement at the bottom. The whole is lined with pure white silk.

"The door is thin, of the *wafer* type, but a few twigs have been incorporated in its upper surface round the edges, and though the inside was very white, the upper surface is the same colour as the surrounding soil. The top of the tube projects about a quarter of an inch above the level of the ground, and a series of twigs are incorporated in this portion by their

ends. These stand out in radial fashion all round it, on the surface of the ground, and as they are mostly two or three inches long, and some of them are branched, they must have rendered the nest very conspicuous.

"The nest and spider were sent us by Mr. J. P. Harris, of Minnivale, on March 14, 1913, and he afterwards kindly sent a second spider exactly similar to the first, in order that I might forward it to you for identification."

Hab.—Minnivale, Western Australia.

Genus Aganippe, *O. P. Cambr.*

AGANIPPE BERLANDI, *sp. nov.*

(Figs. 9-13.)

♂ Cephalothorax 7 mm. long, 5 mm. broad; abdomen, 8 mm. long, 4·7 mm. broad.

Cephalothorax.—Yellow-brown, moderately pilose. *Pars cephalica* raised, arched, sloping backwards to thoracic fovea; a row of stiff black bristles run from ocular area to base; *ocular area* longer than broad, raised, distinctly arched both longitudinally and laterally, black, with a group or cluster of strong, black bristles, both in front of and between front pair of eyes; *clypeus* pallid; thoracic groove distinct, and pencilled with dark brown; *Pars thoracica* arched, radial grooves distinct and pencilled with dark brown; *thoracic fovea* deep, procurved; radial grooves distinct, pencilled with dark brown; there are three narrow but distinct depressions in front of posterior angle; *marginal band* thickly fringed with moderately long, stout, black bristles.

Eyes.—In three rows, reading from the front of 2, 2, 4; front pair of eyes seated obliquely, and separated from each other by a space equal to fully twice the diameter of one of the median eyes; median eyes separated from each other by a space equal to once their own individual diameter; median row recurved; rear median eyes smallest of the group, and separated from each other by a space equal to four times their own individual diameter; they are seated close to, but do not touch their lateral neighbours, which latter are placed diagonally, though not so much so as the front pair (fig 9).

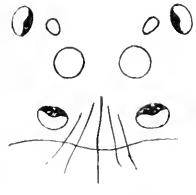


Fig. 9.—*A. berlandi*, Rainb., Eyes.

Legs.—Long, thin, tapering, concolorous with cephalothorax, not strong, clothed with hairs and long, black bristles, and furnished with a few spines; tibia i. has a double spur or apophyses on inner angle at lower extremity (fig. 10); tarsus i. and ii. scopulated; superior tarsal claws have each a comb with nine teeth; inferior claw very small, and obscured by ungual tufts. Measurements in millimeters as follow:—

Fig. 10.—*A. berlandi*, Rainb., Tibia, leg i.

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total
1	3.2	9.3	7.8	7.6	27.9
2	2.7	8.2	7.5	6.6	25
3	2.5	6.5	5.5	7.3	22.8
4	2.7	8.7	9.3	9.6	30.3

Palpi.—Long, similar in colour and clothing to legs; tibial joint inflated; it has on outer angle a double apophysis, of which the lower branch is the longest, and on the underside of which there are several tapering toothlike spines; radial joint small, overhanging, divided at tip; genital bulb large, shining, and reddish; stigma long, tapering, and twisted (fig. 11.). Measurements in millimeters as follow:—Trochanter and femur, 4.6; patella and tibia, 4; radial joint, 1.4; total 10.

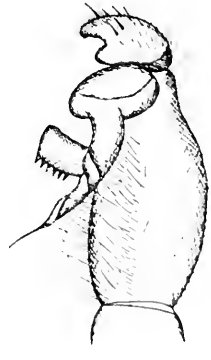


Fig. 11.—*A. berlandi*, Rainb., ♂ palp; upper branch of apophyses obscured

Falces.—Concolorous with cephalothorax; porrected; shining; clothed with hairs and bristles, and furnished with *rastellum*; inner margin of falx-sheath fringed with red hairs; inner ridge of falx armed with six moderately large teeth, of which the three nearest the fang are the closest together; outer margin has also six teeth, but they are much smaller and cover a smaller area; intermediate between these two rows there are two other teeth, and these are smaller still (fig. 12); *fang* shining, reddish-brown, well curved.

Fig. 12.—*A. berlandi*, Rainb., Scheme of dentition.

Maxillæ.—Not strong, yellow, divergent, arched, hairy, inner angles fringed with red hairs.

Labium.—Concolorous, somewhat submerged, arched, broader than long, hairy, devoid of spines.

Sternum.—Pale yellow, pyriform, narrowest in front, broadest at a point between the second and third coxæ, slightly arched, surface rather thickly beset with black bristles; posterior *sigilla* moderately large, distinct, bright yellow, and widely removed from margin.

Abdomen.—Obovate, strongly arched, slightly overhanging base of cephalothorax, yellow-brown, upper surface ornamented with four large and distinct sub-lateral yellow spots, arranged in pairs; the first pair are seated at about one-third the length of the abdomen from the front, and the second pair, which are by far the larger, are placed slightly beyond the middle; immediately below the latter there are two moderately large, dark brown spots; the upper surface is pubescent, and furnished rather closely with black bristles or spines; sides concolorous, hairy; inferior surface yellow, hairy (fig. 13).

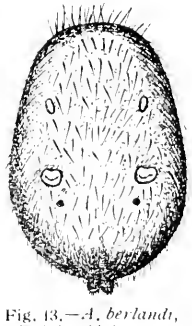


Fig. 13.—*A. berlandi*, Rainb., Abdomen.

Spinnerets.—Short; superior mammillæ stout, pale yellow; first joint much longer than the second and third combined; third joint much the smallest and dome-shaped; inferior

mammillæ very short, darker than the superior, and separated from each other by a space equal to once their individual transverse diameter.

Obs.—I have named this species in honour of my correspondents and co-workers M. and Mme. Berland.

Hab.—Narrabri, New South Wales.

Genus Blakistonia, *Hogg.*

In 1902 Hogg founded the genus *Blakistonia*[12] for a species of trap-door spider, specimens of which he reported from Adelaide, Blakiston, and Mt. Lofty Ranges, South Australia. Up to the present time the type species only has been known (*B. aurea*, Hogg), but it now appears that the range of the genus is fairly extensive, for the example before me was collected by Dr. Thos. L. Bancroft at Eidsvold, near Gayndah, Queensland. This species, which I describe hereunder, I name in honour of the collector, and, in order to assist students, submit the following key:—

A—Front eyes separated from each other by a space equal to one-and-a-half the diameter of one of the median eyes, median eyes once their individual diameter apart, long diameter of front pair of eyes equals diameter of rear lateral eyes; thoracic fovea slightly procurved; maxillæ on lower inner corner furnished with spines similar to those on lip; lip as long as broad, convex, rounded at base, straight in front, furnished with rather thick bristles and stout spines on the upper half, tapering from base to point; sternum pyriform; posterior sigilla moderate in size, about their diameter from margin... ... . *B. aurea*, Hogg.

B.—Front eyes separated from each other by a space equal to twice the diameter of one of the median eyes, median eyes once their individual diameter apart, long diameter of front pair of eyes rather larger than that of rear lateral eyes; thoracic fovea strongly procurved; maxillæ furnished with a few scattered coniform spines; lip as long as broad, convex, rounded at base, straight in front, apical

[12] Hogg—Proc. Zool. Soc., 1902, p. 131.

area furnished with long, coarse, black bristles, amongst which are interspersed a few short, coniform spines; sternum pyriform; posterior sigilla moderate in size, and about twice their individual diameter from margin.

B. bancrofti, Mihi.

BLAKISTONIA BANCROFTI, *sp. nov.*

(Fig. 14-15.)

♀ Cephalothorax, 9.6 mm. long, 7.8 mm. broad; abdomen, 11.6 mm. long, 8.1 mm. broad.

Cephalothorax. — Longer than broad; smooth, shining, brownish-yellow. *Pars cephalica* high, depressed at rear of posterior row of eyes, compressed at sides, sparingly clothed with fine, short, silky pubescence; *ocular area* nearly as long as broad, almost black between the two median eyes, a cluster of long black bristles between and below the eyes; *clypeus* pale, deep, sinuous. *Pars thoracica* rather lighter in colour than cephalic segment, sparingly hairy, arched, radial grooves strongly defined; *thoracic fovea* deep, strongly procurved; *marginal band* pale, broad, fringed with rather long, fine yellowish hairs.

Eyes.—In three rows, reading from the front, of 2, 2, 4; front eyes elliptical, separated from each other by a space equal to twice the individual diameter of one of the median eyes, or rather more than once their own individual diameter; median eyes round and separated from each other by a space equal to once their own individual diameter; lateral eyes of rear row elliptical, and separated from each other by a space equal to rather more than four times the diameter of one of the median eyes; inner eyes of posterior row smallest of the series, round, and each close to its outer lateral neighbour, being removed therefrom by a space equal to nearly once their own individual diameter, and two-and-a-half times the diameter of a median eye; the centres of the rear row are in a straight line (fig. 14).

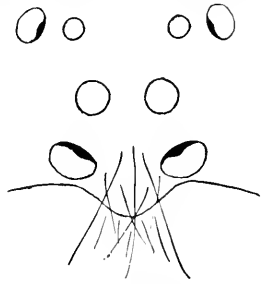


Fig. 14.—*B. bancrofti*, Rainb., Eyes.

Legs.—Concolorous with cephalothorax, rather short, strong, clothed with coarse black bristles; metatarsi and tarsi of legs i. and ii. somewhat flat, thickly scopulated, and armed with short, stout spines; tibia of legs iii. and iv. each armed with two or three rather long, fine spines, while the metatarsus and tarsus of each are armed on the outer side with a number of long, stout, thickly-set black spines; claws, three; superior tarsal claws strongly curved, and furnished with a couple of teeth at their base. Measurements in millimeters are as follow:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	3.9	7.9	7.7	5.2	24.7
2	3.5	7.1	7.3	5.2	23.1
3	3.2	6.4	6.2	5	20.8
4	3.4	7.9	8.9	8	28.2

Palpi.—Concolorous also; similar in clothing and armature to legs i. and ii.; femur, bowed; tarsus scopulated, and terminated by a single claw. Measurements in millimeters as follow:—Coxa, 4.4; trochanter and femur, 6.1; patella and tibia, 5.9; tarsus, 4; total, 20.4.

Falces. — Reddish-brown, smooth, shining, arched, clothed with long, coarse bristles on sides and apices; upper surface almost entirely free from hairs and bristles; *rastellum* composed of several rows of long, black spines; outer angles fringed with long, reddish hairs; inner margin of falx sheath armed with seven teeth, of which the four seated near the apex are the largest; on the outer margin there are ten, all of which are strong, though of varying size, and irregularly arranged; there is also an intermediate row, consisting of seven small teeth (fig. 15).

Fig. 15 *B. bancrofti*, Rainb., Scheme of dentition.

Maxillæ. — Reddish-brown, long, arched, rather thickly clothed with long, coarse hairs or bristles, intermingled with which near the base are a few scattered, coniform spines; apical angles straight, and the bases rounded; inner angles thickly fringed with yellowish and reddish hairs.

Labium.—Concolorous, submerged between basis of maxillæ, as long as broad, convex rounded at base and straight at apex; apical area fringed with long, coarse, black bristles, amongst which are interspersed a few short, coniform spines.

Sternum.—Yellowish, pyriform, narrowest in front where it is moderately clothed with short, black, bristles; moderately arched; lateral and posterior angles fringed with long, fine, yellowish hairs; four *sigilla*, anterior pair opposite coxæ of second pair of legs, and submarginal; posterior pair larger and more distinct than the preceding, of a pinkish tint, and about twice their individual diameter from margin.

Abdomen.—Slightly overhanging base of cephalothorax, ovate, arched, pubescent, greyish-brown.

Spinnerets.—Hairy, stout, very short; superior pair three-jointed; first joint much the largest, the second very small, and the third smaller still; inferior mammillæ very short and separated from each other by a space equal to about once their transverse diameter.

Hab.—Eidsvold, Queensland.

Group CTENIZEÆ.

Genus Megalosara,[13] *gen. nov.*

Cephalothorax.—Longer than broad; *pars cephalica* elevated, arched; *pars thoracica* somewhat flattened; lateral grooves broad; *thoracic fovea* deep, slightly procurved.

Falces.—Porrected, bristly, furnished with *rastellum*; no teeth on outer edge of falx.

Eyes.—Eight, poised upon a slightly elevated protuberance, which is broader than long; arranged in two rows of four each; anterior row strongly procurved; the posterior pairs, constituting the second row are widely separated from each other, and the inner eyes are much the smallest.

Legs.—Long, tapering, anterior pair strongest, and having on the inner angle of each tibia, in the ♂, two strong spurs; metatarsi and tarsi scopulated. Relative lengths: 4, 1, 2, 3. Each tarsus furnished with three claws; the two superior claws toothed.

[13] μεγαλοσαρος, with large brushes, in reference to the scopulated metatarsi and tarsi.

Palpi.—Long; furnished with rastellum; copulatory organ large, inflated; stigma moderately long.

Maxillæ.—Long, arched, inner angle scopulated, apices widely divergent.

Labium.—Short, free, broadest at base, apex truncated.

Sternum.—Gently arched, truncated in front, where it is narrowest; broadest toward posterior extremity; two sigilla only visible, and these seated close to posterior extremity, and near to outer angles.

Abdomen.—Overhanging base of cephalothorax; hairy.

Spinnerets.—Four, short, not extending beyond tip of abdomen; superior pair three-jointed; basal joint as long, or nearly as long as second and third joints combined; terminal joint coniform, inferior spinners very short, and placed closely together.

MEGALOSARA VILLOSA, *sp. nov.*

(Fig, 16-22.)

♂ Cephalothorax 9.6 mm. long, 8 mm. broad; abdomen, 8 mm. long, 5.8 mm. broad.

Cephalothorax.—Piceus, not shining. *Pars cephalica* smooth, strongly arched, sides declivous, gently sloping from anterior angle to thoracic fovea, surface provided with a few scattered, yellowish hairs chiefly in front and at sides. *Pars thoracica* broad, sloping very gently to posterior angle, sides uneven and deeply and irregularly impressed, radial grooves broad and deep; upper surface sparingly furnished with short, yellowish hairs, while the sides and the posterior angle are densely clothed with long, coarse, yellowish hairs; *clypeus* not deep, yellowish-brown; *thoracic fovea* deep, very slightly procurved; *marginal band* thickly fringed with long, yellowish hairs.

Eyes.—As in figure; front row procurved; outer eyes sensibly the largest; the median pair of this row are separated from each other by a space equal to once their individual diameter, and each again from its anterior lateral neighbour by a space equal to about one half the individual diameter of the former; the outer eyes of the second or posterior row are sensibly smaller than the median anterior pair; the inner eyes of the second row are minute and elliptical, and each is placed

close to its lateral neighbour; the space intervening between the lateral eyes of the second row is equal to five times their individual diameter, and these are again removed from their anterior lateral neighbours by a space equal to about once the individual diameter of the latter. The entire series of eight eyes are poised upon a slightly elevated tubercular eminence, which latter is decidedly broader than long (fig. 16).

Fig. 16.—*M. villosa*, Rainb., Eyes.

Legs.—Long, tapering, reddish-brown, densely clothed with long, coarse, greyish hairs or bristles; the underside of each tibia of the first and second pairs are provided with spines, while the third and fourth pairs have the tibiæ and metatarsi so armed; none of the spines are very long or strong. At apex of tibia (first pair) there are two spurs or apophyses, of these the upper one is bifurcated and the lower armed with four long, strong teeth (figs. 17 and 18). These spurs stand boldly out, and the intervening space between them is depressed, and forms a large, rather deep pit. Measurements of legs in millimeters as follow :—

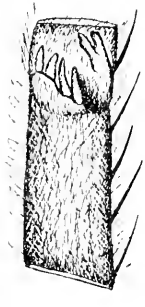


Fig. 17.—*M. villosa*, ♂, Rainb., Tibia i., inner side.

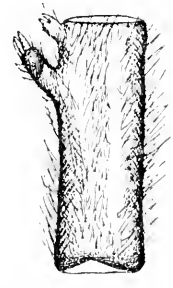


Fig. 18.—*M. villosa*, ♂, Rainb., Tibia i., from above.

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	5	9.4	10.2	10	34.6
2	4.4	9.4	9.4	9.6	32.8
3	3.3	7.5	6.8	8.7	26.3
4	3.5	9.8	12.1	11.5	36.9

Palpi.—Similar in colour and clothing to legs; moderately long; radial joint very large, inflated, apex bifurcated (fig. 19); base of bifurcation hollowed out; angles of processes thickly set with short, stiff bristles or small teeth suggestive of the armature of a rastellum; digital joint rather small, overhanging its neighbour like a hood, and is strongly armed over the greater part of its upper surface with short stiff bristles or small teeth, which latter again suggest a rastellum; this joint carries the *genital bulb* (fig. 20) which is bright and shining and terminating with a strong, moderately long, style. The palp of this species somewhat recalls that of *Blakistonia aurea*, Hogg.

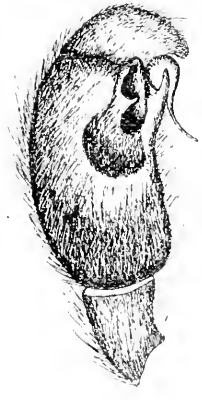


Fig. 19.—*M. villosa*, Rainb., ♂ Palpus, outer angle.

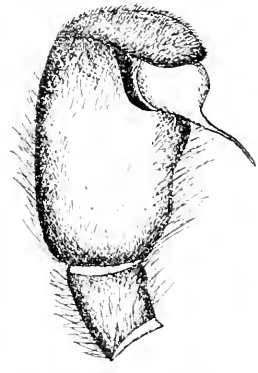


Fig. 20.—*M. villosa*, Rainb., ♂ Palpus, inner angle.

Falces.—Long, moderately stout, arched, projecting for about one-third their length, then curving sharply downwards, clothed with long, coarse yellowish bristles; apical portion of outer angles furnished with long, foxy-red hairs; teeth forming front row of *rastellum* long, and projecting over base of fangs; those at the rear of the latter are spread over a considerable surface, are very small, and are suggestive of a rasp or file. Inner angle of the furrow of each falx armed with ten strong teeth and the outer angle with seven; there is also an intermediate row consisting of seven small teeth (fig. 21).

Fig. 21.—*M. villosa*, Rainb., Scheme of dentition.

Maxillæ.—Chocolate brown, long, arched, bristly, inner angles clothed with fringes of long foxy-red hairs.

Labium.—Concolorous, short, broadest at base, apex truncated.

Sternum.—Concolorous also, hairy, elongated, moderately convex, narrow in front, anterior angle truncated, broadest behind, posterior extremity terminating between the fourth pair of coxæ in an obtuse point; one pair of sigilla only visible; these latter are distinct, and are located near the outer angles at its broadest part.

Abdomen.—Obovate, slightly projecting over base of cephalothorax, densely clothed with long, coarse, yellowish brown hairs.

Spinnerets.—As in figure (fig. 22).

Fig. 22—*M. villosa*, Rainb., Spinnerets.

Hab.—Enfield, near Sydney.

Group ARBANITEÆ.

Genus Arbanitis, *L. Koch.*

Only two species of this genus have up to the present time, been recorded from the Commonwealth, namely *A. longipes*, L. Koch, from Bowen, North Queensland, and *A. maculipes*, Hogg, from Tasmania. In his paper "On Australian and New

Zealand Spiders of the Suborder Mygalomorphæ," Mr. Hogg gives a key of the species then known to him[14] in which he says:—

Middle eyes of front row about $\frac{1}{2}$ diameter apart (*sec.* L. Koch) ..... *A. longipes*, L. Koch.

To this I now add:—

Middle eyes of front row one-third their individual diameter apart ..... *A. fuscipes*, Mihi.

Middle eyes of front row separated from each other by a space equal to nearly once their individual diameter ..... *A. maculipes*, Hogg.

ARBANITIS FUSCIPES, *sp. nov.*

(Figs. 23, 24, 25.)

♀ Cephalothorax, 12.2 mm. long; 9.9 mm. broad; abdomen, 13.6 mm. long; 9.9 mm. broad.

Cephalothorax.—Chocolate-brown, furnished with a few rather long and scattered fine hairs. *Pars cephalica* arched, anterior angle truncated, slightly depressed at rear of ocular area, thence very gradually rising towards its highest point, which is about two-thirds its length; from the summit the slope is sudden and almost precipitate to thoracic fovea; sides declivous; the normal grooves are very broad, and each is broken by two deep, elongate pits, which latter are separated from each other by a broad, strongly-arched ridge or bar; *clypeus* almost white, deep, broad, sloping, lower angle sinuate, and furnished at the middle with a tuft of short, pale hairs. *Pars thoracica* broad, arched, clothed with a few short, scattered hairs; radial grooves broad, distinct, somewhat broken, thereby giving the surface an uneven appearance as though impressed with deep and shallow pits; *thoracic fovea* very deep, broad, somewhat sinuous in outline, slightly—but distinctly—procurved; *marginal band* narrow, sinuous, and sparingly fringed with short hairs.

[14] Hogg—Proc. Zool. Soc., 1901, p. 233.

Eyes.—Compact, seated upon a slightly raised and arched tubercular eminence which is broader than long, they are arranged in two rows consisting of four each; the front row is procurved; of this row the median pair are large, round, and removed from each other by a space equal to one-third their individual diameter, and from the front laterals by a space equal to nearly once the diameter of a front median eye; the front lateral eyes are elliptical, heavily margined with black on the inner angle; they are poised obliquely and are separated from each other by a space equal to three times their longitudinal diameter; the space intervening between the lateral eyes of rear row is equal to six times the longitudinal diameter of one of the inner eyes of that series; lateral eyes of posterior row of equal size to their anterior lateral neighbours, obliquely poised, and heavily margined with black on the inner angle; gauged by its rear angle, the posterior row is somewhat recurved while by its anterior angle it is straight (fig. 23).

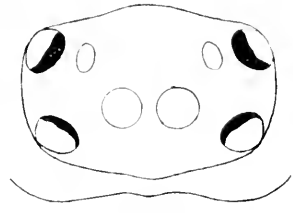


Fig. 23.—*A. fuscipes*, Rainb., Eyes.

Legs.—Strong, moderately long, metatarsi and tarsi of first two pairs scopulated; fuscus; thickly clothed with long hairs; femur of front legs bowed; tibia i. armed with six long and strong spines, of which three are seated at the underside of the outer angle, and three distally at the inner angle; tibia ii. has four similar spines on the underside of its outer angle, two on the underside of the inner angle, and three distally at the inner angle; outer angles of tibia iii. armed with three spines and distally with four; tibia iv. has several bristle-like spines distributed over the surface, the outer and inner angles, and distally on the under side; each metatarsus is is armed with six long, strong spines on the underside; metatarsus iii. has six similar spines on the upper surface; tarsus iii. and iv. have each four spines on the underside. Outer superior claws armed with five teeth

Fig. 24.—*A. fuscipes*, Rainb., Outer superior claw.

(fig. 24). Posterior leg less robust and more tapering than its neighbours. Measurements in millimeters :—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	6	11.2	10.2	7.7	35.1
2	5.6	10.7	9.3	7.1	32.7
3	5.1	8.9	7.8	6.1	27.9
4	5.3	12	12.6	9.9	39.8

Palpi.—Long, strongly bowed, robust, similar in colour and armature to legs ; tibial joints each armed with six long spines on outer angle and three on inner; underside armed with eight —four on each side ; tarsal joints scopulated. Measurements in millimeters as follow :—Coxa, 5.5 ; trochanter and femur, 8.3 ; patella and tibia, 7.8 ; tarsus, 4.2 ; total 25.8.

Falces.—Chocolate-brown, long, stout, arched, projecting for about one-half their length, then curving sharply downwards ; outer angles at base, and for about two-thirds their length smooth; inner angles and apices clothed with long bristles; *rastellum* composed of a number of moderately short fine teeth. Inner margin of furrow of each *falx* armed with a row of nine moderately long, strong teeth ; outer margin armed with a row of thirteen smaller teeth, of which the five nearest the apex are arranged in a single row ; the remaining seven, which become gradually smaller towards the base of the falx, are clustered together; the teeth comprising the inner row terminate at the apical angle at the juncture of the falx and fang, while those that constitute the outer row terminate in a line about midway between the third and fourth apical teeth of the outer row (fig. 25) ; outer angle of each furrow, fringed with long, foxy-red hairs. *Fangs* long and powerful.

Fig. 25—*A. fuscipes*, Rainb., Scheme of dentition.

Maxillæ.—Concolorous with falces, arched, hairy, inner angle fringed with long, foxy-red hairs.

Labium.—Concolorous with above, sunk beneath maxillæ, as broad as long, clothed with coarse hairs or bristles.

Sternum.—Concolorous also, moderately arched, narrowest in front, apical angle truncated; posterior extremity broadest near coxæ of third pair of legs, and terminating in an obtuse point between the coxæ of the fourth pair. *Sigilla* normal.

Abdomen.—Ovate, overhanging base of cephalothorax, strongly arched, hairy, yellow-brown.

Spinnerets.—Short, stout, not extending beyond posterior extremity of abdomen. The superior pair are separated from each other by a space equal to once their individual diameter; they are three-jointed; the first joint is the stoutest, and is equal in length to the second and third combined; third joint somewhat longer than the second, conical and rounded. Inferior spinners exceedingly short, and separated from each other by a space equal to once their individual diameter.

Hab.—Willoughby, North Sydney.

Arbanitis longipes, *L. Koch.*

(Figs. 26-27.)

In 1874 Dr. Ludwig Koch proposed, for the reception of a Queensland spider the generic and specific names of *Arbanitis longipes*, which species he also figured[15]. From Dr. Thomas L. Bancroft, of Eidsvold, Queensland, the Museum has received from time to time, miscellaneous collections of natural history specimens and amongst these males and females of what I take to be *A. longipes*. Up to the present the male only has been described, and in comparing Dr. Bancroft's material with Koch's description and figure, I find that both agree save in respect of certain details, the chief and most important being the omission of any indication or suggestion by Koch of the presence of tibial apophyses or spurs on leg i. In the material before me from Eidsvold and the Upper Burnett River, the feature here referred to is very distinct, and it certainly seems remarkable that the distinguished author who founded the

[15] Koch.—Die Arach. des Austr., i., 1874, pp. 472 and 491, pl. xxxvi., figs. 3, 3*a*, 3*b*, 3*c*.

genus and described the type species (of which his specimen was a male) should not have observed and noted so prominent a character, and which is, in fact, a generic one.

Simon, in his great work[16] placed *Arbanitis* in the Nemesieæ group, and in his comments, says:—"Les caracteres des mâles rappellent un peu ceux de ces derniers: les tibias antérieurs, sauf deux exceptions (*Rachias* et *Scalidognathus*), sont pourvus d'un ou de deux éperons apicaux, qui le plus souvent ne sont que des épines plus fortes que les autres et un peu courbes, mais qui dans certain cas (*Arbanitis* et *Genysa*) prennent la forme de véritables apophyses," while in his description of the genus, he says:—"♂ Tibia antica calcare apicali valido instructa"[17]. Later, in his supplement, the author last quoted removed this genus from the Nemesiæ, and made it the type of a new group for which he proposed the name *Arbanitea*[18]. Further, my friend, Mr. H. R. Hogg, made no reference to the tibial spur under discussion in his paper "On Australian and New Zealand Spiders of the Suborder Mygalomorphæ."[19] As Simon had drawn attention to it, and defined it as an obvious generic character, Hogg may not have deemed any additional remarks upon the point in question necessary. For the convenience of students I give herewith a diagram of of the tibia of leg i., showing the apophyses (fig. 26). That which I suspect to be the female of *A. longipes* is herewith described:—

Fig. 26.—*A. longipes*, L. Koch., Tibia of leg i. from beneath.

♀ Cephalothorax, 12.3 mm. long, 9.2 mm. broad; abdomen, 14 mm. long, 9.5 mm. broad.

Cephalothorax.—Longer than broad, dark brown, arched, moderately hairy; *pars cephalica* arched, slightly depressed at rear of ocular area, sides compressed; *ocular area* consists of a distinctly raised eminence, which is broader than long, arched,

[16] Simon.—Hist. Nat. des Araign., i., 1892, p. 111.

[17] Simon.—*Loc. cit.*, p. 115.

[18] Simon.—*Loc. cit.*, ii., 1903, p. 903.

[19] Hogg.—Proc. Zool. Soc., 1901, pp. 230 and 233.

and almost black; *clypeus* moderately deep, of a pearl-grey tint, fringed with black bristles, which latter are longest and strongest in front of eyes; *pars thoracica* arched, sloping to posterior angle, radial grooves distinct; *thoracic fovea* straight and deep; *marginal band* narrow, of a somewhat pearl-grey tint; sinuous in outline, and sparingly fringed with short, black hairs.

Eyes.—In two rows of four each; front row procurved, rear row recurved; those constituting the front row are the largest of the group and of equal size; each front lateral eye is removed from its inner neighbour by a space equal to about once its individual diameter, while the median pair are separated from each other by a space somewhat less than their individual diameter; of the rear row the laterals are elliptical, and their longitudinal diameter equal to that of one of the eyes of the anterior row; inner eyes of rear row small, widely separated from each other and each closely contiguous to its lateral neighbour.

Legs.—Long, strong, dark brown, hairy, but having on the upper surface of the femur, patella and tibia of each long, yellow, naked stripes; hairs on underside of all legs very long; femur of leg i. only slightly bowed; femur of leg ii. is also slightly bowed, but less so than that of leg i.; tibiæ of legs i. and ii. are each armed with seven long spines; tibia iii. with three, and tibia iv. with six; metatarsi i. and ii. each armed with ten long and powerful spines, and iii. and iv. with six each; tarsi i. has ten spines, and all the others six each; tarsal scopulæ divided; superior claws long, and furnished at base with three long teeth; fourth leg relatively thinner than its neighbours and more tapering. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter and Femur	Patella and Tibia.	Metatarsus and Tarsus.	Total.
1	5.5	9.6	10.8	7.7	33.6
2	4.3	9	9	6.8	29.1
3	3.4	7.5	8	6.8	25.7
4	4	12.2	10.7	8.7	35.6

Palpi.—Moderately long, strong, similar in colour and armature to legs; femur slightly bowed; tibia armed with seven long, stout spines, and the tarsus with twelve; claw long and furnished with one large tooth at base. Measurements in millimeters as follow:—Coxa, 5.5; trochanter and femur, 9.2; patella and tibia, 7.7; tarsus, 5.7; total, 28.1.

Falces.—Concolorous with legs, clothed with long, coarse hairs or bristles; there are, however, areas running from base to near the apex that are free from hirsute clothing and these are smooth and shining, broadest at the base, and acuminate at apex; outer angles fringed with reddish hairs; each falx has two of these, the uppermost one in each case being much the broadest; the outer margin of the furrow of each falx has a series of eight strong teeth, an inner row of six, while at apical extremity there are two additional teeth that constitute a second inner row; the inner margin of the furrow of each falx has two very large and very strong teeth (fig. 27).

Fig. 27.—*A. longipes*, L. Koch, ♀.—Scheme of dentition.

Maxillæ.—Dark brown, divirgent, arched, hairy, curving round the *labium* to a narrowish heel at lower extremity; inner angles fringed with long reddish hairs, and furnished near their base with a few toothlike spines.

Labium.—Concolorous generally, though slightly paler at apex, short, broad, nearly square, arched, slightly curved at apex, hairy, and having a few toothlike spines at apex.

Sternum.—Dark brown also, though slightly lighter in colour at posterior extremity, narrowest in front where it is excavated to receive base of labium; it is broadest at a point near the third pair of coxæ, arched, hairy; *sigilla* moderate and marginal.

Abdomen.—Apparently obovate and slightly overhanging base of cephalothorax (unfortunately this part of the body had been injured in collecting); above it is of dark brown colour and hairy; beneath it is dark brown also, and clothed with long hair; *pulmonary sacs* yellowish; the chitinous plate immediately above the *rima epigastris* has a pale yellowish patch at the middle of the lower angle.

Spinnerets.—Short, stout, yellowish, hairy; basal joint of superior mammillæ longer than those of the first and second combined; third joint much the shortest, and rounded at apex.

Hab.—Eidsvold and Upper Burnett River, Queensland.

Group EUOPLOÆ.

Among the material in our cabinets, received from time to time through the generosity of Dr. Thos. Bancroft, there is a large female trap-door spider with ova-sac and young, and apparently a hitherto undescribed form. The species in question evidently belongs to the sub-family Ctenizinæ, but at the same time differs from all Australian Ctenizid genera known to me chiefly by the form of the labium and disposition of the sternal sigilla. In the Australian genera of the sub-family Ctenizinæ, the lip is somewhat square, being short and broad, while in the specimen before me it is rather longer than broad, and coniform. Simon, in defining this sub-family, says of the labium: "pièce labiale libre ou moins séparée du sternum par une strie suturale et rarement un peu plus longue que large"[20]. In respect of the sternal sigilla—the form under review—appears to come nearest to that of the genus *Genysa*, Simon—group *Genyseæ*—but differs therefrom by its eyes. This will be seen at a glance if the reader will compare Simon's figures and description[21] with those given hereunder (figs. 28 and 31). Taking the facts herein briefly noted, in addition to others that will occur to the student as he peruses the description I give below, it appears to me that I have no other alternative than to erect not only a new genus for its reception, but also a new group name; I therefore propose *Euoplos* for the former, and *Euoploa* for the latter.

Genus Euoplos,[22] *gen. nov.*

Cephalothorax.—Longer than broad. *Pars cephalica* raised (somewhat as in *Missulena*, though not quite so high), sides deeply impressed at junction of cephalic and thoracic

[20] Simon.—Hist. Nat. des Araign., i., 1892, p. 85.

[21] Simon.—*Loc. cit.*, ii., 1903, p. 905, figs. B, C.

[22] εὔοπλος, well armed.

segments; *ocular area* broader than long, slightly elevated; *pars thoracica* arched, sloping posteriorily, radial grooves deep; *thoracic fovea* profound, recurved.

Falces.—Large, massive; margin of the furrow of each falx armed with strong teeth; in addition to these there is also an intermediate row. *Rastellum* present.

Eyes.—Arranged in two rows of four each; front row recurved; rear row, owing to smallness of inner eyes, has the appearance of being slightly recurved in its front line, and slightly procurved at the rear (fig. 28).

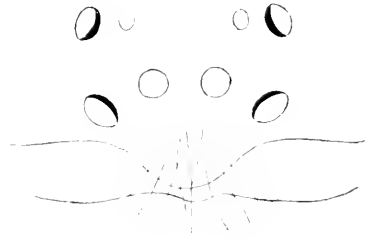


Fig. 28.—*E. spinnipes*, Rainb., Eyes.

Legs.—Not long, sturdy, tapering, strongly bespined; no true scopula; three tarsal claws present.

Palpi.—Long, strong, bespined.

Maxillæ.—Strong, divergent, arched, furnished with a few toothlike spines near the base.

Labium.—Free, coniform, arched, rather longer than its basal width; no toothlike spines present.

Sternum.—Narrowest in front, broadest at a point nearest to coxæ iii., anterior angle nearly straight, posterior extremity terminating in an obtuse point; *sigilla*, four; anterior pair small, marginal; posterior pair large, widely removed from margins.

Abdomen.—Obovate.

Spinnerets.—Short, sturdy; superior mammillæ three-jointed, and exceeding in length the second and third combined; second joint rather longer than third; the latter rounded.

Ecoplos spinnipes, *sp. nov.*

(Figs. 28-31.)

♀ Cephalothorax, 14.7 mm. long, 11.5 mm. broad; abdomen, 19.6 mm. long, 11.8 mm. broad.

Cephalothorax.—Longer than broad, smooth, glossy, rich mahogany brown. *Pars cephalica* elevated, sides declivous, compressed laterally with deep pits at junction of cephalic and thoracic segments, rear extremity sloping suddenly to thoracic fovea, a few short, fine hairs scattered over the surface; besides these latter there is a tuft of long black hairs immediately in front of the eyes; *ocular area* a black, slightly elevated and arched tubercle which is broader than long; *clypeus* moderately deep, of a somewhat whitish opalescent tint; *pars thoracica* arched, sloping to posterior angle, radial grooves deep and broad; *thoracic fovea* broad, very deep; *marginal band* broad, concolorous with clypeus, sparingly fringed with moderately long, fine hairs.

Eyes.—Eight, seated upon a black, moderately raised, arched, tubercular eminence, and distributed over two rows consisting of four each, and of which the anterior one is strongly recurved; of this row the lateral eyes are elliptical, and are separated from each other by a space equal to rather more than five times their individual longitudinal diameter, whilst the median pair are round, and are separated from each other by a space equal to once their individual diameter; each median eye is, again, separated from its lateral neighbour by a similar space; of those constituting the posterior row, the outer laterals are elliptical, and the inner eyes which are the smallest of the group, round; these latter are each close to its lateral neighbour, though it does not touch it, and are separated from each other by a space equal to rather more than three times the individual diameter of one of the front median eyes; viewed from the side the posterior row of eyes is distinctly recurved on its front line, and slightly procurved on its rear line (fig. 28).

Legs.—Short, strong, concolorous with cephalothorax, hairy; hairs rather long and black; there are, however, on the upper surface of their respective joints, elongated naked areas which impart to the limbs the appearance of being striped; apical extremities of joints of each leg wholly or partially ringed with white, each ring, with the exception of those of the coxæ and trochanters is much the broadest underneath; tibiæ i. and ii. armed with seven rather short but powerful spines; tibia iii. has two short, stout spines on the outer angle, and tibia iv. one; metatarsus i. armed with about thirty short stout spines, which are arranged mostly in pairs on the outer and inner angles (some of these have been broken off); metatarsus ii. has twelve spines, iii. has eight, and iv. ten, and there are indications of others having been broken off, so that the numbers given must be accepted as being relatively correct; tarsi i., ii. and iii. have each seventeen strong, short spines, and tarsus iv. about twelve; there are indications that some spines have been broken off each tarsus of leg iv., so that the number given must be accepted as being approximately correct; ungual tufts extend to tips of claws; superior claws long and furnished with a row of two or three long teeth at the base, which latter are obscured by the ungual tufts. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter and Femur.	Patella and Tibia.	Metatarsus and Tarsus.	Total.
1	6.4	11.8	10.9	6.6	35.7
2	5.7	10.7	9.6	6.6	32.6
3	4.3	5.2	4.7	8.0	22.2
4	5.5	12.5	12.5	9.6	43.1

Palpi.—Long, strong, similar in colour and clothing to legs; femur bowed; tibia armed with twelve long strong spines, and tarsus with twenty-four; claw long. Measurements in millimeters as follow:—Coxa, 6.8; trochanter and femur, 10; patella and tibia, 9.7; tarsus, 4.7; total, 31.

Falces.—Concolorous with legs, porrected, upper surface and outer angles clothed with coarse black hairs or bristles; these latter are much the longest on the upper surface or angle and apical extremity; on their inner side each falx has near the base and just beneath its upper angle a series of adpressed spinelike bristles, while the entire inner surface is moderately clothed with long fine hairs (fig. 29); outer and inner angles of the furrow of each falx armed with seven strong teeth; of these two rows those upon the inner angle are the largest and most extended, between these rows there is an intermediate one having fourteen teeth, and these are the smallest of the series (fig. 30); teeth of *rastellum* small and distributed over three rows; *fangs* long, powerful, nearly black.

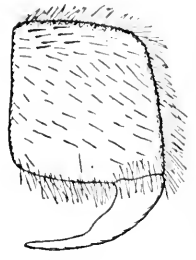


Fig. 29.—*E. spinnipes*, Rainb., Inner surface of falx.

Fig. 30.—*E. spinnipes*, Rainb., Scheme of dentition.

Maxillæ.—Reddish-brown, thickly clothed with long hairs, divergent, arched, furnished with a few tooth-like spines at base; basal extremity curving round side of labium, and terminating in a heel-like process (fig. 31).

Labium.—Concolorous, similarly clothed, in length rather exceeding width at base, coniform, not furnished with tooth-like spines, arched, and having a distinct though narrow, sinuous, transverse groove at base (fig. 31).

Sternum.—Concolorous also, somewhat shield-shaped, arched, hairy; *sigilla* four; of these the anterior pair are small and marginal, while the posterior pair are large, and removed from their respective margins (fig. 31).

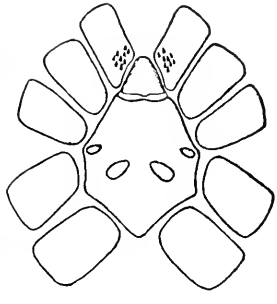


Fig. 31.—*E. spinnipes*, Rainb., Maxillæ, labium, sternum, and coxæ.

Abdomen.—Obovate, arched, overhanging base of cephalothorax; upper

surface and sides yellow-brown, clothed with fine pubescence, and short, stiff, spinelike bristles; under surface concolorous, pubescent; chitinous plate in front of *rima epigastris* hairy, somewhat lighter in colour and impressed with two large sigilla.

Spinnerets.—Short, sturdy, somewhat lighter in colour than abdomen; first joint of superior mammillæ longer than second or third joints combined; inferior mammillæ very short, and separated from each other at their base by a space equal to once their individual tranverse diameter.

Obs.—Since the above was written three additional ♀ specimens have been forwarded by Dr. Bancroft to the Museum, and an examination of these discloses the fact that the size of the marginal sigilla (the anterior pair) are variable, those received later showing these distinctive impressions somewhat larger than in the type specimen.

Hab.—Upper Burnett River and Eidsvold, Queensland.

Group CATAXEÆ.

Two specimens of a species for which I propose a new genus *Cataxia* were included in material presented to the Trustees by Dr. Thomas Bancroft, to which assiduous collector this institution is so largely indebted. The new genus does not appear to fall into any of Simon's groups, and for that reason I venture to suggest the one above, namely: Cataxeæ. *Cataxia* agrees with the sub-family Ctenizinæ by the compact grouping of the eyes, the presence of a *rastellum*, and the third tarsal claw, but it fails to fall into any of the known groups of the sub-family by, primarily, the complete absence of scopula, and for this reason I am placing it at the end of the Ctenizinæ.

Genus Cataxia,[23] *gen. nov.*

Cephalothorax.—Longer than broad, almost parallel-sided, arched. *Pars cephalica* moderately raised, sloping forward towards clypeus, and rearwards towards thoracic fovea; *ocular area* distinctly raised, broader than long, arched; *clypeus* deep. *Pars thoracica* arched, radial grooves distinct; *thoracic fovea* deep, short, straight.

[23] κατα ξιος—Of good worth.

Eyes.—In two rows of four each; front row procurved, rear row recurved.

Legs.—Short, moderately long, strong, tapering, hairy, spined; devoid of scopula; claws, 3; superior claws long. Relative lengths: 4, 1, 2, 3.

Palpi.—Long, strong, hairy, spined.

Falces.—Projecting well forward, provided with a *rastellum* and two rows of teeth.

Maxillæ.—Almost parallel-sided; clothed with bristles, and furnished with a few short, tooth-like spines at base.

Labium.—Short, broad, arched; as broad as long, and furnished with tooth-like spines near apex.

Sternum.—Arched; one pair of sigilla present; these are sub-marginal, and indistinct in the type.

Abdomen.—Obovate.

Spinnerets.—Four; short, cylindrical, superior mammillæ three-jointed; first joint longer than second; third joint shortest and domed; inferior mammillæ very short.

Cataxia maculata, *sp. nov.*

(Figs. 32-35.)

♂ Cephalothorax, 5.5 mm. long, 3.9 mm. broad; abdomen 6.8 mm. long 4.5 mm. broad (fig. 32).

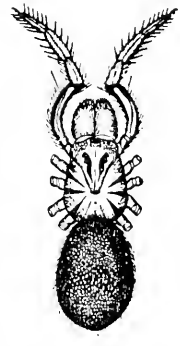


Fig. 32.—*C. maculata*, Rainb.

Cephalothorax.—Longer than broad, reddish-brown with dark-brown patches and dark-brown reticulated areas at sides and front of cephalic segment; surface smooth, with a few short, fine, yellowish adpressed hairs. *Pars cephalica* moderately elevated, arched, sloping gently forward towards clypeus, and more sharply rearward towards thoracic fovea; *ocular area* broader than long, elevated, arched longitudinally and laterally; a few erect, stiff, black bristles in front; the tubercle almost entirely black; *clypeus* steep,

wavy, vitreous. *Pars thoracica* arched, radial grooves distinct, broad, and suffused with dark-brown; *thoracea fovea* short, deep, broad, straight; *marginal band*, undulating, vitreous, with wavy black pencillings, sparingly fringed with rather long, fine black hairs (fig. 32).

Eyes.—Eight, arranged in two rows of four each; front row procurved, rear row recurved; median eyes of front row largest of the group, and separated from each other by a space equal to one half their individual diameter; front laterals separated from each other by a space equal to three times the diameter of one of their median neighbours; median eyes of rear row smallest of the group, and separated from their anterior median neighbours by a space equal to about once their individual and longitudinal diameter; lateral eyes of rear row somewhat smaller than anterior laterals, and almost touching their inner neighbours (fig. 33).

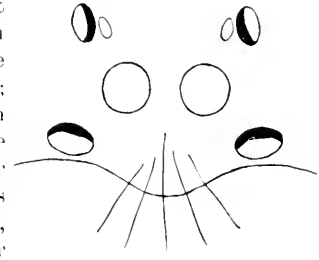


Fig. 33.—*C. maculata*, Rainb., Eyes.

Legs.—Not long, moderately strong, upper sides yellow-brown with longitudinal stripes of dark-brown, the latter thickly clothed with fine black hairs, and long stiff black bristles; underside of legs dark-brown, thickly clothed with long fine hairs and bristles; leg i. is the darkest on the underside, and leg iv. the lightest; tibia i. has eight long powerful spines, and tibiæ ii., iii., and iv. have a similar number of long, spine-like bristles; metatarsi i. and ii., are each armed with a series of ten long and powerful spines, metatarsus iii. has eight, and metatarsus iv. has also eight, but these although long, are not so strong as those on metatarsus iii., tarsus i. has eight long and powerful spines; tarsi ii., iii., and iv. have also eight each, but they are more bristle-like. Claws long; superior claws furnished with two teeth, one very short one, and one very long one (fig. 34) Measurements in millimeters as follow:—

Fig. 34.—*C. maculata*, Rainb., Superior tarsal claw

Leg.	Coxæ.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	2.2	4.4	4.2	3	13.8
2	1.8	4	3.7	3	12.8
3	1.8	3.7	3.3	3	11.8
4	1.8	5	5.2	4.5	16.5

Palpi.—Long, strong, similar in colour and clothing to leg i.; femur bowed, patella armed on underside with two long spines, tibia with eight, and tarsus with twelve; tarsal claw long, with one large tooth at base. Measurements in millimeters as follow:—Femur, 3.7; patella and tibia, 3.7; tarsus, 2.1; total, 9.5.

Falces.—Concolorous with cephalothorax, smooth at sides, upon which a few fine, short, scattered hairs are noticeable; upper angles and apices furnished with stiff, black bristles; the *rastellum* consists of one row of long, powerful spines; outer ridge of the furrow of each falx armed with eight small teeth, and the inner with six large teeth; there is no intermediate row (fig. 35); outer angles fringed with red hairs; *fang* long, and well curved.

Fig. 35.—*C. maculata*, Rainb., Scheme of dentition.

Maxillæ.—Yellowish, moderately long, almost parallel-sided, arched, base curving round the lip, and terminating in a heel-like projection; surface moderately clothed with black bristles, inner angle fringed with red hairs; a few (about seven or eight) tooth-like spines at base.

Labium.—Concolorous, free, strongly arched, short, broad (as broad as long), the base slightly wider than apex, near which latter there is a procurved row of three tooth-like spines; there are a few long black bristles spread over the surface and the apex, which is very slightly curved, and fringed with long, black bristles; between the latter and the row of teeth, the surface is smooth, and free from hairs and bristles.

Sternum.—Concolorous with labium, somewhat obovate, arched, anterior angle excavated to receive base of lip; surface clothed with long black bristles; two *sigilla* are present, but they are not distinct nor large; they are sub-marginal, and are seated near the base of the second and third coxæ.

Abdomen.—Obovate, slightly overhanging base of cephalothorax, strongly arched, moderately hairy, upper surface and sides chocolate-brown, numerously pitted with small, yellow spots; ventral surface lighter in colour, but displaying the same scheme of ornamentation; lower pair of tracheal sacs ringed with yellow.

Spinnerets.—Yellow, cylindrical, hairy, short; superior mammillæ one-fourth the length of cephalothorax; basal joint largest, third shortest and domed; inferior mammillæ minute, and separated from each other by a space equal to fully twice their individual transverse diameter.

Hab.—Upper Burnett River, Queensland.

Sub-family Barychelinæ.

Group BARYCHELEÆ.

Genus Encyocrypta, *Simon.*

Encyocryta ? fusca, *L. Koch.*

(Figs. 36-39).

In 1873 Herr L. Koch described and figured the female of this species under the name of *Idiommata fusca*,[24] but from that date until now, no male has been recorded. Recently Mr. F. P. Dodd, of Kuranda, North Queensland, presented to the Trustees of this Museum, a dried specimen of an adult male *Encyocrypta*, and which may, in all probability, be synonymous with that of Koch's species herein referred to. Only three species of the genus are known from the mainland of Australia. They are *E. fuliginata*, Thor., *E. fusca*, L. Koch, and *E. reticulata*, L. Koch. The species collected by Mr. Dodd, is decidedly not that of the latter, which in addition to differing therefrom in point of "ornamentation" and colouration, differs

[24] L. Koch—Die Arach. des Austr., i., 1873, p. 478, pl. xxxvii., figs. 1, 1*a*, 1*b*.

also in respect of space between the two median eyes. *E. fuliginata*, Thorell's species, and L. Koch's *E. fusca* agree in respect of space between the two median eyes, but they differ in respect of the process from the genital bulb, and also in colour and vestiture. In reference to the former, Thorell says:—"Cujus apex in spinam gracilem, longam, acuminatam et paullo curvatum producitor"; and again—"Totum fere animal fuligineo-nigrum est, pilis appressis tenuibus sericeis obscure olivaceis, aliisque longioribus nunnsque densis nigris et fuscis vestitum."[25] In the form described hereunder the process extending from the genital bulb does not take the form of a long delicate spine, but is short, flattened, rather broad, and obtusely pointed. As to colour and clothing, the form which I believe to be the male of *E. fusca* is, as its specific name would imply, of a fuscus colour; it is also devoid of anything in the way of silky pile, but on the contrary is densely clothed, especially on the legs, palpi and abdomen, with long black hairs and bristles. *E. reticulata*, L. Koch, has been recorded from Port Mackay, Rockhampton, and Sydney; *E. fuliginata*, Thor., from Cape York; and *E. fusca*, L. Koch, from Rockhampton. Another species pertaining to this genus is *E. ausserері*, L. Koch, from Pelew Island, a German possession away to the north of New Guinea.

For the convenience of students, I give the following particulars:—

♂ Cephalothorax, 9.6 mm. long; 8.7 mm. broad; abdomen, too shrivelled for reliable measurements.

Cephalothorax.—Suborbiculate, fuscus, thickly clothed with long black hairs, arched, broad. *Pars cephalica* slightly elevated, broad, arched, rounded in front, lateral grooves distinct; *clypeus* not deep. *Pars thoracica* broad, moderately arched, lateral grooves distinct; *thoracic fovea* deep, procurved; *marginal band* fringed with long, black hairs.

Eyes.—Raised; seated upon a tubercular protuberance which is longer than broad, and arranged in three series reading from the front or clypeal angle, of 2, 2, 4; the anterior and

[25] Thorell—Studi Rag. Mal. e Pap., iii., 1881, p. 245.

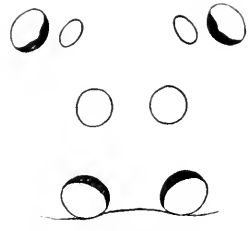


Fig. 36.—*E. ? fusca*, L. Koch. Eyes.

median eyes form a trapezium of which the length is greater than the breadth; anterior and lateral eyes each heavily margined on their inner angles with black; the anterior eyes are separated from each other by a space equal to rather more than once their individual diameter; the median eyes are separated from each other by a space equal to once their individual diameter, from their anterior neighbours by a space equal to about one-and-a-half diameters, and again from the inner eyes of the posterior row by a space equal to about one-and-a-quarter diameters; gnaged by its posterior angle the rear row is somewhat recurved, while by its anterior angle it is straight; front eyes close to margin of clypeus (fig. 36).

Legs.—Fuscous, heavily clothed with long black hairs, and armed on the underside with a few spines. Metatarsi and tarsi scopulated; tarsal scopulæ extending beyond the claws of which there are only two. Apex of tibia i. provided with a double apophysis, consisting of two spurs; outer spur large, two-toothed, and curving inwards; inner tooth somewhat the longer, and the outer by far the strongest; the opposite spur is much smaller and is also two-toothed, the teeth directed obliquely inwards; of these latter the inner-tooth is the smaller and is spine-like, intervening space between spurs depressed (fig. 37). Measurements in millimeters:—

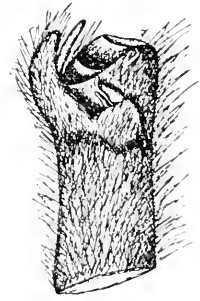


Fig. 37.—*E. ? fusca*, L. Koch. Tibia of leg i.

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	4.1	10.3	9.9	9.3	33.6
2	3.9	9.5	9.1	9.3	31.8
3	3.5	4.7	8.1	9.7	26
4	3.9	10.8	10.1	11.9	36.7

Palpi.—Similar in colour and clothing to legs; trochanter strongly bowed; radial joint short; digital joint very small, scopulated; *genital bulb* somewhat pear-shaped, red, shining, and terminating with a moderately long, flattened, obtusely pointed, and slightly twisted process (fig. 38).

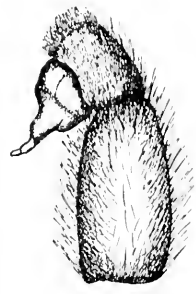


Fig. 38.—*E.* ♂ *fusca*, L. Koch, Left palp.

Falces. — Short, moderately strong, arched, densely hairy, slightly projecting forward for a short distance, then sharply curving downwards. *Rastellum* consists merely of spinous bristles. On the outer ridge of each falx there are no teeth, but the inner is armed with ten strong, and moderately large ones; in addition to these there is a number of minute granular teeth at the base forming an intermediate double row (fig. 39). Inner angles fringed with long red hairs.

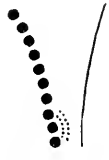


Fig. 39.—*E.* ♂ *fusca*, L. Koch, Scheme of dentition.

Maxillæ.—Brown, arched, inner angles fringed with long, red hairs, surface clothed with long black hairs.

Labium.—Concolorous; longer than broad, strongly arched; slightly rounded at apex, clothed with black hairs.

Sternum.—Concolorous also; evidently oval; but as it has been badly damaged it is not possible to give further details.

Abdomen.—Dark-brown, apparently ovate, strongly arched, and overhanging base of cephalothorax; upper surface and sides densely clothed with long, black hairs; ventral surface thickly clothed with short, black hairs.

Spinnerets.—Four; inferior spinners minute, and placed closely together; superior pair cylindrical; second joint apparently as long as first, and the third short and hemispherical.

Hab.—Cairns, North Queensland.

Genus Idioctis, *L. Koch.*

Only one species of this genus has up to the present, been recorded from Australia, and that, *I. palmarum*, Hogg, came from Palm Creek, Central Australia, where it was collected by members of the Horn Exploring Expidition. The species described and figured hereunder, was collected by Dr. Bancroft, on the Upper Burnett River, Queensland. In the material collected by that gentleman, so far as this species is concerned, males predominated; there were two damaged females, but fortunately these latter were sufficiently intact to enable determination.

IDIOCTIS ORNATA, *sp. nov.*

(Figs. 40-44).

♂ Cephalothorax, 4.6 mm. long; 3.7 mm. wide; abdomen, 6 mm. long, 2.9 mm. wide.

Cephalothorax.—Obovate, dark-brown, nearly black, clothed with long, yellow hair. *Pars cephalica* raised, sides sloping, thoracic groove distinct; *ocular area* slightly raised, rather wider than long; *clypeus* deep. *Pars thoracica* arched, radial grooves distinct; *thoracic fovea* deep, straight; *marginal band* narrow, hairy.

Eyes.—Arranged in two rows of four each; front row strongly recurved; anterior lateral eyes touching margin of clypeus, and separated from each other by a space equal to twice their individual diameter; anterior median eyes are separated from each other by a space equal to rather more than one-half their individual diameter; rear row decidedly procurved on the posterior line; inner rear eyes small, each just touching the outer black ring of its lateral neighbour, and each separated from the other by a space equal to twice the diameter of one of the anterior median eyes (fig. 40).

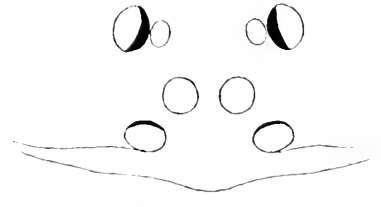


Fig. 40. *I. ornata*, Rainb., Eyes.

Legs. — Moderately long, thin, tapering, clothed with long black hairs and long black, slender spines; femoral joints concolorous with cephalothorax; all other joints yellow; tibia i. furnished on inner angle at apical extremity with a double spur or apophyses (fig. 41); two tarsal claws only. Measurements in millimeters as follow :—

Fig. 41.—*I. ornata*, Rainb., Tibia leg i.

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	1.8	5.3	5.3	5.5	17.9
2	1.5	4.5	4.5	5.5	16.0
3	1.3	4	3.8	5.5	14.6
4	1.6	5.5	6.8	7.4	21.3

Palpi.—Moderately long, similar in colour and armature to legs; femoral joint bowed; radial joint large, inflated, hollowed out, and furnished on underside with a large lateral spur; overhanging edge or lip of pit armed with numerous black tooth-like spines, each of which curves downwards; digital joint overhanging radial like a cap; *genital bulb* rounded, broader than deep, somewhat flattened above and below, smooth and shining, and terminating with a long, tapering slightly twisted style (fig. 42).

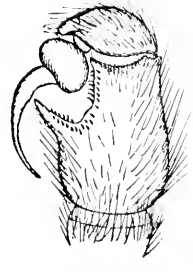


Fig. 42.—*I. ornata*, Rainb., Palpus.

Falces.—Long, porrected, dark-brown, rather narrow, clothed with coarse hairs or bristles; inner angle of falx sheath armed with six rather long teeth, and the outer angle with eight small ones; in addition to those here enumerated there are near the base between these two rows a couple of teeth, rather widely separated, and intermediate in size (fig. 43); inner angles fringed with red hairs; fangs wine-red.

Fig. 43.—*I. ornata*, Rainb., Scheme of dentition.

Maxillæ.—Yellowish, divergent, moderately long, not strong; surface moderately clothed with black, bristly hairs; inner angles fringed with red hairs.

Labium.—Concolorous and similar in clothing to maxillæ; broader than long, arched, widest at base, apex rounded.

Sternum.—Also concolorous, and similarly clothed; arched, narrowest in front, broadest in the vicinity of coxæ iv.; posterior extremity terminating in an obtuse point; sigilla two; each is small, round, marginal, and seated opposite coxæ iv. respectively.

Abdomen.—Oval, arched, slightly overhanging base of cephalothorax, upper surface yellow, ornamented with broad, curved, dark-brown bars, and spots; the lower transverse bars interrupted; surface hairy; ventral surface pale yellow, moderately clothed with rather long, dark hairs (fig. 44).

Fig. 44. *L. ornata*, Rain., Abdomen.

Spinnerets.—Normal.

♀—Except that it is rather larger the ♀ does not differ in general appearance from the ♂, the colour, clothing and ornamentation being exactly the same. The legs are long and tapering, and clothed and armed similar to those of the opposite sex; the palpi are long, and similar in clothing and armature to the legs; femur bowed, and the tarsi terminating with a single claw.

Hab.—Upper Burnett River, Queensland.

Sub-family DIPLURINÆ.

Group BRACHYTHELEÆ.

Genus Aname *L. Koch.*

ANAME ? PALLIDA, *L. Koch.*

Under the above name there is one specimen, a male, in the Museum cabinets, from New South Wales.

It is of course, impossible in the absence of the type, to determine this species with any approach to accuracy. Koch's specimen came from Bowen, Queensland and was apparently, a

newly moulted example, hence, as Hogg points out, the description is somewhat misleading. The specimen before me, bears out Hogg's remarks, relative to the abdominal marking and lateral stripes.

ANAME BICOLOR, *sp. nov.*

(Figs. 45-47).

♀ Cephalothorax, 4.3 mm. long, 3.8 mm. broad; abdomen, 4.3 mm. long, 3.8 mm. broad (fig. 45).

Fig. 45.—*A. bicolor* Rainb.

Cephalothorax.—Obovate, truncate in front, golden-straw-yellow, smooth, with a few fine hairs and black bristles spread over surface. *Pars cephalica* elevated, truncated in front, sides declivous, sloping sharply to thoracic fovea; commencing at rear of eyes, and running from thence to base of cephalic segment there is a darker yellow marking; it is as wide as ocular tubercle in front, but becomes gradually narrower towards the middle, from which point it sharply tapers off; extending laterally from the centre there is on each side a concolorous, narrow, procurved branch; the sides are also suffused with darker yellow; *ocular area* broader than long, elevated, distinctly arched, black; *clypeus* golden-straw-yellow, fringed at middle with black bristles. *Pars thoracica*, broad, arched, radial grooves distinct; *thoracic fovea* very slightly procurved; *marginal band* narrow, concolorous with cephalothorax.

Eyes.—In two rows of four each; front row procurved, rear row recurved; lateral eyes of front row largest of the group, elliptical, seated obliquely, and nearly touching their posterior lateral neighbours; median eyes round, separated from each other by a space equal to once their individual diameter; rear side eyes elliptical, and seated obliquely; rear median eyes smallest of the group; each one is placed close to and nearly touches its lateral neighbour (fig. 46).

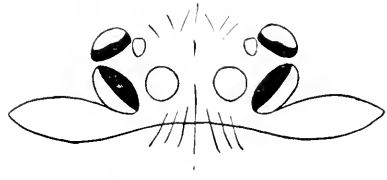


Fig. 46.—*A. bicolor*, Rainb., Eyes.

Legs.—Concolorous with cephalothorax, moderately long and strong, hairy, and armed with a few black spines; superior claws have two basal combs, each consisting of several pectinations. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	2.4	3.4	3.8	3.2	12.8
2	2	3.2	3.5	3.2	11.9
3	1.5	2 4	3.1	2.8	9.8
4	2	3.4	4.2	3.4	13

Palpi.—Short, strong, concolorous with legs, hairy, spined; femur bowed; tarsal claw has a comb with five pectinations. Measurements in millimeters as follow:—Trochanter and femur, 3.1; patella and tibia, 2.3; tarsus, 1.6; total, 7.

Falces.—Concolorous with cephalothorax, porrected; on outer sides there are a few fine, scattered, down-like hairs, and on upper surface and apices a number of stiff bristles; these latter are thickest on apices; no true *rastellum* is present, but some of the apical bristles have been strengthened to perform the functions of one; outer angle fringed with yellow hairs; outer ridge of the furrow of each falx armed with a row of seven moderately strong teeth, and the inner ridge with six; in addition to these there is an irregular and intermediate row of six small teeth (fig. 47).

Fig. 47.—*A. bicolor*, Rainb., Scheme of dentition.

Maxillæ.—Pale-yellow, divirgent, arched, moderately hairy, posterior angle curving round lip, and terminating in an obtuse point or heel; for about one-half its surface each maxilla is studded with dark-brown tooth-like spines, and these are most numerous above the heel; inner angle fringed with long, fine yellowish hairs.

Labium.—Somewhat longer than broad, concolorous, arched, apex rounded; a few scattered hairs are distributed over the surface, and there is also a fringe of same at apex; from the summit to rather beyond midway the surface is thickly studded with dark-brown tooth-like spines.

Sternum.—Concolorous, broadly oval, arched, anterior angle excavated to receive base of lip; margins fringed with black bristles, a few of which are also scattered over the surface; sigilla, six; anterior pairs small, indistinct, marginal; posterior pair sub-marginal, moderately large, round, of a darker colour and distinct.

Abdomen.—Obovate, slightly overhanging base of cephalothorax; upper surface and sides chocolate-brown, faintly dotted with paler coloured spots, moderately pilose; near the front on the upper surface there are two somewhat indistinct rounded depressions; running down the centre from just above the middle there is a faint median streak from which four or five pairs of concolorous and equally fine lateral streaks or pencilling extend (these latter are more distinct in the co-type than the type); ventral surface somewhat smoky-yellow, and clothed with rather long black hairs.

Spinnerets.—Short, yellow, hairy; superior mammillæ tapering; first joint longest and stoutest, second shortest; inferior mammillæ separated from each other by a space equal to about once their individual transverse diameter, cylindrical, and as long, or nearly as long, as the basal joint of superior mammillæ.

Obs.—A very distinct form, easily identifiable by its colour and the spines upon maxillæ and labium. This species was included in a quantity of material collected by Mr. S. J. U. Moreau, by whom it was presented to the Trustees of the Museum.

Hab.—Antonio, near Rydal, New South Wales.

Genus Ixamatus, *Simon.*

Under the name of *Ixalus varius*, L. Koch described a male from Bowen, Queensland.[26] The species referred to is unknown to me; it was also unknown (and I believe is so still) to both Simon and Hogg.

[26] Koch, L.—Die Arach. des Austr., i., 1873, p. 469, pl. xxxvi., figs. 2, 2*a*-2*c*.

Koch's generic name, *Lealus*, was sunk as a synonym by Simon, it having been previously applied for a mammal, and the name *Leamatus* substituted instead, with *carius* as the type species. Later, Simon again sunk *Leamatus* as a synonym, and associated *carius* with *Hapalothele*, H. Lenze, but Hogg in his paper "On Australian and New Zealand Spiders of the Sub-order Mygalomorphæ,"[27] re-habilitated Simon's genus, and in this the distinguished author of "Histoire Naturelle des Araignées" acquiesced.

Unfortunately all trace of the specimen upon which Koch founded genus and species appears to be lost, otherwise, I feel sure, my friend Mr. Hogg would have examined it when engaged upon the task of preparing his paper just quoted. Unhappily, too, Koch does not appear to have had any female specimens, and until such, together with males, shall have been procured from the type locality, the matter will have to rest.

Among the material presented by Dr. Thos. Bancroft, to the Trustees, are three female specimens of a species of *Leamatus* which I am inclined to regard as an undescribed form, and for reasons which will appeal to students who will take the trouble to compare the following description with those already published. *Leamatus* is an Australian genus, and up to the present time three species have been described, and in each instance the male only is known. These species are *L. carius*, L. Koch, from Bowen, Queensland; *L. gregorii*, Hogg, from Macedon, Victoria; and *L. broomii*, Hogg, from Hillgrove, New South Wales.

In studying the species described hereunder, I was somewhat puzzled with the appearance of the *thoracic fovea*. Simon makes no reference to it in his "Histoire Naturelle des Araignées," but Hogg, in his definition of the genus, says:—"The thoracic fovea is straight"[28]; on the succeeding page in pointing out wherein his *L. gregorii* and *L. broomii* differ from each other, the author observes that "the thoracic fovea is straighter" in the former species than in the latter; again in his description of *L. broomii*[29] Mr. Hogg says:—"The fovea is

[27] Hogg.—Proc. Zool. Soc., 1901, p. 257.

[28] Hogg.—*Loc. cit.*, p. 257.

[29] Hogg.—*Loc. cit.*, p. 260.

rather long and deep, and clearly recurved." There can be little doubt but that the reference to the *thoracic fovea* in the definition of the genus is an accidental slip; and it appears also clear to me, that the direction of the fovea in *Ixamatus* has no generic significance, because it is, according to Koch, straight in *I. varius*; "clearly recurved," to again quote Hogg, in *I. broomii*; and apparently somewhat less so in *I. gregorii*; while in the species described hereunder, it is short, deep, and procurved.

Ixamatus distinctus, *sp. nov.*

(Figs. 48, 49.)

Cephalothorax, 10 mm. long, 7.6 mm. broad; abdomen, 11 mm. long, 7.6 mm. broad.

Cephalothorax.—Long, narrow, dark-brown, clothed with moderately long, fine, yellowish hairs; *pars cephalica* raised, strongly arched, sloping backwards to thoracic fovea, sides declivous, lateral grooves distinct; *ocular area* a distinctly arched, tuberculur eminence, black, broader than long, and fringed in front with stout, black bristles; *clypeus* moderately deep, slightly wrinkled, and of a somewhat pearl-greyish tint. *Pars thoracica* moderately arched, radial grooves distinct, posterior angle indented; *thoracic fovea* short, deep, procurved; *marginal band* somewhat sinuous, concolorous with clypens, moderately deep, and fringed with coarse black hairs or bristles.

Eyes.—Front row of eyes procurved; rear row recurved; outer eyes of front row elliptical, largest of the group; front median eyes round and separated from each other by a space equal to rather more than one-half their individual diameter; rear eyes elliptical; inner rear eyes smallest of the group; the group compact, wider than long (fig. 48).

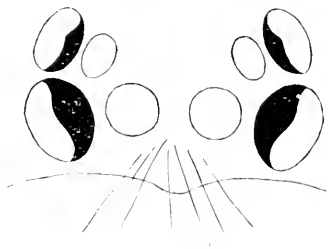


Fig. 48.—*I. distinctus*, Rainb., Eyes.

Legs.—Not long, tapering, thickly clothed with long, black hairs, which give the ambulatory limbs a very dark appearance; upon each limb there are narrow, elongate, naked patches; metatarsi and tarsi of legs i. and ii. scopulated[30]; tarsi only of legs iii. and iv. scopulated; tibiæ and metatarsi of all legs bespined; claws with six or seven pectinations. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	5.3	7.9	9.2	7.1	29.5
2	5	7.5	8	6.7	27.2
3	3.6	6.7	6.2	6	22.5
4	4	9	9.2	9	31.2

Palpi.—Similar in colour, armature, and clothing to legs; tarsi scopulated. Measurements in millimeters as follow:—Trochanter and femur, 6.4; patella and tibia, 6.5; tarsus, 4.3; total, 17.2.

Falces.—Long, somewhat narrow, projecting well forward, fully two-thirds the length of cephalothorax, dark-brown, almost black; upper angles and apical extremities densely clothed with long black hairs or bristles; sides at base smooth, but having a few short, scattered hairs; outer angle of the furrow of each falx not denticulated; inner angle provided with a row of nine large and strong teeth and an intermediate row of five small ones at base (fig. 49); outer angle fringed with red hairs; fangs long, dark-brown.

Fig. 49.—*I. distinctus*, Rainb., Scheme of dentition.

Maxillæ. — Yellow, divergent, arched, clothed with long hairs, bases thickly studded with short, dark-brown toothlike spines, which latter impart a decidedly granular appearance; bases curving round labium, and heeled at lower extremity; outer angle fringed with long reddish hairs.

[30] In connection with this feature the definition of the genus will require amendment, because in the description it is clearly stated that "the metatarsi are not scopulated on any of the legs." Hogg, however, remarks in his description of *I. gregorii*, "the front two metatarsi partly scopulated." *Cf.* Hogg, Proc. Zool. Soc., 1901, pp. 257 and 258.

Labium.—Concolorous, arched, broader than long, devoid of spines, sides nearly straight, apex hollowed, furnished with a few short bristles, submerged beneath maxillæ.

Sternum.—Yellowish, though not so bright as maxillæ and labium, arched, hairy, truncated in front, obtusely acuminate posteriorly; *sigilla* moderately large and marginal.

Abdomen.—Somewhat obovate, slightly overhanging base of cephalothorax, upper surface and sides hairy; ventral surface lighter in colour, but hairy; plates of pulmonary sacs of a rather bright yellow; the chitinous plate immediately in front of the *rima epigastris* concolorous, impressed with two large *sigilla*, the lower angle fringed with long, black hairs; there is also a cluster of long, black hairs near the anterior angle, which latter is sinuous and very pale.

Spinnerets.—Superior mammillæ equally as long as *pars cephalica*, yellow, clothed with short hairs, three-jointed, tapering; third joint the longest, and second shortest; inferior mammillæ short, and about two diameters apart.

Hab.—Eidsvold, Queensland.

Genus Chenistonia, *Hogg*.

In 1901 Mr. H. R. Hogg, established a new genus to which he gave the name *Chenistonia* for the reception of two species collected by him at Macedon and Upper Macedon, Victoria, respectively, and to these—*C. maculata* and *C. major*—he added in the following year one other, a South Australian form to which he gave the name, *C. tepperi*. In the material before me, I have two species of this genus: One from North Sydney, which is herewith described under the name of *C. hoggi*, in honour of my friend referred to above, and one from North Queensland, which latter is also herein described.

In order to assist students I have drawn up the following short table in elucidation of the five species contained in the genus:—

A—Median eyes of front row once their individual diameter apart; labium slightly broader than long, hollowed in front; no spines; abdomen above, black ground with transverse rows of medium sized yellow spots . . . . . *C. maculata*, Hogg.

B—Median eyes of front row barely their individual diameter apart; labium slightly broader than long, hollowed in front; no spines; abdomen yellow above and below..... *C. tepperi*, Hogg.

C—Median eyes of front row three-quarters their individual diameter apart; labium rather round, with three or four spines in one row in front; abdomen with a black median dorsal stripe, and about five pairs of motley diagonal lateral stripes on a buff ground . . . . *C. major*, Hogg.

D—Median eyes of front row rather more than one-half their individual diameter apart; labium rather broader than long, slightly hollowed at apex, and with four spines in a procurved row in front; abdomen yellow, irregularly mottled, both above and laterally, with black . . *C. hoggi*, Mihi.

E—Median eyes in front row not more than one-half their individual diameter apart; labium slightly broader than long, hollowed in front, ♂ devoid of spines, ♀ densely studded towards apex with short toothlike spines; abdomen, dark-brown in ♂, yellow-brown in ♀, densely clothed with long hairs . . . . . *C. giraulti*, Mihi.

CHENISTONIA HOGGI, *sp. nov.*

(Figs. 50, 51.)

♀ Cephalothorax, 9.5 mm. long, 7.2 mm. broad; abdomen, 14.1 mm. long, 10 mm. broad.

Cephalothorax.—Yellow-brown, smooth, shining, moderately clothed with short, adpressed yellow hairs. *Pars cephalica* arched, sloping backwards towards thoracic fovea, sides declivous, lateral thoracic grooves distinct; *ocular area* broader than long, black, elevated, arched, fringed with bristles in front; *clypeus*, yellowish, somewhat wavy in outline, sloping slightly forward. *Pars thoracica* arched, radial grooves not

very distinct, posterior angle indented; *thoracic fovea* deep, straight; *marginal band* narrow, yellowish, fringed with short, yellowish hairs.

Eyes.—In two rows; viewed from the side the front row is slightly recurved in front, and procurved in the rear line; rear row recurved, arranged in pairs each pair widely separated; anterior median eyes separated from each other by a space equal to rather more than once their individual diameter, and each nearly touching its lateral neighbour; posterior median eyes smallest, and separated from each other by a space equal to rather more than twice the diameter of one of the anterior median eyes; lateral eyes of both rows elliptical and seated obliquely; lateral eyes of second row all but touch their smaller median neighbours (fig. 50).

Fig. 50.—*C. hoggi*, Rainb., Eyes.

Legs.—Slender, tapering, concolorous with cephalothorax, hairy; femur bowed; patellæ with long naked stripes on upper surface; each tibia has eight spines underneath; metatarsi i. and ii. have six spines underneath, and metatarsi iii. and iv. have seven each; metatarsi and tarsi i. and ii. are fully scopulated, while legs iii. and iv. have their tarsi only fully scopulated; superior claws furnished with two rows of seven or eight teeth; inferior claw very small and hidden by scopula. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	4.4	9	9.5	8.8	31.7
2	3.9	9	7.7	8.4	29
3	3.2	7.3	7.2	8.4	26.1
4	3.7	9.6	9.6	10.2	33.1

Palpi.—Short, not strong, concolorous with legs, hairy; femur bowed; patella with two naked stripes on upper surface; tibia furnished with twelve long, strong spines; tarsus scopulated. Measurements in millimeters as follow:—Trochanter and femur, 7; patella and tibia, 6.3; tarsus, 3.5; total, 16.5.

Falces.—Stout, dark-brown; porrected; sides hairy; upper surface and apices clothed with bristles; a broad, naked area occurs between the bristly upper angle and the side; inner angle of furrow of each falx armed with nine teeth; outer angle free (fig. 51), and fringed with long red hairs; fang long, shining, dark-brown (almost black) to near the tip; latter portion reddish-brown.

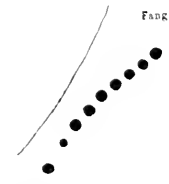


Fig. 51. *C. bessei*, Rainb., Scheme of dentition.

Maxillæ.—Yellowish-brown, divergent, slightly arched, inner angle fringed with long red hairs; surface moderately hairy; the base, which curves round the side of the labium, has a number of short tooth-like spines.

Labium.—Concolorous; short, broader than long, arched, surface sparingly hairy, apex slightly hollowed; near the latter there is a procurved row of four toothlike spines; one of the latter is wanting in the type, having apparently been broken off.

Sternum.—Concolorous also; moderately arched, narrowest in front, and broadest in the vicinity of the fourth pair of coxæ; immediately below the labium there is a strongly defined transverse wavy groove; distributed over the surface there are a number of black bristles; *sigilla* marginal.

Abdomen.—Obovate, slightly overhanging base of cephalothorax, clothed with soft, downy yellow hairs, and having a few black bristles in front; upper surface and sides yellow, irregularly mottled with black markings and spots; underneath, yellowish-brown, pubescent; pulmonary sacs yellowish, pubescent; the chitinous plate in front of the *rima epigastris* concolorous, arched, pubescent, with a few scattered black bristles; two sigilla are present.

Spinnerets.—Yellow, pubescent; superior mammillæ tapering, rather more than one-third the length of cephalothorax, first joint longest, the second shortest; inferior mammillæ very short and close together.

Hab.—North Sydney.

CHENISTONIA GIRAULTI, *sp. nov.*

(Figs. 52-57.)

One adult male and three adult females of what appear to be examples of the genus *Chenistonia*, have recently come to hand, and all, according to notes by Mr. A. A. Girault, who collected them, were obtained in forest country, in the Nelson district, North Queensland, from under logs. In addition to these there is also a half-grown female from forest country in the same district. The latter was included in a small collection of ground-running and arboreal forms. Doubtless it was too young to have a permanent home, and was in the wandering stage.

In the adult specimens before me, there is a striking difference between the sexes in general appearance. In the male the cephalothorax is black with hoary hairs, while the legs and abdomen are, more or less of a very dark-brown (almost black). Again, in the male, the cephalic segment is decidedly raised, while in the female, the cephalic and thoracic segments are almost on the same plane. In both sexes there is an ocular tubercle, but that of the male is much the higher. In his definition of the genus *Chenistonia* Mr. Hogg says:—"The front row of eyes is slightly procurved, the side eyes being larger than the middle." This is absolutely correct in respect of the female example of the species for which I propose the name *Chenistonia girault*i, but in the male on the other hand, the front side eyes are no larger than the front median. In this respect it will apparently be necessary to amend Hogg's definition of the genus, so as to read:—"Side eyes as large as or larger than, the front middle." The generic position of the male is easily determined by the presence of the powerful single spur, springing from the middle of tibia i.

This species I have named in honour of the collector, Mr. A. A. Girault. The description is as follows:—

♂ Cephalothorax, 9.4 mm. long, 7.3 mm. broad; abdomen, 8.2 mm. long, 5.1 mm. broad.

Cephalothorax.—Ovate, black, shining, rather thickly clothed with hoary pubescence. *Pars cephalica* truncated in front, moderately elevated, arched, slightly depressed at rear of

ocular tubercle, sloping laterally and again posteriorly towards thoracic fovea; *clypeus* broad, somewhat precipitous, vitreous; *ocular area* forms a well defined and very distinct tubercular eminence, which is again strongly arched both longitudinally and laterally; it is decidedly broader than long, and has a tuft of erect bristles in front. *Pars thoracica* broad, arched, radial grooves distinct, posterior angle indented; *thoracic fovea* deep, straight, or but very slightly procurved; *marginal band* somewhat concolorous with clypeus, and fringed with erect, black bristles.

Fig. 52.—*C. grandis*, Rainb., Eyes.

Eyes.—In two rows of four each; front row procurved, rear row recurved; lateral eyes of both rows nearly touching, and about equal in size to anterior medians; eyes of anterior row only slightly removed from each other; posterior median eyes smallest of the group, and almost touching their lateral neighbours (fig. 52).

Legs. — Rather long, moderately strong, tapering dark reddish-brown, almost black, hairy; leg. i. strongest; tibia i. armed on underside with a long, powerful spur springing from an enlargement at the centre; metatarsus i. excavated on underside for rather less than one-half its length, where it suddenly enlarges, and from whence it tapers towards apex; with the exception of the powerful spine herein described, the limb is not otherwise armed (fig. 53); tibiæ ii., iii., and iv., have each six spines; metatarsi and tarsi i. and ii., scopulated; metatarsi iii. and iv. heavily and powerfully spined, but having no true scopula; tarsi iii. and iv. scopulated; claws 3; superior claws armed with a comb of seven or eight rather long teeth. Measurements in millimeters as follow:—

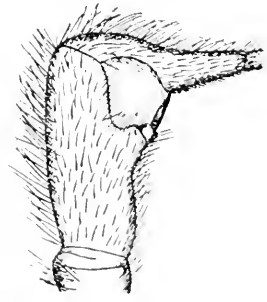


Fig. 53.—*C. grandis*, Rainb., ♂ Tibia and metatarsus of leg i.

Leg.	Coxa.	Trochanter and Femur.	Patella and Tibia.	Metatarsus and Tarsus.	Total.
1	5	9.2	9.8	9.1	33.1
2	4.2	8.0	9.2	8.2	29.6
3	3.7	7	6.4	8.2	25.3
4	4	10	9.5	11.2	34.7

Palpi.—Moderately long, similar in colour and clothing to legs; radial joint short, scopulated; genital bulb rounded and furnished with a long curved style (fig. 54). Measurements in millimeters as follow:—Trochanter and femur, 7.2; patella and tibia, 6.9; radial joint, 2; total, 16.

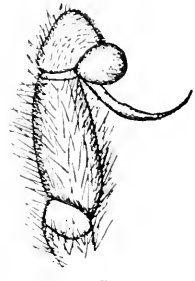


Fig. 54.—*C. graulti*, Rainb., ♂ Palpus.

Falces.—Black, rather long, not very broad, porrected, arched; surfaces on the inner and outer side of each falx have a few short, fine hairs; upper angles and apices clothed with long hairs or bristles; inner ridge of the furrow of each falx armed with nine strong teeth; the outer ridge is unarmed, but there is an intermediate row of five small teeth at the base (fig. 55); outer angle fringed with long, red hairs; fang black, long, well curved.

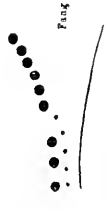


Fig. 55.—*C. graulti*, Rainb., ♂ Scheme of dentition.

Labium.—Short, slightly broader than long, dark-brown at base, reddish-brown towards the middle; arched; apex hollowed and fringed with bristles; a few of the latter is also spread over the surface.

Sternum.—Elliptical, dark-brown, arched, moderately clothed with long, fine hairs; *sigilla* very indistinct, rounded, and marginal.

Abdomen.—Obovate, arched, slightly overhanging base of cephalothorax; upper surface and sides dark-brown, and densely clothed with long hairs; ventral surface yellowish-brown, hairy; pulmonary sacs yellowish.

Spinnerets.—Yellow, hairy; superior mammillæ tapering, half as long as cephalothorax, first joint longest and stoutest, the second shortest; inferior mammillæ cylindrical, half as long as joint i. of superior spinners.

♀ Cephalothorax, 9 mm. long, 7.5 mm. broad; abdomen 12.2 mm. long, 7 mm. broad.

Cephalothorax.—Obovate, moderately arched, yellow-brown, clothed with short hairs. *Pars cephalica* very slightly higher than the thoracic segment; *ocular area* a slight tubercular eminence, broader than long, arched transversely and longitudinally, dark-brown; *clypeus* narrow, somewhat vitreous, fringed with rather long hairs. *Pars thoracica* rather broad, posterior angle indented, radial grooves not deep, but distinct; *thoracic fovea* moderately deep, straight; *marginal band* narrow, slightly reflexed, fringed with short hairs.

Eyes.—In two rows of four each; front row procurved; anterior laterals largest; anterior median eyes separated from each other by a space equal to one-half their individual diameter; posterior row recurved, the median eyes of which are the smallest and nearly touch their lateral neighbours (fig. 56).

Fig. 56.—*C. eyaulti*, Rainb., ♀ Eyes.

Legs.—Long, moderately strong, first pair strongest, yellow-brown, thickly clothed with long hairs, and armed with long, fine, bristle-like spines; metatarsi and tarsi scopulated; superior claws similar to those of the ♂, and obscured by the thick tarsal scopulæ. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	4.3	10	11	9	34.3
2	3.5	8.3	8.7	7.3	25.5
3	2.7	7.2	7	8.2	25.1
4	3.5	9.5	10.1	11.2	34.3

Palpi.—Concolorous with legs, similarly clothed, not spined; femur bowed; tarsi scopulated. Measurements in millimeters as follow:—Trochanter and femur, 5.8; patella and tibia, 5.2; tarsus, 3.2; total, 14.2.

Falces.—Concolorous also, porrected, densely hairy; inner ridge of the furrow of each falx armed with ten strong teeth, with an intermediate row of six small ones; outer ridge devoid of teeth (fig. 57); outer angles fringed with red hairs; fang long, black, well curved.

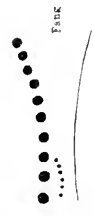


Fig. 57. *C. giraulti*, Rainb., Scheme of dentition.

Maxillæ.—Concolorous with falces, arched, sparingly hairy; a rather extensive and thick cluster of short toothlike spines at base; base curving round labium and terminating in an obtuse projection or heel; inner extremity of apical angle terminating in an obtuse point; inner angle fringed with red hairs.

Labium.—Short, broader than long, concolorous with maxillæ, apex slightly hollowed; upper part thickly studded with short toothlike spines; apex fringed with black hairs.

Sternum.—Short, broad, concolorous with labium, apical angle slightly hollowed to receive base of lip, surface flat or but very slightly arched, hairy; *sigilla* round, marginal, very indistinct.

Abdomen.—Obovate, yellow-brown, slightly overhanging base of cephalothorax, densely clothed with long hairs.

Spinnerets.—Concolorous; superior mammillæ long, tapering, hairy, rather more than half the length of cephalothorax, first and second joints of about equal length, the third longest; inferior mammillæ short, cylindrical, nearly as long as joint i. of superior mammillæ.

Hab.—Nelson, near Cairns, North Queensland.

Genus, Euctimena,[31] *gen. nov.*

(Fig. 58.)

The genus described hereunder, and for which I propose the name *Euctimena* differs primarily from Hogg's genera, *Chenistonia* and *Dekana*, by the powerful tibial spur being seated on tibia ii. instead of tibia i., and secondly by the fact of the spur being armed with several short, strong, spines instead of one large one. There are of course, other points of difference, but these will suggest themselves to the reader who studies this branch of natural history.

Cephalothorax.—Obovate, broader than long. *Pars cephalica* moderately elevated, arched. *Pars thoracica* arched, radial grooves district; *thoracic fovea* short, strongly procurved.

Eyes.—In two rows of four each; front row procurved, rear row recurved; lateral eyes of anterior row are the largest, and the median eyes of posterior row the smallest.

Falces.—Porrected, moderately strong, clothed with long, coarse bristles; ridges of the furrow of each falx denticulated; in addition to these two rows there is an intermediate one consisting of several small teeth. *Fangs* long.

Legs.—Rather long, tapering, first two pairs strongest; all legs hairy and strongly bespined; tibia ii. has at its middle on the underside, a powerful spur, armed with spines at the apex (fig. 58); tarsi i. and ii. scopulated. Relative lengths: 4, 1, 2, 3.

Fig. 58. *E. tibialis*, Rainb., Tibia and metatarsus of leg ii.

Maxillæ. — Moderately strong, arched, curving round labium, apical extremity of inner angle acuminate, lower half of each maxilla thickly studded with short, somewhat granular spines.

[31] εὔκτιμενος well built.

Labium.—Short, broader than long; arched, apex slightly rounded; surface thickly studded with small granular spines.

Sternum.—Somewhat shield-shaped, rather flat, broadest at a point between the second and third pairs of coxæ; anterior angle deeply excavated to receive base of labium; *sigilla* six, marginal, anterior pair smallest, posterior pair largest.

Abdomen.—Obovate, arched, hairy.

Spinnerets.—Hairy; superior mammillæ rather long, tapering, third joint longest, second shortest; inferior mammillæ very short, cylindrical, apices rounded off, separated from each other by a space equal to once their individual transverse diameter.

EUTIMENA TIBIALIS, *sp. nov.*

(Figs. 59, 60.)

♂ Cephalothorax, 10.8 mm. long, 8.5 mm. broad; abdomen, 10.5 mm. long, 7.1 mm. broad.

Cephalothorax.—Obovate, dark, shining, mahogany-brown, smooth, with a few fine hairs scattered over the surface. *Pars cephalica* moderately raised, arched, sloping towards thoracic fovea, thoracic groove distinct; at the upper extremity of this groove there is, on each side, a rather deep depression or pit; *ocular area* broader than long, raised, arched, dark-brown, almost black; *clypeus* precipitate, deep, vitreous, and furnished with a few short, bristly hairs at the middle. *Pars thoracica* broad, arched, radial grooves moderately deep, and broadest at the middle; *thoracic fovea* short, strongly procurved, deep; *marginal band* narrow.

Eyes.—In two rows of four each; front row procurved, rear row recurved; lateral eyes of front row much the largest of the series, and separated from each other by a space equal to nearly three times the diameter of one of the anterior median eyes; anterior median eyes round, and separated from each other by a space equal to rather more than half their individual diameter; posterior lateral eyes separated from each other by a space equal to

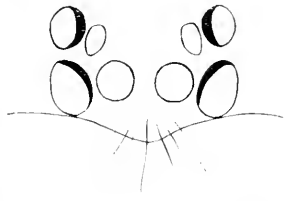


Fig. 59.—*E. tibialis*, Rainb., Eyes.

rather more than three times the diameter of one of the anterior median eyes; posterior median eyes smallest of the group (fig. 59).

Legs.—Moderately long, tapering, concolorous with cephalothorax, hairy, strongly bespined; legs i. and ii. strongest; patellæ i. and ii. have each four strong spines on the underside; tibia i. is armed on the underside for its entire length, with long and closely set spines; there are also a few spines at the sides; tibia ii. has about half-a-dozen spines on the underside, and near the middle a bold and stout projecting spur, the apex of which is crowned with a cluster of short, stout spines; metatarsus i. is closely and thickly bespined for its entire length (fig. 58); metatarsus ii. is excavated on the underside near the base; within this excavated portion there are no spines, but the remainder of the joint, on the underside, is closely and heavily bespided; tarsi i. and ii. armed laterally with short, strong spines; tibiæ and metatarsi iii. and iv. are each armed on the underside with eight rather long spines; tarsi iii. and iv. each armed with a few short, strong spines; each tarsus is furnished with a light scopula; superior claws long, and armed with a series (about nine) of long teeth at the base. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total
1	4.9	10.3	10.5	11.3	37
2	4.4	9.8	10.2	9.6	33.7
3	3.5	9	9.2	9.6	31.3
4	3.8	10.3	11.3	12	37.4

Palpi.—Concolorous with legs, clothed with long hairs; femur bowed, armed at apex with spines; patella and tibia armed with powerful spines; radial joint short, and densely hairy; genital bulb pear-shaped; style long, not twisted, tapering, flattened; genital bulb and style as long as femur. Measurements in millimeters as follow: Trochanter and femur, 6.1; patella and tibia, 6.6; radial joint, 2; total, 14.7.

Falces.—Moderately powerful, concolorous with cephalothorax and legs, porrected; apices and upper surface clothed with long, coarse bristles; outer ridge of the furrow of each falx armed with ten strong teeth, and the inner ridge with fifteen of varying strengths; in addition to these there is an intermediate row of six small teeth near the base (fig. 60); outer angles fringed with long red hairs; fangs dark-brown (nearly black), except at tips which are reddish; they are long, and well curved.

Fig. 60.—*E. tibialis*, Rainb., Scheme of dentition.

Maxillæ. — Reddish - brown, divergent, arched, moderately clothed with long hairs, apical extremity of inner angle acuminate; lower half of each maxilla thickly studded with short spines, imparting to the surface a decidedly granulated appearance; inner angles fringed with long red hairs.

Labium.—Concolorous, short, broader than long, arched, surface thickly studded with short spines similar to those on maxillæ; apex and sides slightly rounded, and fringed with a few bristly hairs; the base distinctly rounded.

Sternum.—Concolorous also; shield-shaped, broadest at a point between second and third pairs of coxæ; surface somewhat flattened, and moderately clothed with long, bristly hairs; anterior angle deeply excavated to receive base of labium; *sigilla* six, marginal; anterior pair small, and posterior pair large.

Abdomen.—Dark-brown, obovate, slightly overhanging base of cephalothorax; hairy; a few stiff spine-like bristles in front.

Spinnerets.—Superior mammillæ nearly half the length of cephalothorax.

Hab.—Turramurra (obtained from under a log) and Mosman, North Sydney.

Group ATRACEÆ.

Genus Hadronyche, *L. Koch.*

HADRONYCHE CERBEREA, *L. Koch.*

Two specimens of this species are included in the Museum Collection, and are labelled Sydney, which is the type locality. Both are females. There is no date or any other information appended to them, but they have been in the collection to my knowledge, more than twenty years. Both specimens agree with Koch's general description, and one of them to the measurements given by that author. The other, however, is considerably larger, and I therefore append the following measurements as a guide to students. They are, as usual, given in millimeters :—

♀ Cephalothorax, 16.5 mm. long, 13.8 mm. broad; abdomen, 18.3 mm. long, 14.6 mm. broad.

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	7.2	15.2	13.8	11.7	47.9
2	6.7	14.3	13	11.1	45.1
3	6.5	12.3	10	10.6	29.4
4	6.8	13.6	14.3	14.2	48.9

Palpi.—Trochanter and femur, 11 mm.; patella and tibia, 7.1 mm.; tarsus, 5.5 mm.; total, 23.6 mm.

Obs.—Mr. H. R. Hogg, M.A., has described a form[32] which he thinks will, in all probability, prove to be a male of this species. His specimen came from Macedon, Victoria.

Genus Atrax, *O. P. Cambr.*

Hogg gives the following synopsis of the previously recorded species of this genus: *A. robustus*, O. P. Cambr., and *A. modesta*, Simon, and to these I now add that of *A. versuta* and *A. formidabilis* which I describe below :—

[32] Hogg—Proc. Zool. Soc., 1901, pp. 274-276, figs. *a*, *b*, *c*.

Front middle eyes more than their individual diameter apart, and distinctly less in their diameter than side eyes of same row; patellæ of two rear pairs furnished with one or two spines; all four pairs of tibæ bespined ..... *A. robustus*, Cambr.

Front middle eyes less than their individual diameter apart, and about the same in diameter as the front side eyes; patellæ of third pair furnished with numerous spines, fourth pair none; and the front four tibiæ without any... *A. modesta*, Simon.

Front middle eyes once their individual diameter apart, and distinctly less than the diameter of front side eyes; patellæ of third pair furnished with five spines; all four tibiæ bespined..... .....*A. versuta*, Mihi.

Front middle eyes one-half their individual diameter apart, and distinctly larger than their lateral neighbours; all patellæ bespined; tibiæ i., ii. and iii. heavily bespined—i. and ii. especially so; tibia iv. also bespined, but less strongly so... *? A. formidabilis*, Mihi.

ATRAX VERSUTA, *sp. nov.*

(Figs. 61, 62.)

♀ Cephalothorax 8.5 mm. long, 7 mm. broad; abdomen, 13 mm long, 8.7 mm. broad.

Cephalothorax.—Smooth, shining, mahogany-brown, a few very short, fine hairs scattered over the surface. *Pars cephalica* raised, strongly arched, deeply compressed laterally near lower extremity, sloping towards thoracic fovea; *ocular area* broader than long, slightly elevated, and gently arched; *clypeus* sloping, finely wrinkled, indented at middle, of a vitreous-greyish tint, and furnished with a tuft of black bristles immediately below the eyes. *Pars thoracica* arched, radial grooves forming broad, shallow indentations, posterior angle deeply indented at middle; *thoracic fovea* deep, procurved; *marginal band* broad, yellow, sparingly fringed with long, yellowish hairs.

Eyes.—In two rows of four each; front row very slightly recurved; median anterior eyes rounded, and separated from each other by a space equal to once their individual diameter; lateral eyes of both rows seated obliquely and elliptical in form; median eyes of posterior row separated from each other by a space equal to two-and-a-half times the diameter of one of the anterior median eyes; posterior row strongly recurved (fig. 61)

Fig. 61.—*A. versuta*, Rainb., Eyes.

Legs.—Concolorous with cephalothorax, hairy, not strong, of median length; femur i. bowed; patella iii. has five spines; all tibiæ armed with three spines, metatarsi with eight, and tarsi with ten. Measurements in millimeters as follows:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	4	7	7.2	6.4	24.6
2	3.5	6.7	6.7	6.1	23
3	3.2	6	5.3	5.8	20.3
4	3.5	7.3	7.2	7.2	24.2

Palpi.—Concolorous with legs, similar in clothing, not strong; femur bowed; tibia furnished with five long, strong spines, and tarsus with ten.

Falces.—Porrected, chocolate-brown, upper surface transversely wrinkled, clothed with long hairs; inner facies pilose; outer angle of each falx armed with eleven strong teeth, and the inner with nine; in the groove between these two rows there are a large number of very small teeth (fig. 62); fang black with exception of base which is chocolate-brown.

Fig. 62.—*A. versuta*, Rainb., Scheme of dentition.

Maxillæ.—Yellow-brown, arched, divergent, not strong, the surface hairy, bases curving

round labium, and terminating in a heel; apical inner extremity obtusely pointed; for rather more than half the upper surface each maxilla is studded with small, erect, toothlike spines, imparting a decidedly granulated appearance; these spines are much more numerous near the base; inner angles fringed with long red hairs.

Labium.—Concolorous, slightly longer than broad, arched, moderately hairy; upper half densely spined, imparting to that portion of the lip the same granulated appearance as noted in respect of the maxillæ.

Sternum.—Concolorous also, sparingly clothed, with long hairs, slightly arched, narrowest in front where it is profoundly indented to receive base of lip; it is widest at a point between coxæ iii. and iv.; sigilla six, large, marginal; posterior pair largest.

Abdomen.—Obovate, overhanging base of cephalothorax, dark-brown, hairy; pulmonary sacs and chitinous plate in front of *rima epigasteris* concolorous with sternum; the plate has also two large sigilla.

Spinnerets.—Yellow, short; superior mammillæ stout, tapering; basal joint longest and stoutest; second very slightly longer than third; inferior mammillæ short, and separated from each other by a space equal to about once their individual transverse diameter.

Hab.—Jenolan, New South Wales.

? Atrax formidabilis, *sp. nov.*

(Figs. 63-66.)

♂ Cephalothorax 11.5 mm. long, 9.6 mm. broad; abdomen, 10.5 mm. long, 7.3 mm. broad.

Cephalothorax.—Obovate, arched, shining, rich dark-brown, smooth. *Pars cephalica* moderately raised, strongly arched, sides compressed, sloping backwards to thoracic fovea, a few fine setæ distributed over the surface; *ocular area* a moderately raised tubercular eminence, much broader than long, almost black, arched laterally and longitudinally, and furnished in front with a few bristles; *clypeus* deep, precipitous, yellowish. *Pars thoracica* broad, arched; radial grooves broad, distinct; *thoracic fovea* deep, broad, procurved; *marginal band* reflexed, thinly fringed with moderately long hairs.

Eyes.—In two rows of four each; anterior row faintly procurved, rear row recurved; anterior medians largest of the group and separated from each other by about one-half their individual diameter, and each again from its front lateral neighbour by a space scarcely equal to that; front and rear laterals seated obliquely; posterior medians smallest of the group (fig. 63).

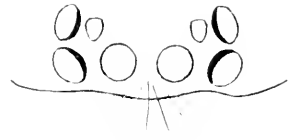


Fig. 63.—*A. formidabilis*, Rainb., Eyes.

Legs.—Concolorous with cephalothorax, long, tapering, first and second pairs strongest and heavily bespined; the spines are longest, strongest and most numerous on tibiæ and metatarsi i. and ii. (figs. 64, 65); tibia and metarsus ii. are each strongly produced towards the middle on the underside (fig. 65); the spines are less numerous and less strong on leg iv.; each tarsus is closely spined laterally; no true scopula present; superior claws long, armed with a curved row of thirteen or fourteen teeth, of which those at the centre are the longest. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	5.5	12	11.8	12.2	41.5
2	5	11.2	11.2	12.2	39.6
3	4.6	10	10	11.8	36.4
4	5	11.6	13.3	13.2	43.1

Fig. 64.—*A. formidabilis*, Rainb., Tibia and metatarsus, leg i.

Fig. 65.—*A. formidabilis*, Rainb., Tibia and metatarsus, leg ii.

Palpi.—Rather short, concolorous with legs, hairy, femur bowed, broadest at apex, where it is armed with three strong, moderately long spines, and three short, weak ones; patella broadest at apex also, where it is armed with two strong, moderately long spines, and two short, weak ones; tibia armed on its upper surface with four short, stout spines, on the inner angle with eight long, strong spines, and at the apex with several short ones; radial joint short, densely hairy; genital bulb pear-shaped, broadly cleft at apex; style rather broad, long, twisted, terminal extremity flattened like a spatula.

Falces.—Concolorous with cephalothorax, moderately long, porrected, powerful; upper surface from base to apex, densely hairy; sides smooth, but having a narrow row or line of setæ running down the middle; in addition to these latter there are, towards the lower angle, a quantity of very short, scattered setæ; inner ridge of the furrow of each falx armed with ten strong teeth, and the outer ridge with thirteen; the latter not quite so strong as the former; there is also a somewhat sinuous and irregular intermediate row consisting of fourteen small teeth (fig. 66); outer angles fringed with red hairs; *fangs* long, well curved, nearly black.

Fig. 66.—? *A. formidabilis*, Rainb., Scheme of dentition.

Maxillæ.—Reddish-brown, divergent, arched, inner angles acuminate, surface moderately hairy; at the base of each maxilla there are a large number of very small toothlike spines, which latter impart a granulated appearance at that point; base curving gently round the labium, and terminating with a somewhat heel-like projection; inner angles fringed with long, red hairs.

Labium.—Concolorous, arched, short, broad, rounded at apex, thickly studded with short, toothlike spines, similar to those on maxillæ; apex, sides, and base thinly clothed with rather long hairs.

Sternum.—Concolorous also; rather flat, narrowest in front, where it is deeply excavated to receive base of labium, broadest at a point between third and fourth pairs of coxæ, base rounded off; surface moderately clothed with black bristles; *sigilla* large, sub-marginal, posterior pair largest.

Abdomen.—Obovate, dark-brown, clothed with long hairs; plates of pulmonary sacs large, yellowish-brown; the large chitinous plate in front of *rima epigasteris* yellowish-brown also, hairy, and having two large, lateral depressions.

Spinnerets.—Yellow, hairy; superior mammillæ, less than half the length of cephalothorax; third joint longest, second shortest; inferior mammillæ short, and close together.

Obs.—It may be necessary, hereafter, to erect a new genus for the reception of *A. formidabilis*, but as up to the present time males of previously described species of the genus *Atrax* are unknown, I hesitate to do so at this juncture.

Hab.—Richmond River, New South Wales.

Group PSEUDATRACEÆ.

The species herennder described is a very interesting form. It was collected by Mr. S. J. U. Moreau, when stationed at Antonio in charge of the public school there. This gentleman was successful in obtaining two specimens, both females—one mature, and the other about half-grown. These specimens have lain in our collection for some time, awaiting an opportunity of being worked out. Whilst engaged upon the study of this material my attention was called to another example, collected by Mr. John Brazier, near Narrabeen. This was also an adult female, and although decidedly bleached, was otherwise in good order. The specimens collected by Mr. Moreau were presented by him to the Trustees.

For the reception of this species, which I name *Pseudatrax moreani*, it appears necessary to found not only a new genus, but also another group or section, to which I give the name Pseudatraceæ. Furthermore, just as I was concluding the present paper, another Territelarian came to hand, and for its reception another group or section is also required, as also another genus. For the former I propose the name Poikilomorphiæ, and for the latter, *Poikilomorphia*. Hogg[33] has given a table in elucidation of the groups as they were known, at the date of its publication, to occur in Australia and New Zealand. They

[33] Hogg—Proc. Zool. Soc., 1901, p. 250.

were four in number, namely:—Hexatheleæ, Brachytheleæ, Macrotheleæ, and Atraceæ, and to these are now added the two herein referred to. Below, I give a key which will, I hope, be of assistance to students. Hexatheleæ belonging, apparently, exclusively to New Zealand, is not included. The key is as follows:—

A—No teeth on outer margin of falx sheath; tarsi unbespined; first two pairs scopulated; metatarsi of same especially so; front row of eyes straight in *Brachythele*, Auss., otherwise procurved, rear row recurved; sternal sigilla moderately large and marginal; superior mammillæ usually not exceeding half the length of cephalothorax; inferior mammillæ close together ..... *Brachytheleæ.*

B—No teeth on outer margin of falx-sheath; tarsi (except in *Porrhothele*, Sim., New Zealand) bespined, no scopulæ present; front row of eyes straight or very slightly procurved (*Porrhothele*, Sim.) or distinctly procurved (*Stenygrocerus*, Sim.), rear row recurved; sternal sigilla moderately large and marginal; superior mammillæ at least not much shorter than length of cephalothorax, inferior mammillæ widely separated, about four times their transverse diameter apart..... .... *Macrotheleæ.*

C—Both margins of falx-sheath armed with teeth, together with an intermediate row at base; tarsi bespined, no true scopulæ present; front row of eyes slightly procurved (*Atrax*, L. Koch) or straight (*Hadronyche*, L. Koch), rear row recurved; sternal sigilla large, not marginal; superior mammillæ short scarcely exceeding two-fifths the length of cephalothorax, inferior mammillæ close together ..... *Atraceæ.*

D—Both margins of falx-sheath armed with teeth, together with an intermediate double row running almost the entire length; tarsi bespined, no true scopulæ present; front row of eyes straight on its front line when viewed from side, and recurved on its rear line when viewed from the same angle, rear row recurved; sternal sigilla large and sub-marginal; superior mammillæ one-half the length of cephalothorax; inferior mammillæ close together..... *Pseudatraceæ.*

E—Both margins of falx-sheath armed with teeth, there is also an intermediate row running almost the entire length; tarsi bespined; no scopulæ present; front row of eyes procurved, rear row very slightly recurved, front median eyes smallest; two front pairs of sternal sigilla small and marginal, posterior pair large and sub-marginal; superior mammillæ one-half length of cephalothorax; inferior mammillæ close together..... *Poikilomorphiæ.*

Genus Pseudatrax, *gen. nov.*

(Fig. 67.)

Cephalothorax.—Longer than broad. *Pars cephalica* somewhat as in *Missulena*, Walck.; posterior portion compressed laterally; truncated in front; *clypeus* deep; *ocular area* broader than long. *Pars thoracica* very gently arched; *thoracic fovea* deep, strongly procurved.

Falces.—Large, massive, hairy; margins of furrow of each falx armed with strong teeth; in addition to these two rows, there is an intermediate double row which extends from the base to near the apex. No *rastellum*.

Eyes.—Disposed in two rows consisting of four each, and poised on a slightly raised tuberecular eminence: anterior row straight in front when viewed from side, and recurved in the rear line when viewed from the same angle; rear row recurved; inner rear eyes smallest of the group (fig. 67).

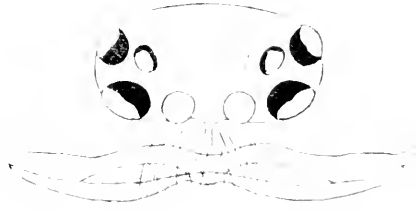


Fig. 67.—*P. morcau*, Rainb., Eyes.

Legs.—Not long, strong, hairy, bespined; metatarsi and tarsi especially so; no true scopulæ; ungual tufts extending beyond claws, of which latter there are three; superior claws strongly denticulated. Relative lengths: 1, 2 — 4, 3.

Palpi.—Not long, similar in clothing and armature to legs.

Maxillæ.—Rather short, divergent, arched, inner angles fringed; surface thickly studded with small, erect, conical spines, and clothed (though not thickly) with long hairs.

Labium.—Free, longer than broad, rounded at base and apex, arched transversely and longitudinally; the surface thickly studded with small, erect, conical spines, and furnished with a few long hairs.

Sternum.—Moderately arched at sides, anterior angle deeply excavated to receive base of lip; six large sub-marginal sigilla.

Abdomen.—Moderately hairy.

Spinners.—Four. Inferior mammillæ short, separated from each other by a space equal to about once their individual transverse diameter; superior mammillæ half the length of cephalothorax, three-jointed; first joint longest and stoutest; second joint shortest; third joint tapering, conical.

Pseudatrax moreaui[34] *sp. nov.*

(Figs. 68-70.)

♀ Cephalothorax, 10.8 mm. long, 10 mm. broad; abdomen, 14.6 mm. long, 10.5 mm. broad.

Cephlothorax.—Longer than broad, surface smooth and shining, of a polished mahogany-brown colour, and having a few short fine hairs sparingly distributed. *Pars cephalica* high, strongly arched; posterior region compressed laterally; *clypeus* pale, sloping, deep, sinuous, furnished with a cluster of long and stout bristles below and in front of eyes; *ocular area* broader than long, distinctly raised, arched. *Pars thoracica* broad, moderately arched, radial grooves deeply and broadly depressed, lateral angles sinuous, posterior angle deeply excavated; *thoracic fovea* deep, strongly recurved; *marginal band* broad, pale, thinly fringed with rather short bristles.

Eyes.—Poised upon a slightly raised, arched, tubercular eminence, and distributed in two rows of four each; anterior row when viewed from the side has its front line straight, and its rear line recurved; posterior row recurved; median eyes

[34] In honour of Mr. S. J. U. Moreau.

of front row separated from each other by a space equal to once their individual diameter, and are each rather smaller than the oblong diameter of its anterior neighbour; lateral eyes of posterior row separated from each other by a space equal to fully five times the diameter of one of the front median eyes; the oblong diameter of each of these eyes is considerably smaller than the oblong diameter of its anterior lateral neighbour; lateral eyes of each row quite close to their inner neighbours; inner eyes of posterior row smallest of the group.

Legs.—Rather short, strong, concolorous with cephalothorax, clothed with long coarse hairs or bristles; femur of leg i. slightly bowed; femora of all legs free from spines; tibia i. has three spines in a row (one behind the other), and two on apical angle, all of which are on the underside; tibia ii. has one spine on the underside about one-third its length from base, and one on the apical angle; tibia iii. has three spines on its outer angle, and two on underside of apical angle; tibia iv. is free from spines; metatarsi have each eight spines distributed in pairs; the tarsi also have each eight spines distributed in pairs; no true scopulæ present; ungual tufts extending beyond claws, of which latter there are three; superior claws have each a row of seven long, strong teeth. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter and Femur.	Patella and Tibia.	Metatarsus and Tarsus.	Total.
1	4.6	9.4	8.8	7	30
2	4.6	9.2	8.3	7	29.1
3	4	8	7	6.4	25.4
4	4.1	8	9	7.2	29.1

Palpi.—Concolorous with legs, short, clothed with long hairs; femur bowed, tibia armed with a long spine on inner angle, and again with one on the outer, while at the apical angle there are three; tarsi armed with four spines on the inner angle, and four on the outer; terminal claw obscured by ungual tuft. Measurements as follow:—Trochanter and femur, 6.5 mm.; patella and tibia, 5.1 mm.; tarsus, 3.5 mm.; total, 15.1 mm.

Falces.—Dark-brown, nearly black, strong, porrected, curving downwards, arched, clothed with long hairs or bristles; inner and outer angles fringed with long, reddish hairs; angles of the furrow of each falx armed with a series of nine strong, coniform teeth; between these two rows there is in addition, a series of smaller teeth, and this series extends from the base to the apex (fig. 68); *fangs* black, and shining.

Fig. 68.—*P. moreau*, Rainb., Scheme of dentition.

Maxillæ. — Rather short, but strong, reddish-brown, arched, the surface studded with numerous short, coniform spines, which latter are most thickly clustered near the base; the surface is also rather thickly clothed with long hairs, while the inner angle of each maxilla is thickly fringed with red hairs (fig. 69).

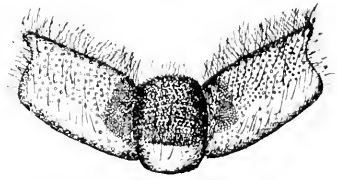


Fig. 69.—*P. moreau*, Rainb., Maxillæ and labium.

Labium.—Rather longer than broad, free, concolorous with maxillæ, rounded at base and apex, arched both longitudinally and transversely, and for about two-thirds of its length from apex densely studded with small coniform spines.

Sternum.—Concolorous also, narrowest in front where it is deeply excavated to receive the lip; middle rather flat; sides, anterior and posterior angles somewhat curved and sloping; sigilla large, sub-marginal; posterior pair largest and deepest; anterior pair less distinct; surface clothed with black bristles; lateral and posterior angles fringed with yellowish hairs (fig. 70).

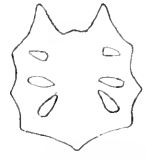


Fig. 70.—*P. moreau*, Rainb., Sternum.

Abdomen.—Obovate, dark-brown, nearly black both above and laterally, strongly arched, moderately hairy; underside concolorous except for the chitinous plate above the *rima epigasteris*, and the plates of the pulmonary sacs, which are yellow; the chitinous plate in front of the *rima epigasteris* has two large and deep sigilla—one on either side.

Spinnerets.—Yellowish, hairy.

Hab.—Antonio, near Rydal, and Narrabeen, New South Wales.

Group POIKILOMORPHÆ.

The species, for the reception of which I propose, as already intimated, a new group or section and a new genus, differs from all known genera of the sub-family Diplurinæ, by the relative size of its eyes. The feature is certainly unique. Usually, the median eyes of the rear row are the smallest, but in the form described underneath they are slightly the largest; again, the front medium pair, which are invariably large—sometimes even the largest—are in this instance not only small, but minute. Other generic features of importance are noted in the description given below.

Genus Poikilomorphia,[35] *gen. nov.*

Cephalothorax.—Broader than long, arched, truncated in front. *Pars cephalica* moderately raised, sloping rearward to thoracic fovea; *ocular area* much broader than long, with front row of eyes touching edge of clypeus. *Pars thoracica* broad, arched, radial grooves distinct; *thoracic fovea* deep, broad, procurved.

Eyes.—In two rows of four each; front row procurved, rear recurved; front median eyes very small, rear median eyes large (fig. 71).

Legs.—Moderately long and strong, tapering; front pair strongest, hairy; all legs bespined; claws three; superior claws long. Relative lengths:—4, 1, 2, 3.

Palpi.—Moderately long, similar in colour and armature to legs.

Falces.—Long, porrected, clothed with long bristles. Ridges of the furrow of each falx denticulated, and between these an intermediate row of small teeth.

[35] ποικίλομορφία, variety of form (in reference to the eyes).

Maxillæ.—Powerful, divergent; inner angle of apices acuminate; closely studded with toothlike spines.

Labium.—Short, broad, nearly square, apex slightly indented, surface thickly studded with toothlike spines.

Sternum.—Somewhat shield-shaped, deeply excavated in front to receive base of labium; *sigilla* six; two front pairs small and marginal; posterior pair large and sub-marginal.

Abdomen.—Obovate.

Spinnerets.—Superior pair tapering, third joint longest, second shortest; inferior pair small and close together.

POIKILOMORPHIA MONTANA, *sp. nov.*

(Figs. 71, 72.)

♀ Cephalothorax, 11.2 mm. long, 8.6 mm. broad; abdomen, 13.5 mm. long, 9.8 mm. broad.

Cephalothorax.—Obovate, truncated in front, smooth, shining, reddish-brown, arched, sparsely clothed with fine hairs. *Pars cephalica* slightly raised, arched, compressed at sides, slightly depressed behind ocular tubercle, and sloping backward to thoracic fovea; *ocular area* consists of a slightly raised tubercle, which is broader than long, nearly black at centre, arched both laterally and longitudinally; *clypeus* deep, vertical, and furnished with a tuft of bristles at the middle. *Pars thoracica* arched, radial grooves distinct and broad, posterior angle indented at middle; *thoracic fovea* deep, broad, procurved; *marginal band* not broad, reflexed.

Eyes.—In two rows of four each; front row procurved, rear row recurved; lateral eyes of front row elliptical, and separated from each other by a space equal to about three times their individual longitudinal diamter; anterior intermediate eyes smallest of the entire series, round, and widely separated from each other; rear lateral eyes elliptical, rather smaller than their anterior lateral neighbours;

Fig. 71.—*P. montana*, Rainb., Eyes.

intermediate eyes of posterior row elliptical also, large, and touching their lateral neighbours; front lateral eyes and rear intermediate eyes about equal in size (fig. 71).

Legs.—Moderately long, strong, tapering, concolorous with *cephalothorax*, first pair somewhat the strongest, clothed with long hairs; femur i. moderately bowed; patella i. has one short apical spine on its inner angle; patellæ ii. and iii. are each armed with two spines on inner angle, while patella iv. has none; tibia i. has four spines, tibiæ ii. and iii. have seven, and tibia iv. four spines; metatarsi i. and ii. are armed with ten powerful spines, metatarsus iii. with sixteen, and metatarsus iv. with twelve or fourteen; each tarsus has ten strong spines; there is no scopula; superior claws long and armed with ten teeth. Measurements in millimeters as follow:—

Leg.	Coxa.	Trochanter & Femur.	Patella & Tibia.	Metatarsus & Tarsus.	Total.
1	5	10.1	9.3	9.3	33.7
2	4.5	9.7	8.6	8.6	31.4
3	4.3	9.1	7.6	8.6	29.6
4	4.3	10.3	10	10.6	35.2

Palpi.—Moderately long, similar in colour and clothing to legs; femur bowed; tibia armed with six spines, of which the apical three are the strongest; tarsus armed with twelve spines; claw, long. Measurements in millimeters as follow:—Trochanter and femur, 7.3; patella and tibia, 5.4; tarsus, 4.2; total, 16.9.

Falces.—Long, powerful, porrected, concolorous with cephalothorax; upper surface and apices clothed with long, coarse bristles; outer sides smooth, but having a few short, fine hairs distributed over the surface; inner surfaces clothed with short, fine hairs; outer ridge of the furrow of each falx armed with a row of thirteen teeth, of which the apical four are the largest and strongest; inner ridge with a row of fifteen teeth; between these denticulated ridges there is an intermediate row of eighteen minute teeth, and of these latter the basal eight are arranged in pairs (fig. 72); inner angles fringed with long red hairs; *fangs* long, black, and well curved.

Fig. 72. *P. montana*, Rainb., Scheme of dentition.

Maxillæ.—Concolorous with cephalothorax, divergent, curving round lip at base, clothed with long coarse hairs, closely studded at base with short, toothlike spines; inner angles fringed with red hairs.

Labium.—Concolorous also, rather longer than broad, apex hollowed, sides slightly curved, base rounded; surface closely studded with short, toothlike spines, apex fringed with long bristles; there are also a few long bristles at the sides and base.

Sternum.—Shield-shaped, arched, yellow-brown, widest at a point between second and third pairs of coxa; anterior angle hollowed to receive base of labium, a number of long, black bristles distributed over the surface; *sigilla*, six; first and second pairs small marginal; third pair much the largest, elliptical in shape, and sub-marginal.

Abdomen.—Obovate, slightly overhanging base of cephalothorax, hairy; superior surface and sides dark chocolate-brown; ventral surface clothed with long hairs, and of a light yellowish colour.

Spinnerets.—Yellow, hairy; superior mammillæ one-half length of cephalothorax, tapering, third joint longest, second shortest; inferior mammillæ very short, cylindrical, equal in length to second joint of superior spinnerets, and separated from each other by a space equal to once their own individual transverse diameter.

Hab.—Jamieson Valley, Wentworth Falls, Blue Mountains, New South Wales.

SUPPLEMENT.

Sub-family ACTINOPIDINAE.

Genus Missulena, *Walck.*

During the passage of the present paper through the press, Mr. H. H. Burton Bradley, Crown Trustee, and President of the Board of Trustees of the Australian Museum, presented to this institution an interesting specimen of the genus *Missulena*, Walck., and this proves to be a decided novelty, and

distinct from any of its congeners. My friend, Dr. R. Pulleine, of Adelaide, being in Sydney on a visit, I showed it to him, and his conclusion coincided with mine. Dr. Pulleine has collected more Australian Avicularidae than anyone else, and certainly possesses the largest and best collection of our native trap-door spiders that has ever been brought together, so that his advice and support upon questions in respect of species of this family is of decided value.

The student upon perusing the description given below, together with the accompanying figures, will readily detect the points wherein this beautiful and strikingly marked spider differs from species previously described and known.

Mr. H. H. Burton Bradley was the first Australian naturalist to study our endemic Araneidae, and I have therefore much pleasure in dedicating the species under discussion in his honour.

MISSULENA BRADLEYI, *sp. nov.*

(Figs. 73-75.)

♂ Cephalothorax 6.2 mm. long, 6.7 mm. broad; abdomen, 6.2 mm. long, 5 mm. broad.

Cephalothorax.—Black, shining, broader than long. *Pars cephalica* high, very strongly arched, apex and sides closely and finely wrinkled, smooth at base, truncated in front; *ocular area* normal; *clypeus* sloping inwards. *Pars thoracica* rough, radial grooves indistinct; *thoracic fovea* deep and strongly procurved; from the centre of the latter a deep, straight, longitudinal groove extends to near the posterior angle; *marginal band* reflexed, rough.

Eyes.—Eight; in two rows of four each, of which the front is procurved, and the rear recurved; front middle eyes large, round, of a pearl-grey lustre, and separated from each other by a space equal to about once their individual diameter; front lateral eyes elliptical and widely removed from each other; inner eyes of rear rows smallest of the group and exceedingly brilliant (like diamonds); outer rear eyes somewhat larger than their inner neighbours and elliptical (fig. 73).

Fig. 73.—*M. bradleyi*, Rainb., Eyes.

Legs.—Shining, strong, black, pearl-grey at joints; femur of leg i. slightly bowed and furnished with a few short, scattered hairs; patella i. has the inner angle thickly beset with with short, strong spines; tibiae i. and ii. have each a number of long coarse hairs or bristles, and on the underside a number of long, spinelike bristles; femora i., ii. and iii. are each sparingly clothed with short hairs and long fine bristles; femur of leg iii. is the stoutest; patella ii. is armed on its apical angle with a cluster of short, stout spines; patella iii. is thickly beset with short, stout spines both on its upper surface and lateral angles; while patella iv. has a number of very short spines scattered over its upper surface and lateral angles; tibiae iii. and iv. are each clothed with short hairs and bespined; metatarsi and tarsi strongly bespined, thickly clothed and scopulated. Measurements in millimeters:—

Leg.	Coxa.	Trochanter and Femur.	Patella and Tibia.	Metatarsus and Tarsus.	Total.
1	2.5	4.8	5.3	5	17.6
2	2.5	4.2	4.8	4.8	16.3
3	2.5	4.2	4	4.3	15.
4	2.5	5.1	5.7	5	18.3

Palpi.—Long, smooth, shining, not strong, concolorous with legs; femur and patella very sparingly clothed; tibia thickly fringed with long hairs on underside; radial joint small, overhanging, hairy, cleft at apex; genital bulb shining, reddish; stigma long, tapering, curved, apex rounded off, blunt. Measurements in millimeters:—Trochanter and femur, 10.2; patella and tibia, 9.8; radial joint, 1; total, 21 (fig. 74.)

Fig. 74.—*M. bradleyi*, Rainb., Palpus.

Falces.—Concolorous with cephalothorax, porrected upper surface wrinkled, sides smooth; the *rastellum* is a pad on the inner side of the falx; fang long, black, reddish at tip, and well curved; inner angle of the furrow of each falx fringed with long reddish hairs, and armed with a

row of thirteen strong teeth of varying sizes; the outer angle has five smaller teeth, and in addition to these there is, at the base, an intermediate row of five still smaller teeth.

Maxillæ.—Black, shining, stout, strongly arched; outer angles acuminate, the surface furnished with a few long bristles; inner angles fringed with reddish hairs, and armed with short, conelike teeth.

Labium.—Concolorous, long, coniform, transversely wrinkled, sparingly hairy, apex armed with short, coniform teeth.

Sternum.—Concolorous also, rather flat, lateral and basal angles reflexed, anterior angle deeply excavated to receive base of labium; *sigilla* six, removed from margin, posterior pair much the largest, and anterior pair decidedly the smallest.

Abdomen.—Obovate, arched, slightly overhanging base of cephalothorax, chocolate-brown with small yellowish spots; in front there is a large patch of bluish-grey (fig. 75); sides concolorous with upper surface, and relieved by fine yellowish, irregular striations; upper surface and sides furnished with short bristles; underside concolorous also, spotted with yellow, and clothed with rather long hairs; pulmonary sacs yellowish; the chitinous plate above the *rima epigasteris* yellowish also, but having in addition two broad, longitudinal, dark-brown bars near the middle.

Fig. 75.—*M. Stuttert*, Rumb., Abdomen.

Spinnerets.—Short, chocolate-brown; apices of superior pair white.

Hab.—North Sydney.

THE GENUS ENOPLOCLYTIA IN THE CRETACEOUS ROCKS OF QUEENSLAND.

By R. Etheridge, Junr., Curator.

(Plates xxiii. and xxiv.)

Comparatively few Crustacean remains have, so far, been found in the Cretaceous of Queensland, or for the matter of that throughout Australia generally. A short note by myself, published in 1892 gives details of all that was known up to that date.[1] Emphasis is there laid on the occurrence of both the Macrura and Brachyura.

The Trustees have, from time to time received from Mr. W. H. Blomfield collections of Queensland Cretaceous fossils collected by him. In a series received some time ago occurred a specimen of great interest being the greater portion of a Macruran carapace apparently referable to *Enoploclytia*, McCoy.

The specimen consists of the carapace less the rostral portions, and all appendages. It is sharply bent down along the dorsal median line, leaving the lateral portions but very little convex, indeed the entire body may be said to be highly compressed; on the right side the ventral margin is fairly well preserved, but on the left it is wanting. The general outline of this carapace is long-oval, and in its present compressed condition rather broadly pod-shaped, the entire surface being highly tuberculate. The posterior margin is only preserved towards its ventral lateral portions which are rounded.

The nuchal furrow is deep, wide, devoid of tubercles and faintly sigmoidal on each half of the shield, curving forwards on approaching the ventro-lateral margins and running parallel to the latter forwards for a short distance. At about the middle of its course there is a short open supplementary groove directed forwards. The mesobranchial furrow, like the nuchal, is deep, devoid of tubercles, but not so wide, and is double, one groove behind the other, but close together

[1] Etheridge—Proc. Linn. Soc. N.S. Wales, vii. (2), 1892, p. 305.

The anterior of these curves towards the nuchal on each carapace half, gradually lessening in conspicuousness but still reaching the nuchal just before its anterior turn forwards. The posterior mesobranchial is continuous across the entire carapace from margin to margin, distinctly sigmoidal, and deep at its extremities, faint and somewhat concavely curved in its median portion on each half of the carapace; these two principal furrows, the mesobranchial and nuchal are united immediately above each latero-ventral margin by a short transverse furrow tending to separate off and helping to form the small epibranchial lobes. The cephalic lobes, anterior to the nuchal furrow are, accepting the nuchal as a base line, obtusely triangular and highly scabrous, the tubercles large and close. The mesobranchial lobes enclosed between the furrows of the same name and the nuchal are roughly parallelogramatic, the tubercles resembling those of the cephalic lobes.

Between the mesobranchial and epibranchial lobes occur two small more or less round, or pear-shaped lobes formed by the junction of the anterior mesobranchial furrow above and the posterior below with the nuchal.

The large branchial region is highly scabrous, but the tubercles are certainly smaller than those of the cephalic or mesobranchial portions.

The genus *Enoploclytia* was established by McCoy[2] to receive the well-known *Astacus leachii*, Mantell, of the Lower Chalk. The absence of the rostral portions in the present specimen is unfortunate, as here are situated some of the principal parts relied on by McCoy for the separation and support of his genus. However, the double branchial furrows (here termed mesobranchial after Prof. T. Bell) described in *Enoploclytia*, are unmistakably present in the Queensland Crustacean, and although McCoy's figure is a more or less diagramatic one, the furrows in question are well shown. It is in the figures of Reuss, Geinitz, and Fritsch and Kafka that similar characters to those of our specimen are so apparent.

[2] McCoy—Ann. Mag. Nat. Hist., iv. (2), 1849, p. 330, fig.

In Reuss' illustration,[3] not only is the double mesobranchial furrow shown but also the epibranchial lobes. These features are even better displayed in Geinitz's figure,[4] and equally well also in that of *E. ventricosa*, Meyer.[5] It appears to me, judging from the figures quoted, that the form and degree of development of the epibranchial lobes form good characters for specific separation, at any rate in the absence of the rostral and other appendages.

The original figures of *Astacus leachii* by Mantell[6] and Bell[7] are almost wholly those of the chelæ and are therefore of no assistance at present, but relying on the figures of Reuss and Geinitz and more particularly the beautiful illustration by the latter, our form, which I purpose calling *E. terra-reginæ*, would appear to possess a greater development of supplementary lobes in the meso-epibranchial region; other than this it is unquestionably very close to *E. leachii*.

To some extent there is a resemblance to another Cretaceous genus *Phlyctisoma*, Bell,[8] but the presence in this genus of a mesogastric lobe enclosed within the bifurcation of the mesial longitudinal sulcus at the anterior end of the carapace at once tends to distinguish one from the other.

Loc.—Barcoo River Watershed, South Central Queensland.

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[3] Reuss—Verstein. Böhm. Kreideformation, Abth. 1, 1845, pl. vi., fig. 2.

[4] Geinitz—Charakter. Schichten Petrefacten säch. Kreid., 2 heft, 1840, pl. ix., fig. 1.

[5] Meyer—Fossiler Krebse, 1840, pl. iv., fig. 29 a and b.

[6] Mantell—Foss. S. Downs, 1822, pl. xxix., figs, 1, 4, 5.

[7] Bell in Dixon—Geol. and Foss. Sussex, 1850, pl. xxxviii*, figs. 6 and 7 (as *Palæastacus macrodactylus*, Bell.)

[8] Bell—Mon. Foss. Malacostracous Crust. Gt. Brit., pt. ii., 1862, p. 34.

NOTE ON THE OCCURRENCE OF THE SAND-ROCK CONTAINING BONES OF EXTINCT SPECIES OF MARSUPIALS (EMU, KANGAROO, WOMBAT, ETC.,) ON KING ISLAND, BASS STRAIT, TASMANIA.

By WILLIAM ANDERSON, F.R.S.E., F.G.S.,
formerly of the Geological Surveys of New South Wales and India; late Government Geologist of Natal.

During a recent visit to King Island I was, through the kindness of Mr. J. M. Bowling, fortunate in being able to make a cursory examination of the deposits in which the bones of extinct species of Marsupials occur, and to obtain a small collection of the fossils which are now deposited in the Australian Museum, Sydney.

It has not previously been observed that the wind-blown sand forming the recent dunes is not the original matrix of the fossils. Hence this note!

The literature dealing with the geology of the island, the occurrence of the deposits and the description of their bone contents is as yet of a very limited character. The earliest reference to the fossil bones is a short note, recording their discovery by Mr. Bowling, published in an early number of the King Island "Record,"[1] subsequently followed by a paper[2] in which Professor Baldwin Spencer and Mr. J. A. Kershaw describe a collection of these bones and a paper[3] by Mr. F. Debenham on the general geology of the island.

Allusion is made, in a paper[4] by Mr. F. Noetling, to the occurrence of remains of *Nototherium*, obtained by Mr.

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[1] The Record, King Island, i., 2, 6th Dec., 1905.

[2] Spencer and Kershaw—Mem. Nat. Mus. Melbourne, 3, 1910.

Debenham—Journ. Roy. Soc. New South Wales, xliv., 1910, p, 560.

Noetling—Proc. Roy. Soc. Tas., 1911, p. 124.

Stephenson of Yambacoona, while draining a swamp on his property in the northern portion of the island. The specimens, consisting of portions of the lower jaw are now in the Victoria Museum, Launceston, and are the first and only specimens yet obtained from the island. These remains, however, occurred in an inland lake deposit and not in marine coastal accumulations such as the ossiferous sand-rock of the southern end of the island, with which this note deals. They are probably geologically earlier, as, so far, there have been no evidences of contemporaneity with the extinct species of Marsupials above referred to.

The deposits from which the bones were collected and from which the specimens were obtained which were described by Professor Spencer are situated near the extreme southern point of the island, on the most southerly of Mr. J. M. Bowling's farms, to the south-east of Surprise Bay. The sand-dunes in this locality attain a considerable elevation. They are the most extensive on the southern half of the island, and with the ossiferous sand-rock occurring among them, cover its most southerly promontory, the geological formation of which consists of metamorphosed sedimentary rocks, chiefly phyllites, schists, quartzites, etc. similar to those exposed in other parts of the island. Outcrops of these are not infrequent protruding from among the sand deposits and they usually prevail along the immediate foreshore, around the southern end of the island.

The bones are usually found in the loose wind-blown sand now forming the recent sand-dunes, but this is not their original matrix, which is generally a fairly hard sand-rock, of a reddish-brown colour, coarse in texture and frequently exposed through the sand-dunes. There is no apparent lamination in the deposit, yet on the eastern aspect of the peninsula, it outcrops through the sand in numerous bold, parallel ridges, exhibiting suspicions of false bedding, which form quite a feature in the sand-dune landscape.

These ridges of sand-rock appear to have a decided southerly dip which, however, may perhaps be due to blown sand weathering. This, in other regions, is very often the case, and is chiefly due to the occurrence of a persistent prevailing

wind. In exposed areas, where the winds are variable and non-persistent, such degradation of similar strata produces most irregular outcrops unless the deposit has been distinctly bedded originally, in which case the stratification becomes emphasised rather than obliterated. Among the higher exposures of the sand-rock there are fairly extensive outcrops of light coloured calcareous and siliceous rocks containing numerous concretions, some of which are of considerable thickness individually and usually irregularly vermiform in character. Some are hollow, but the majority are solid. So far as my cursory examination went they showed no plant structure although often a radiating structure is present which is probably aragonite. By their size and the frequency of their occurrence it is possible they may represent roots or stems of plants and trees. On the other hand, there are, the world over, calcareous deposits in which segregation, due to chemical agencies has produced the most curiously contorted concretions which have had no connection whatever with an organic origin. At the same time, I may mention the fact that in climates which are not so very different from that of the southern part of Australia, I have known occurrences such as the following:—On the west coast of Madagascar, and on the opposite east coast of Africa, where the rocks consist chiefly of Cretaceous calcareous strata, the recent deposits now forming, principally among the mangrove swamps, are calcareous. There, one occasionally sees, especially in an estuary which has become more or less silted up, and is in process of geological regeneration, that the deposited matter is a calcareously cemented mud exhibiting hollows which originally were occupied by the roots and in some cases the lower ends of the stems of the mangrove. In the King Island concretions there are no signs of vegetable structure and to all intents and purposes they might be fulgurites, or worm burrows, filled with calcareous material.

Other calcareous deposits containing similar concretions occur in different parts of the island near the coast; one such outcrop is about a mile to the north of the township of Currie. These deposits, on the southern peninsula, abut against each other in such a way that they would seem to be contemporaneous with the red sand-rock. Besides the concretions the southern calcareous deposits contain isolated specimens of the

bones of extinct species of Marsupials. Mr. Bowling informed me he had obtained a number of specimens from them. There are no pebbles or boulders in either the calcareous or the red sand-rock except in the immediate vicinity of the metamorphic rock outcrops. These deposits are now exposed quite near the highest parts of the sand-dunes and of the peninsula. In some cases the highest outcrops consist of the metamorphic slates, quartzites, etc., and the bone-bearing deposits are present at least over one hundred and fifty feet above sea level.

The fossils occur sparingly in the calcareous and siliceous deposits but are quite common in the hard sand-rock. In the former they have to be chiselled out, while in the latter a pointed implement of some kind is necessary to release them from the matrix and careful manipulation is needed if a useful specimen is to be obtained. On the outcrops of the sand-rock, fossil bones are extremely plentiful and are distributed promiscuously through them, the long bones and jaw bones often protruding from the exposed surfaces at all angles and sometimes resting intimately upon each other in couples and bunches. There are no instances of the occurrence of whole skeletons or even portions of the same skeleton being found together. In the sand-rock itself and frequently in the loose sand, even at the highest exposures specimens of more than one species of bivalve are of frequent occurrence, together with numerous stout operenla of Gasteropoda, and much comminuted shell material is disseminated through the deposits. Those portions of the bones exposed to the atmosphere on the outcrops of the sand-rock are usually eroded by the action of wind blown sand and for the same reason, all the bones which are present in the recent loose sand make equally bad specimens.

There is little doubt in my mind that these deposits, with the exception of the blown sand, have been formed under marine shallow water conditions. The occurrence of the bones on every exposure justifies such a conclusion. They are scattered indiscriminately through the matrix showing no arrangement in layers and it seems certain that the animals whose remains are here embedded did not die in the position in which their bones are fossilised. There had been little or no erosion of the bones prior to their deposition and even the teeth in the lower jaws of the various genera are mostly intact

and in position, except after exposure in the blown sand. It is more than probable that these detached skeletal remains have been conveyed to their present position in the sand-rock, not by running water but by a gradual assimilation, into an estuarine or coastal sandy deposit, of the already disjointed skeletons, probably from the immediate foreshore where they had been accumulated after death. Other facts which lend support to the conclusion that these deposits were formed under marine coastal conditions are the presence of several species of mollusca, with opercula of Gasteropoda, fragments of shells, and much comminuted shell material.

This seems to me the most feasible explanation which would account for the wide distribution of the individual bones of the various genera of animals occurring in the sand-rock. If they had been fossilised in the place where the animals died there would, of a certainty, have been present local accumulations of bones which had belonged to one individual skeleton or a portion of one. In all the bones that have been picked up there is, so far as observation has gone, no trace of any individual specimen exhibiting marks of having been gnawed by carnivora, although the bones of a much larger "native cat" than the present species appear indiscriminately mixed with them. This would tend to show that the bones were not exposed for any length of time before their deposition in the sand-rock.

The majority of the specimens which have been loosened from the original matrix and are now found detached among the sand of the recent dunes occur in close relation to the bones of the same genera of the present day, together with those of the sheep and horse, so that in collecting, a certain amount of discrimination is necessary. They have, almost in every case, been liberated from the original matrix by the triturating effect of the wind-blown sand on the exposures of the hardened sand-rock, thus freeing the bones and leaving them isolated in the recent sands. This action has continued further on the loose exposed bones, resulting in the destruction of the external boney surface and the laying bare of the spongy interior. Especially is this the case with the ends and articular surfaces of the long bones, although not confined to them.

Similar cases of erosion by wind-blown sand are not uncommon where it has acted upon the later geological formations. Its action on granites and other plutonic and intrusive rocks is well known. One particularly good example of this occurs along the south east coast of Africa, on the littoral of Zululand, where high cliffs of Tertiary strata are being gradually worn away by blown sand weathering, leaving detrital heaps, at the bottom of the cliffs, of fossils, lignitic wood and fragments of foraminiferal limestones, which are present in thin beds in the sections above. These cliffs present a curious aspect, showing the thin protruding limestones, the much excavated sandy beds, while the clayey deposits are cut into the most wonderfully fantastic shapes but often present more or less flat and fairly extensive exposures forming a remarkable and sometimes grotesque feature in the coastal scenery, just as these outcrops of sand-rock form a distinctive feature in the landscape of the sand-dunes, on the south coast of King Island.

The sand-dunes themselves have not been formed in the ordinary way, by the heaping up of wind-blown beach sand but chiefly consist of sand particles resulting from the trituration of the sand-rock, from the period of the elevation of the island after the last subsidence, to the present day, no doubt assisted to a small extent by the drifting sea-shore sands. Although in the majority of cases the chief origin of dune sand, except perhaps on a desert coast line, is undoubtedly blown shore sand, in some cases where there have been uplifts of the coast line, the rocks of which consist of late geological formations, such as Pleistocene, Tertiary, or even Cretaceous strata, the accretion to the amount of sand, and its chief source after these beds had become dry land has been from the wind-blown sand degradation of such exposed soft deposits. Just as in this case on King Island, the present-day sands of the southern coast dunes are undoubtedly to a small extent composed of blown beach sands, but the major portion consists of the triturated sand grains eroded by the wind from the hardened fossiliferous sand-rock.

The fact that similar bone deposits are known to occur at points on both coasts of the island would lend support to the conclusion that during the deposition of the sand-rock, containing the isolated specimens of fossil bones, the whole island

was at a much lower level and was necessarily not so large as at present, pointing to a period of submergence. It is even possible that it underwent a sudden sinking, up to a certain level, the result of which may account for the killing off of large numbers of the animals whose bones have been subsequently found as fossils in the sand-rock. This period of submergence may not have been of any great duration, as there are no evidences of raised beaches or other data suggestive of a lengthened period of submergence. But it seems to me that in suggesting a possible explanation for the presence of this deposit, with its enclosed osseous remains, some such occurrence as the above must have taken place. From other sources we have evidences of great physical disturbances in recent geological times over the area now known as Bass Strait, and it seems quite probable that this suggested disturbance on King Island occurred as a part of these physical changes in the geography of this region.

The whole subject of the physical geology of the islands in Bass Strait, which form partially submerged connecting links between the continent of Australia and the island of Tasmania, is one of exceeding interest but as yet one which has hardly been touched upon by geologists and zoologists. There is no doubt that when this subject has been worked up, not only will there be some remarkable facts discovered, both zoological and palaeontological, but also facts of importance which may have far reaching applications in Australasian physical geology, relating to the geological movements of this most interesting portion of Australasia, which have taken place within geologically recent times. Even now some curious facts in distribution are known; for instance, the large islands, called the Hunters, to the south of King Island and lying off the north coast of Tasmania, although only separated from each other by a strait, not three miles wide, until lately showed a curious zoological anomaly. The geological formation of the two islands differs, the western consisting of granite and the eastern of metamorphic sedimentary rocks. The strait now undoubtedly occupies a line of fault, which within recent geological times caused the separation of the two islands. It has been reported that within living memory the western island was overrun by wallaby while the eastern was absolutely

free from these marsupials, until recently when they were introduced from the western island. Reports are also frequent of animals having been occasionally met with, which were entirely different from the ordinary marsupials to which the layman has been accustomed. Although such reports are not always to be relied upon in their entirety, it has been my experience, in different parts of the world, that where a layman without any special scientific knowledge or even a native (as in the case of the *Okapi* of central Africa) has noted some peculiarities in animals he has either killed or seen, which seemed to him to distinguish them from others he has been acquainted with, it is always judicious to bear the fact in mind and endeavour if possible to prove or disprove it as occasion offers. At any rate this subject must inevitably be dealt with as it is one of the most interesting in the physical geology of the Australian continent.

In their Memoir "A Collection of Sub-fossil Bird and Marsupial Remains from King Island, Bass Strait," Prof. W. B. Spencer and Mr. J. A. Kershaw, the Director and Curator respectively of the National Museum, Melbourne, described the remains of an Emu *(Dromaeus minor)* first found on Kangaroo Island, or Ile Decrès, discovered by Admiral Baudin's expedition in the ships Géographe, Naturaliste and Casuarina, in 1802, of small size, and "possessing when young a greyish plumage that became quite black when the bird reached maturity"; to the osseous remains of a bird (believed to be identical) found on King Island, the above authors applied the name of *Dromaeus minor*. The Phascolomine or Wombat remains found on King Island enabled Messrs. Spencer and Kershaw, supplemented by bones from other islands in the Strait, and historical data, to show that the name *Phascolomys ursinus*, Shaw, must be restricted to the "Wombat of the Bass Strait Islands." Amongst the other osseous remains obtained and described, were those of two "Native Cats" *(Dasyurus)*, a larger and a smaller species; to the larger of these the name *Dasyurus bowlingi* was applied. In addition to these fossils portions of six other existing Marsupials were obtained.

BIRD AND MARSUPIAL BONES FROM THE SAND-ROCK DEPOSITS OF KING ISLAND, BASS STRAIT.

Presented by MR. WM. ANDERSON, February, 1914.

4	l. tibio-tarsi ...	Dromæus minor, *Spencer*.
8	r. ,, ,, ...	,, ,,
1	pt. sternum ...	,, ,,
3	fibulæ	,, ,,
9	r. femora	,, ,,
8	l. ,, ...	,, ,,
5	r. tarso-metatarsi ...	,, ,,
6	l. ,, ,, ...	,, ,,
7	vertebræ	,, ,,
5	pt. pelves	,, ,,
2	skulls	Macropus ruficollis, *Desmarest*.
1	l. ramus mand. . .	,, ,,
1	incisor tooth ...	,, sp.
1	pt. mandible ...	,, ,,
1	skull (calvarium) ...	,, ,,
2	costae	,, ,,
1	skull	(Opossum?)
2	,, ...	Phascolomys ursinus, *Shaw*.
3	mandibles	,, sp.
2	l. ramus mand. ...	,, ,,
2	r. ,, ,, ...	,, ,,
1	skull	Dasyurus bowlingi, *Spencer*.
1	r. ramus mand. ...	,, ? maculatus, *Kerr*.
1	l. ,, ,, ...	,, sp.
2	(bird ribs)	

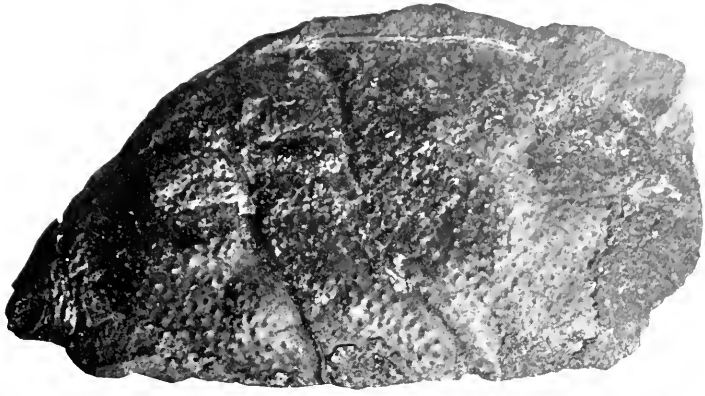
Addendum.—To the brief "Literature" previously given, must be added a paper by Mr. F. Chapman, "Notes on a Collection of Tertiary Limestones and their Fossil Contents, from King Island (Mem. Nat. Mus. Melbn., No. 4, 1912, p. 39, pls. vi. and vii.)

EXPLANATION OF PLATE XXIII.

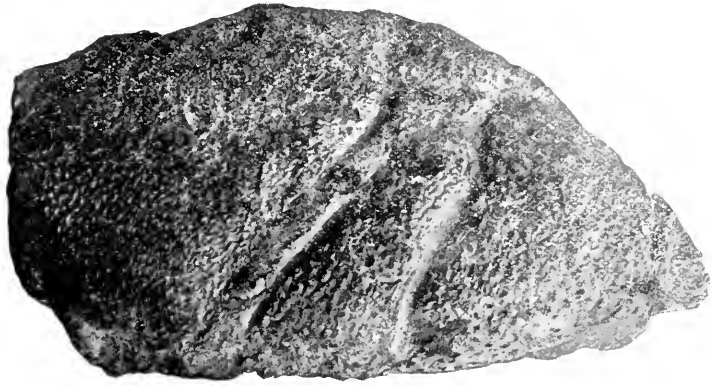
Enoplocłytia terra-reginæ, *Eth. fil.*

Fig. 1. Carapace seen from the right hand side.

Fig. 2. Carapace seen from the left hand side.



1.



2.

C. CLUTTON, Austr. Mus., photo.

EXPLANATION OF PLATE XXIV.

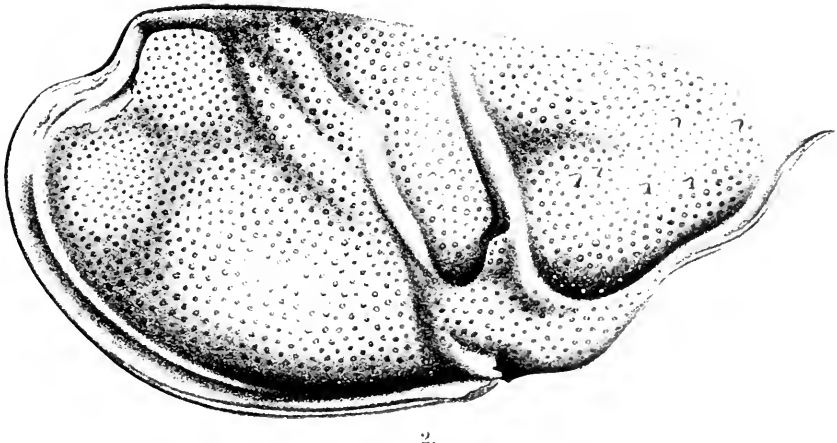
Enoploclytia terra-reginæ, *Eth. fil.*

Fig. 1. Matrix impression of right side of carapace.

Enoploclytia leachii, *Mantell.*

Fig. 2. Right side of carapace (after Geinitz) for comparison.

1.



2.

C. CLUTTON, Austr. Mus., photo.

HYDROZOA FROM ONE HUNDRED FATHOMS, SEVEN MILES EAST OF CAPE PILLAR, TASMANIA.

By E. A. Briggs, B.Sc., Zoologist.

(Plates xxv.-xxvi., and Fig. 1.)

The small collection of Hydroids described in the present paper forms part of the marine invertebrate collections obtained by Messrs. C. Hedley and W. L. May, seven miles east of Cape Pillar, Tasmania, in December, 1907. The specimens are of interest as being the first samples of the Hydroid fauna of Tasmania from one hundred fathoms.

The specimens were dredged "on a firm bottom of sand, rolled pebbles, and a conglomerate of recent shells."[1]

The collection is composed entirely of Calyptoblastic forms, and contains representatives of thirteen species, one of which is new.

The male corbulæ of *Aglaophenia tasmanica* have been described for the first time, and an instance of sexual dimorphism has been observed in the structure of the corbulæ of this species.

The most striking of the records of geographical distribution are as follows:—

Perisiphonia exserta (Johnson), previously reported by Allman and Ritchie from Australian seas, was originally found in the North Atlantic at Madeira; *Thuiaria sinuosa*, Bale, was previously recorded from Port Molle, Queensland, and Jervis Bay, New South Wales; and *Thyroscyphus simplex*, originally described by Lamouroux "sur les Fucus de l' Australasie,"[2] has been recorded by Ritchie in a recent paper from the Clyde Sea Area and from Gough Island, South Atlantic.

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[1] Hedley and May—Rec. Austr. Mus., vii., 2, 1908, p. 108.

[2] Lamouroux—Hist. Polyp. Cor. Flex., 1816, p. 207.

The complete list of the species in the collection is as follows:—

Phylum **Coelenterata.**

Class HYDROZOA.

Order CALYPTOBLASTEA.

Family HALECIDÆ.

Halecium flexile, Allman.

Family CAMPANULARIDÆ.

Thyroscyphus simplex (Lamouroux).

Family LAFOEIDÆ.

Cryptolaria arboriformis, Ritchie.

Perisiphonia exserta (Johnson).

Family SERTULARIDÆ.

Sertularella adpressa, Ritchie.

Sertularella divaricata (Busk).

Sertularella columnaria, sp. nov.

Thuiaria sinuosa, Bale.

Sertularia operculata, Linnæus.

Family PLUMULARIDÆ.

Halicornopsis elegans (Lamarck).

Halicornaria furcata, Bale, var. *intermedia*, Bale.

Aglaophenia decumbens, Bale.

Aglaophenia tasmanica, Bale.

Family HALECIDÆ.

Genus HALECIUM, *Oken*.

HALECIUM FLEXILE, *Allman*.

Halecium flexile, Allman, Rep. Sci. Results "Challenger" Exped., Zool., xxiii., Hydroida, pt. ii., 1888, p. 11, pl. v., figs. 2, 2a. *Id.*, Thornely, Ceylon Pearl Oyster Fisheries,

pt. ii., Suppl. Rep., viii.,—Hydroida, 1904, p. 112. *Id.*, Hartlaub, Zool. Jahrb. Jena, Suppl. vi., iii., 1905, p. 611, figs. J[3], K[3]. *Id.*, Billard, Ann. Sci. Nat., Zool., (n.s.), xi., 1910, p. 3. *Id.*, Ritchie, Mem. Austr. Mus., iv., 16, 1911, p. 811.

Halecium gracile, Bale, Proc. Linn. Soc. N. S. Wales, (2), iii., 1888, p. 759, pl. xiv., figs. 1-3; *Id.*, Bale, Proc. Roy. Soc. Viet., vi., 1894, p. 99. *Id.*, Jäderholm, Ark. för Zool. Stockholm, i., 1903, p. 266, pl. xii., figs. 2, 3.

Halecium parvulum, Bale, Proc. Linn. Soc. N. S. Wales, (2), iii., 1888, p. 760, pl. xiv., figs. 4, 5. *Id.*, Marktanner-Turneretscher, Ann. K. K. Hofmus. Wien, v., 1890, p. 218, pl. iii., fig. 22.

Several fragmentary colonies growing on a spine of an Echinoid are referred to this species. The stem is only very weakly fascicled at the base. The hydrorhiza forms a creeping stolon. The margins of the hydrothecæ are scarcely everted, and in this respect they resemble those figured by Allman. The specimens, however, are much smaller than the four inch high forms described by that author; but they agree in height with Bale's mature colonies from New South Wales. Miss Thornely's immature Ceylon examples from the Gulf of Manaar are only half an inch high.

Dimensions:—

Stem internode, length	0·61-0·71 mm.
Stem internode, diameter	0·15-0·17 mm.
Hydrotheca, depth	0·08-0·10 mm.
Hydrotheca, diameter at month	0·12-0·14 mm.
Hydrotheca, diameter at base...	0·07-0·08 mm.

Distribution.—Previously recorded from Station 145, off Marion Island, 50 fathoms (Allman); Station 312, Port Famine, Patagonia, Lat. 53° 37′ 30″S., Long. 70° 65′W., 9 fathoms (Allman); Port Stephens, Port Jackson, Bondi, New South Wales (Bale); Gulf of Manaar, Ceylon (Thornely); Station 44, off Coogee, New South Wales, 49-50 fathoms (Ritchie).

With regard to the question of priority of name of *H. flexile*, Dr. Billard[3] publishes the following note:—"Après avoir examiné le type d'Allman, je suis d'avis qu'on peut admettre la synonymie entre l'H. flexile Allm. et l'H. gracile comme l'a avancé le premier Hartlaub [1905] (p. 611). La priorité revient au nom d'Allman, le mémoire du "Challenger" étant daté du 9 Mai 1888 et celui de Bale du 27 Juin de la même année."

Family CAMPANULARIDÆ.

Genus THYROSCYPHUS, *Allman.*

THYROSCYPHUS SIMPLEX *(Lamouroux).*

Laomedea simplex, Lamouroux, Hist. Polyp. Cor. Flex., 1816, p. 206.

Campanularia tridentata, Bale, Proc. Roy. Soc. Viet., (n.s.), vi., 1893, p. 98, pl. iii., fig. 3.

Sertularella tridentata, Hartlaub, Abh. Nat. Ver. Hamburg, xvi., 1900, p. 46, fig. 21.

Thyroscyphus tridentatus, Hartlaub, Zool. Jahrb. Syst., xiv., 1901, p. 369, pl. xxi., fig. 14, pl. xxii., fig. 23. *Id.*, Ritchie, Trans. Roy. Soc. Edinb., xlvii., 1909, p. 74, fig. 1a, b.

Thyroscyphus simplex, Billard, C. R. Acad. Sci., cxlviii., 1909, p. 1065; *Id.*, Billard, Ann. Sci. Nat., Zool., (9), ix., 1909, p. 312.

Parascyphus simplex, Ritchie, Ann. Scot. Nat. Hist. Edinb., xx., 1911, p. 160, fig. 1.

Only a few colonies, the largest 14 mm. in height, represent this species. The specimens agree in all respects with the description and figure given by Bale.

After an examination of Lamouroux' type collection Billard has declared *Campanularia tridentata*, Bale, identical with *Laomedea simplex*, Lamouroux. Ritchie has placed it under a new genus as *Parascyphus simplex*.

[3] Billard—Ann. Sci. Nat., Zool., (n.s.), xi., 1910, p. 3.

Dimensions:—

Stem internode, length	0·61-0·78 mm.
Stem internode, diameter	0·15-0·19 mm.
Hydrotheca, length	0·73-0·75 mm.
Hydrotheca, diameter at mouth	0·22-0·23 mm.
Hydrotheca, diameter at base	0·08-0·10 mm.

Distribution.—Previously recorded from Australia (Lamouroux); Port Phillip, Victoria (Bale); French Pass, New Zealand (Hartlaub); Gough Island, South Atlantic Ocean (Ritchie); Clyde Sea Area, Barrier Plateau, between Sanda Island and Ailsa Craig, 24 fathoms (Ritchie).

Family LAFOEIDÆ.

Genus CRYPTOLARIA, *Busk*.

CRYPTOLARIA ARBORIFORMIS, *Ritchie*.

Cryptolaria arboriformis, Ritchie, Mem. Austr. Mus., iv., 16, 1911, p. 824, pl. lxxxiv., fig. 1, pl. lxxxvii., fig. 7.

This species is represented in the collection by a single specimen, which is firmly attached to the surface of a Retepora-like Polyzoon, over which it has sent out hydrorhizal tubes in the form of a reticulum, the components of which have interlaced with the large circular perforations of the Polyzoon. In this manner, a corresponding reticulation has been formed on the under surface of the *Retepora*, giving the specimen a firm basis of attachment.

The colony is 12·5 cm. in height, with a diameter of 3 mm. at the base. The type specimen appears to have undergone very severe weathering, since the branches of the present form do not bear "the aspect of bare, gnarled limbs of some weather-beaten tree." The ultimate and most delicate branchlets have been preserved, thus imparting to the specimen a thick bushy appearance.

The colour of the colony is light-brown to greenish-brown.

Dimensions :—

Fascicle tube, diameter	0·07 mm.
Axial tube, diameter	up to 0·45 mm.
Hydrotheca, length of adnate portion ...	0·28-0·31 mm.
Hydrotheca, length of free portion	0·08-0·10 mm.
Hydrotheca, greatest diameter	0·10-0·12 mm.

Distribution.—Hitherto recorded only from Station 44, off Coogee, New South Wales, 49-50 fathoms (Ritchie).

Genus Perisiphonia, *Allman*.

Perisiphonia exserta *(Johnson)*.

Cryptolaria exserta, Johnson, Quart. Journ. Micro. Sci., vi., 1858, p. 130, pl. xix., figs. 3, 3a, 3b.

Perisiphonia filicula, Allman, Rep. Sci. Results "Challenger" Exped., Zool., xxiii., 1888, Hydroida, p. 44, pl. xxii., figs. 1-4.

Perisiphonia exserta, Ritchie, Mem. Austr. Mus., iv., 16, 1911, p. 834, pl. lxxxvii., fig. 3.

A solitary specimen agrees with the description of *Perisiphonia exserta* (Johnson) given by Ritchie. The colony is 53 mm. in height, with a diameter of 0·6 mm. at the base.

Dimensions :—

Peripheral tube, diameter	0·05-0·06 mm.
Hydrotheca, length adnate to axial tube ...	0·33-0·34 mm.
Hydrotheca, length free from axial tube ...	0·12-0·15 mm.
Hydrotheca, diameter at mouth	0·12 mm.
Sarcotheca, length[4]	0·05-0·06 mm.
Sarcotheca, diameter	0·035 mm.
Distance between adjacent hydrothecæ on hydroclades[5]	0·47-0·51 mm.

[4] From the surface of the peripheral tube to the tip.

[5] Measured from the base of one hydrotheca to the base of the next on the same side of the axial tube.

Distribution.—Previously recorded from Madeira, North Atlantic Ocean (Johnson); Station 75, near the Azores, Lat. 38° 38'N., Long. 28° 28'30"W., 150 fathoms (Allman); Station 163A, off Twofold Bay, New South Wales, 150 fathoms (Allmann); Station 57, off Wata Mooli, New South Wales, 59-54 fathoms (Ritchie).

Family SERTULARIDÆ.

Genus SERTULARELLA, *Gray.*

SERTULARELLA ADPRESSA, *Ritchie.*

(Plate xxv., fig. 2.)

Sertularella adpressa, Ritchie, Mem. Austr. Mus., iv., 16, 1911, p. 837, pl. lxxxv., fig. 5, pl. lxxxviii., figs. 1, 2 and 9.

The collection contains two well-preserved specimens, the characters of which agree in detail with Ritchie's description of *Sertularella adpressa*.

Dimensions:—

Pinna, diameter	0·42 mm.
Hydrotheca, length	0·42-0·43 mm.
Hydrotheca, diameter	0·19-0·21 mm.
Gonangium, length	2 mm.
Gonangium, greatest breadth (frontal aspect)	0·64-0·71 mm.
Gonangium, greatest breadth (lateral aspect)	0·52-0·64 mm.

Distribution.—Hitherto recorded only from Station 36, off Botany Bay, New South Wales, 23-20 fathoms; Station 54, within Jervis Bay, New South Wales, 10-11 fathoms (Ritchie).

SERTULARELLA DIVARICATA (*Busk*).

Sertularia divaricata, Busk, Voy. "Rattlesnake," 1852, p. 388.

Sertularella divaricata, Bale, Cat. Austr. Hydroid Zoophytes, 1884, p. 110, pl. iii., fig. 9, pl. xix., fig. 20; *Id.*, Bale, Proc. Linn. Soc. N. S. Wales, (2), iii., 1888, p. 761, pl. xvi., figs. 1-2 (var. *dubia*), p. 761, pl. xvi., figs. 3-4 (var. *subdichotoma*). *Id.*, Schneider, Zool. Jahrb., 10, 1897, p. 525. *Id.*, Hartlaub, Abh. Nat. Ver. Hamburg, xvi., 1900, pp. 23, 27, 38, pl. iii., figs. 15-20. *Id.*, Ritchie, Mem. Austr. Mus., iv., 16, 1911, p. 839 (var. *subdichotoma*). *Id.*, Bale, Biological Results "Endeavour," ii., 1, 1914, p. 20.

Sertularella subdichotoma, Kirchenpauer, Abh. Nat. Ver. Hamburg, viii., 1884, p. 46, pl. xvi., figs. 1-1b. *Id.*, Hartlaub, Abh. Nat. Ver. Hamburg, xvi., 1900, p. 33, pl. i., figs. 3, 4, 6-9, 11-16, pl. ii., figs. 10-17, 51-52, pl. iii., figs. 3, 4, 13, 14; *Id.*, Hartlaub, Voy. "Belgica," 1904, p. 6; *Id.*, Hartlaub, Zool. Jahrb., Suppl. vi., Band iii., 1905, p. 629, figs. V^3, W^3. *Id.*, Jäderholm, Arkiv. för Zool., i., 1903, p. 278, and ii., 1904, p. 3, and vi., 1910, p. 4; *Id.*, Jäderholm, Schwed. Südpolarexpd., vi., 1905, p. 25, pl. ix., fig. 8. *Id.*, Nutting, American Hydroids, pt. ii.,—Sertularidæ, 1904, p. 96, pl. xxii., figs. 8-12. *Id.*, Vanhöffen, Deutsche Südpolarexpd., xi., Zool., iii., 1911, p. 326, fig. 41a-e.

Sertularella Johnstoni, Bale, Cat. Austr. Hydroid Zoophytes, 1884, p. 109 (in part), pl. iii., fig. 7, pl. xix., fig. 21; *Id.*, Bale, Trans. and Proc. Roy. Soc. Viet., xxiii., 1887, p. 93 (in part); *Id.*, Bale, Proc. Roy. Soc. Viet., (n.s.), vi., 1893, p. 102. *Id.*, Billard (in part), Ann. Sci. Nat., Zool., (9), xi., 1910, p. 13.

(Not *Sertularia Johnstoni*, Gray in Dieffenbach, N. Zealand, ii., 1843, p. 294).

Specimens of this exceedingly variable species were found on *Chione mesodesma*, Quoy and Gaimard. The stems spring from a creeping stolon and reach a height of 4 cm. The colour of the colonies is pale brown.

Gonosome.—Not present.

Dimensions:—

Internode, length	0·40 mm.
Hydrotheca, length adnate	0·31-0·33 mm.
Hydrotheca, length free	0·10-0·11 mm.
Hydrotheca, diameter at mouth	0·17-0·19 mm.
Hydrotheca, diameter at base	0·14-0·15 mm.

Distribution.—Previously recorded from many Australian Stations; South America and Antarctica.

Bale's recent examination of specimens from several Australian localities has established the identity between *Sertularella divaricata* (Busk), var. *subdichotoma*, Bale, and the South American and Antarctic *Sertularella subdichotoma*, Kirchenpauer.

SERTULARELLA COLUMNARIA, *sp. nov.*

(Fig. 1.)

Trophosome.—Colony attaining a height of 6·5 cm., stem straight, 1·5 mm. in diameter at the base, fascicled below, springing from a clump of hydrorhizal tubes and bearing regularly arranged long, monosiphonic branches, the first of which arises 11 mm. above the base of the colony. The branches reach a length of 29 mm. Stem and branches lie in one plane. The stem is divided into regular internodes

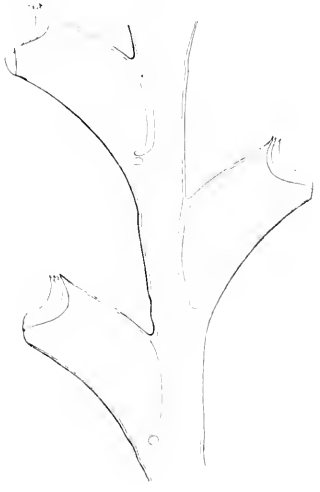

Fig. 1.—*Sertularella columnaria*, sp. nov. Portion of branch with hydrothecæ, × 19.

separated by oblique joints which slope successively in opposite directions. Each internode bears a hydrotheca, or a hydrotheca and a branch. The stem gives rise regularly to a branch and two hydrothecæ on one side, and one hydrotheca on the other. The branches are alternate, and spring, with a long internode, from directly beneath a hydrotheca. They are slightly constricted at their origin. In the branches the nodes may become obscured, although a constriction immediately distal to a hydrotheca generally indicates their position.

The hydrothecæ lie towards the distal ends of the internodes and are remarkable for their large size and for the length of the free portion. They are distant, tubular, smooth and curved outwards. The margin of the hydrotheca is divided into three teeth, one adcauline, central and projecting, the others forming an abcauline lateral pair. The teeth are separated by deep embayments. The cavity of the hydrotheca is only partially cut off from that of the stem by the free end of the adcauline wall, which bends sharply towards the interior of the hydrotheca, forming a ledge at its base. There is a tendency to regeneration of the hydrothecæ, many of the margins being repeated twice or thrice. The colour of the colony is light fawn.

Gonosome.—Unknown.

Dimensions:—

Stem internode, length	1·04-1·16 mm.
Stem internode, diameter	0·40-0·43 mm.
Branch internode, length	0·73-0·87 mm.
Branch internode, diameter	0·35-0·38 mm.
Hydrotheca, length adnate	0·64-0·70 mm.
Hydrotheca, length free	0·70-0·76 mm.
Hydrotheca, diameter at mouth	0·50-0·53 mm.

The present form has only three teeth, and belongs to the Johnstoni—group of Hartlaub.

Type Specimen.—In the Australian Museum, Sydney.

Genus THUIARIA, *Fleming.*

THUIARIA SINUOSA, *Bale.*

(Plate xxv., fig. 1.)

Thuiaria sinuosa, Bale, Proc. Linn. Soc. N. S. Wales, (2), iii., 1888, p. 772, pl. xviii., figs. 9, 10. *Id.*, Ritchie, Mem. Austr. Mus., iv., 16, 1911, p. 844, pl. lxxxv., fig. 1.

Several specimens referable to this species are attached to Polyzoon crusts by a series of fine stolonal tubes. The colonies attain a height of 18·5 cm., and have a diameter of 3 mm. at the base. The stem is straight and polysiphonic,

the fascicled structure being continued to within 1·5 cm. of the distal extremity. The fascicled portion of both the stem and branches is composed of a series of tubes with very thick brown-coloured walls, those towards the interior possessing much thicker walls than those on the exterior of the colony. In cross section the tubes are compressed and almost crescentic in outline.

Gonosome.—The colonies are mature; the gonangia being borne in rows along the front of the pinnæ, to which they are attached by a short stalk which springs from the side of each gonangium about 0·17 mm. from its lower end. They are obovate bodies with seven or eight distinct transverse annulations. The aperture is large with an elevated margin; the neck being armed with several curved, spine-like teeth, which project inward and slightly upward toward the centre of the aperture.

Dimensions:—

Stem, diameter of cladate tube	0·54 mm.
Pinna, length	up to 48 mm.
Pinna, diameter (including hydrotheca) ...	0·47-0·50 mm.
Hydrotheca, length	0·61-0·64 mm.
Hydrotheca, greatest diameter	0·12-0·15 mm.
Gonangium, length	1·41-1·53 mm.
Gonangium, greatest diameter	0·68-0·75 mm.

Distribution.—Hitherto recorded only from Port Molle, Queensland (Bale); Station 54, within Jervis Bay, New South Wales, 10-11 fathoms (Ritchie).

Genus Sertularia, *Linnæus.*

Sertularia operculata, *Linnæus.*

Sertularia operculata, Linnæus, Systema Naturæ, 1758, p. 808. *Id.*, Hincks, Brit. Hydroid Zoophytes, 1868, p. 263, pl. liv. *Id.*, Bale, Cat. Austr. Hydroid Zoophytes, 1884, p. 67, pl. vi., fig. 1, pl. xix., fig. 3. *Id.*, Nutting, American Hydroids, pt. ii.,—Sertularidæ, 1904, p. 54, pl. ii., figs. 3-5. *Id.*, Bartlett, Geelong Naturalist Viet., iii., 4, 1907, p. 60. *Id.*, Warren, Ann. Natal Govt. Mus., i., 3, 1908, p. 305.

Sertularia usneoides, Pallas, Elenchus Zoophytorum, 1766, p. 132.

Dynamena operculata, Esper, Die Pflanzenthiere, iii., 1788-1830, p. 191.

Nigellastrum usneoides, Oken, Lehrbuch der Naturgeschichte, pt. 3, 1815, p. 93.

Amphisbetia operculata, L. Agassiz, Cont. Nat. Hist. U.S., iv., 1862, p. 355.

Dynamena fasciculata, Kirchenpauer, Neue Sertulariden, 1863, p. 12.

Sertularia crinis, Allman, Journ. Linn. Soc., xix., 1885, p. 139, pl. xiv., figs. 1-2.

This widely distributed epizoic species is represented in the collection by several specimens, which occur on the bare horny axis of an Alcyonarian. They are firmly attached by a hydrorhiza in the form of a feltwork.

Dimensions :—

Hydrorhiza, diameter	0·22-0·28 mm.
Stem, diameter...	0·22-0·26 mm.
Hydrotheca, length of external profile ...	0·36-0·38 mm.
Hydrotheca, diameter	0·12-0·14 mm.
Gonangium, length	1·53-1·57 mm.
Gonangium, diameter	0·52-0·64 mm.

Distribution. — Previously recorded from Arctic Atlantic (Bonnevie); Denmark (Winther); British Coasts (Hincks); Belgium (Van Beneden); Azores (Allman); Africa (Busk, Warren); Australia (Bale, Bartlett); New Zealand (Thomson, Allman); Straits of Magellan (Nutting).

Family PLUMULARIDÆ.

Genus Halicornopsis, *Bale.*

Halicornopsis elegans *(Lamarck).*

Plumularia elegans, Lamarck, Anim. sans Vert., ii., 1816, p. 129.

Aglaophenia elegans, Lamouroux, Hist. Polyp. Cor. Flex., 1816, p. 169; *Id.*, Lamouroux, Encyclop. Méth., Zooph., 1824, p. 16.

Aglaophenia orientalis, Kirchenpauer, Abh. Nat. Ver. Hamburg, v., 1872, p. 33, pls. i. and iii., fig. 3.

Halicornopsis avicularis, Bale, Journ. Micro. Soc. Vict., ii., 1881, p. 26, pl. xiii., fig. 3; *Id.*, Bale, Cat. Austr. Hydroid Zoophytes, 1884, p. 185, pl. x., figs. 1, 2, pl. xix., fig. 32; *Id.*, Bale, Trans. and Proc. Roy. Soc. Vict., xxiii., 1887, pp. 90, 101. *Id.*, Marktanner-Turneretscher, Ann. K. K. Hofmus. Wien, v., 1890, p. 279.

Azygoplon rostratum, Allman, Rep. Sci. Results "Challenger" Exped., Zool., vii., 1883, p. 54, pl. xix., figs. 1-3.

Halicornopsis elegans, Billard, Ann. Sci. Nat., Zool., (9), v., 1907, p. 323; *Id.*, Billard, Comp. Rendu., cxlvii., 1908, p. 940; *Id.*, Billard, Ann. Sci. Nat., Zool., (9), ix., 1909, p. 329; *Id.*, Billard, *Ibid.*, (9), xi., 1910, p. 44. *Id.*, Ritchie, Mem. Austr. Mus., iv., 16, 1911, p. 855, pl. lxxxix., fig. 1. *Id.*, Bale, Biological Results "Endeavour," ii., 1, 1914, p. 56.

This species was recorded from Tasmania as far back as 1872 by Kirchenpauer under the name of *Aglaophenia avicularis*.

The present specimen is evidently only the terminal portion of a large colony. There is a considerable amount of variation in the length of the hydroclade-bearing internodes as the following measurements show.

Dimensions:—

Hydroclade-bearing internode (single one), length	0·45-0·64 mm.
Hydroclade-bearing internode (double one), length	0·92-1·15 mm.
Hydroclade-bearing internode, diameter ...	0·29-0·36 mm.
Hydroclade internode, length	0·35-0·42 mm.
Hydroclade internode, diameter	0·12-0·15 mm.
Hydrotheca, depth	0·28-0·29 mm.
Hydrotheca, diameter at mouth (lateral aspect)	0·26-0·29 mm.
Hydrotheca, diameter at mouth (frontal aspect)	0·36-0·38 mm.

Distribution. — Previously recorded from Indian Ocean (Lamouroux); Hobart, Tasmania; Bass Strait (Kirchenpauer); Griffith Point, Portland, Queenscliff, Victoria (Bale); Station 161, off Port Phillip, Victoria, 38 fathoms (Allman); Victorian Coast (Marktanner-Turneretscher); Station 36, off

Botany Bay, New South Wales, 23-20 fathoms; Station 48, off Wollongong, New South Wales, 55-56 fathoms (Ritchie); Great Australian Bight, 40-100 fathoms (Bale).

Genus HALICORNARIA, *Busk*.

HALICORNARIA FURCATA, *Bale*,

var. INTERMEDIA, *Bale*.

(Plate XXV., fig. 3.)

Halicornaria intermedia, Bale, Biological Results "Endeavour," ii., 1, 1914, p. 53, pl. v., fig. 2, pl. vii., figs. 3, 4. (Not *Halicornaria intermedia*, Billard, Les Hydroïdes de l' Expedition du Siboga, i., Plumulariidæ, 1913, p. 65, pl. iv., fig. 37).

Halicornaria furcata, Bale, var. *intermedia*, Bale, Biological Results "Endeavour," ii., 1, 1914, Addendum, p. 1.

Two monosiphonic, dichotomously branched colonies were found associated with *Aglaophenia tasmanica*, Bale. The larger specimen attains a height of 11·5 cm., with a diameter of 1·5 mm. at the base.

Dimensions:—

Hydroclade-bearing internode, length	0·78-0·87 mm.
Hydroclade-bearing internode, diameter	0·56-0·66 mm.
Hydroclade internode, length	0·40-0·42 mm.
Hydroclade internode, diameter	0·29-0·30 mm.
Hydrotheca, depth[6]	0·27-0·29 mm.
Hydrotheca, breadth[7]	0·19-0·21 mm.
Hydrotheca, length of free portion of mesial sarcotheca	0·07-0·10 mm.

Distribution.—This variety has been recorded only from Oyster Bay, Tasmania, 20 fathoms (Bale).

Bale originally ranked this variety as a species, the structural details of which appeared to fall between *H. furcata* and *H. hailegi*. At the same time he pointed out that it may have to be classed ultimately as a variety of *H. furcata*. In the "Report on the Plumulariidæ of the Siboga Expedition"

[6] Measured from aperture to base along long axis of hydrotheca.

[7] At right angles to depth.

Dr. Billard[8] has used the specific name "*intermedia*" for a species of *Halicornaria*. On account of the specific name "*intermedia*" being thus preoccupied, Bale, in an Addendum to the Report on the "Endeavour" Hydroida, reduces his species to varietal rank. He writes:—"This species (*i.e. H. intermedia*, Bale), however, was a very doubtful one, and in preference to establishing another specific name, I propose to retain the name *intermedia*, but treating the Hydroid as a variety of *H. furcata*, until more is known of the affinities of the two forms." The Siboga Report is dated 1913. Bale's paper was published on the 2nd January, 1914.

For comparison I append the dimensions of *H. furcata* deduced from Bale's figures,[9] and the measurements given by Ritchie[10] for the specimens of *H. furcata* obtained by the "Thetis."

Dimensions in mm :—

Organs.	Bale's Figures of *H. furcata*.	"Thetis" Specimens of *H. furcata*.
Hydroclade-bearing internode, length	—	0·74-0·78.
Hydroclade-bearing internode, diameter	—	0·49-0·56.
Hydroclade internode, length	0·32-0·34.	0·33-0·36.
Hydroclade internode, diameter	0·30.	0·21-0·25.
Hydrotheca, depth	0·22-0·23.	0·21.
Hydrotheca, breadth ...	0·18-0·19.	0·18-0·20.
Hydrotheca, length of free portion of mesial sarcotheca	0·06-0·08.	0·05-0·13.

[8] Billard—Les Hydroïdes de l' Expedition du Siboga, i., Plumulariidæ, 1913, p. 65.

[9] Bale—Cat. Austr. Hydroid Zoophytes, 1884, p. 178, pl. xiii., fig. 3, pl. xvi., fig. 5; Trans. and Proc. Roy. Soc. Viet., xxiii., 1887, p. 101; Biological Report "Endeavour," ii., 1, 1914, p. 53, pl. v., fig. 2, pl. vii., figs. 3, 4.

[10] Ritchie—Mem. Austr. Mus., iv., 16, 1911, p. 857, pl. lxxxvi., figs. 2, 3.

Genus Aglaophenia, *Lamouroux*.

Aglaophenia decumbens, *Bale*.

Aglaophenia decumbens, Bale, Biological Results "Endeavour," ii., 1, 1914, p. 48, pl. iv., fig. 4, pl. vi., fig. 6.

Only a simple, pinnate, unbranched fragment of a colony was found. The branch is weakly fascicled, and reaches a length of 4 cm. The minute characters of the hydrothecæ agree with Bale's description, except that the median anterior tooth of the hydrotheca assumes a more upright position than that figured (Pl. iv., fig. 4). Bale, however, notes that "in some parts of the colony the anterior teeth of the hydrothecæ are without the characteristic outward bend."

Dimensions:—

Hydroclade-bearing internode, length	0·42-0·45 mm.
Hydroclade-bearing internode, diameter ...	0·21-0·24 mm.
Hydroclade internode, length	0·38-0·43 mm.
Hydroclade internode, diameter . ..	0·08-0·10 mm.
Hydrotheca, depth	0·36-0·38 mm.
Hydrotheca, breadth at mouth[11]	0·15-0·17 mm.

Distribution.—Hitherto recorded only from Bass Strait (Bale).

Aglaophenia tasmanica, *Bale*.

(Plate xxvi.)

Aglaophenia tasmanica, Bale, Biological Results "Endeavour," ii., 1, 1914, p. 37, pl. iii., fig. 2, pl. vi., fig. 2.

[11] Distance from posterior wall to anterior tooth.

The occurrence in the collection of several specimens of *Aglaophenia tasmanica*, with male corbulæ, is of interest, since the female corbulæ only were known. The largest specimen, 40 cm. in height, springs from a dense mass of hydrorhizal filaments, and divides immediately into three main stems, two of which are broken off. The remaining stem bears branches mostly in opposite pairs, both series in one plane and all facing one way.

Gonosome.—Gonangial pinnæ generally in pairs, with the first five internodes bearing sarcothecæ only. Corbula (male) long, consisting of up to about twenty-four pairs of alternate ribs, springing from separate internodes of the rachis as narrow pinnules, but expanding above into broad leaflets. For most of its length the corbula is closed; towards the distal part, however, the main leaflets become shortened and finally separate, till at the end they are abbreviated close down to the lateral spurs. The latter project outward and forward from the distal edge of each rib just above its origin, bearing two series of sarcothecæ (up to four or five on each side), but no hydrothecæ.

The male corbulæ of *A. tasmanica*, are as Bale described them in *A. dawneriqi*[12] and *A. macrocarpa*,[13] *i.e.* with the leaflets abbreviated and separated at the end of the corbula. In the female corbulæ of *A. tasmanica*, the crests are most luxuriantly developed, and the contrast between the female and the present male form is greater than that which exists between the male and female corbulæ of *A. billardi*.[14] Bale has already recognised an instance of sexual dimorphism in the corbulæ of *A. billardi*, in which those of the male are closed throughout, and not at all different at the distal end, which is like the rest up to the blunt termination.

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[12] Bale—Biological Results "Endeavour," ii., 1, 1914, p. 41, pl. iii., fig. 4, pl. vi., fig. 4.

[13] Bale—Proc. Linn. Soc. N. S. Wales, (2), iii., 1888, p. 791, pl. xxi., figs. 3, 4.

[14] Bale—Biological Results "Endeavour," ii., 1, 1914, p. 33, pl. iii., fig. 3, pl. iv., fig. 3.

Similar instances of the open male corbula, as in *A. tasmanica* and *A. dumerigi*, are described by Torry and Miss Ann Martin[15] in their paper on "Sexual Dimorphism in Aglaophenia."

Dimensions:—

Hydroclade-bearing internode, length ...	0·38-0·42 mm.
Hydroclade-bearing internode, diameter ..	0·42-0·43 mm.
Hydroclade internode, length . ..	0·39-0·42 mm.
Hydroclade internode, diameter	0·19-0·21 mm.
Hydrotheca, depth	0·35-0·38 mm.
Hydrotheca, breadth at month[16]	0·19-0·21 mm.
Corbula, length	up to 11 mm.
Corbula, diameter	1 mm.

Distribution. — Hitherto recorded only from Oyster Bay, Tasmania, 20 fathoms (Bale).

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[15] Torry and Ann Martin—Publ. Univ. California, Zoology, iii., 4, 1906, pp. 47-52.

[16] Distance from posterior wall to anterior tooth.

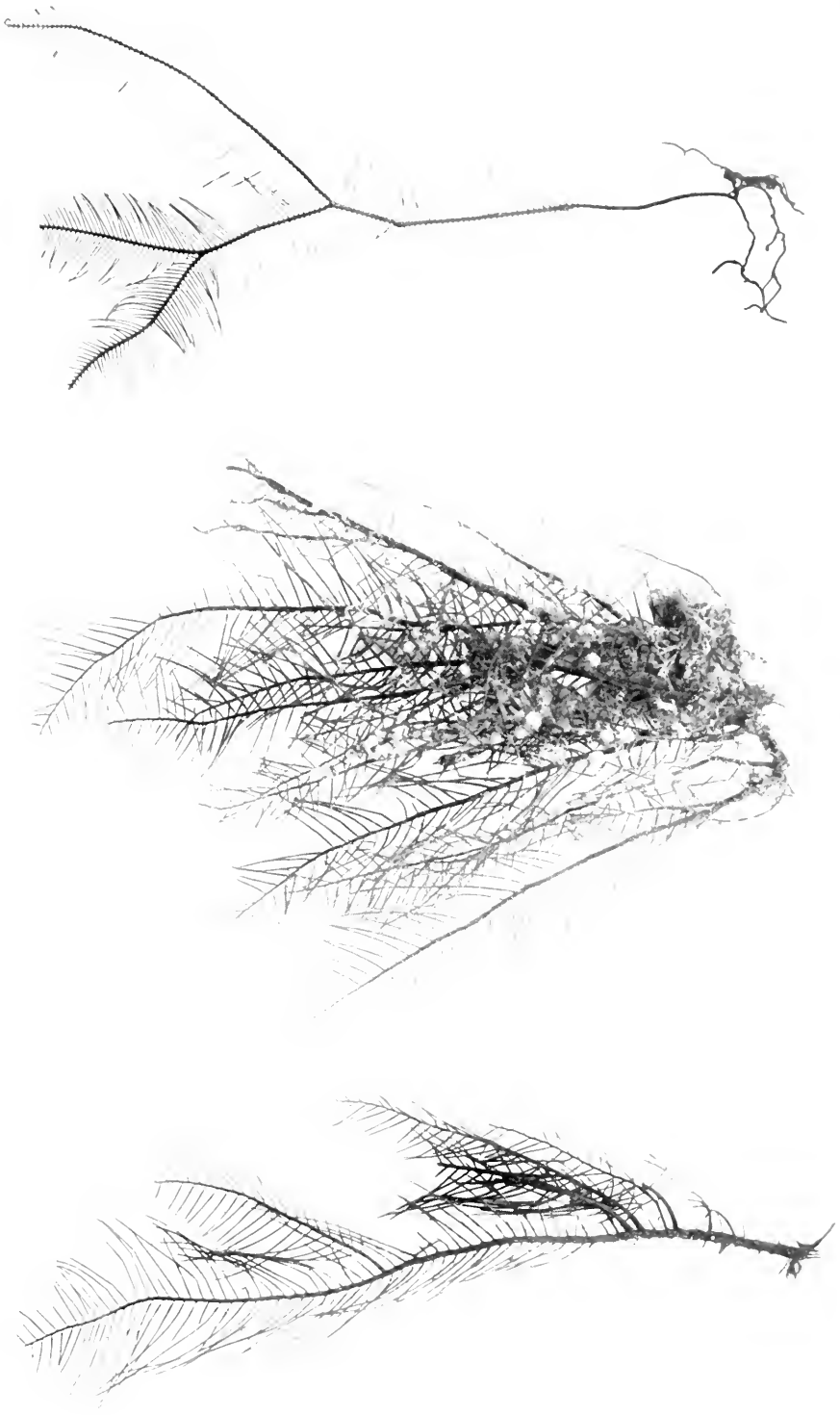
EXPLANATION OF PLATE XXV.

Tasmanian Hydrozoa.

Fig. 1.—*Thuiaria sinuosa*, Bale. Photograph of a specimen 18·5 cm. in height, from seven miles east of Cape Pillar, Tasmania, 100 fathoms.

Fig. 2.—*Sertularella adpressa*, Ritchie. Photograph of a specimen 12·5 cm. in height, from seven miles east of Cape Pillar, Tasmania, 100 fathoms.

Fig. 3.—*Haliciornaria furcata*, Bale, var. *intermedia*, Bale. Photograph of a specimen 11·5 cm. in height, from seven miles east of Cape Pillar, Tasmania, 100 fathoms.



C. CLUTTON, Austr. Mus., photo.

EXPLANATION OF PLATE XXVI.

Tasmanian Hydrozoa.

Aglaophenia tasmanica, Bale. Photograph of a specimen 40 cm. in height, from seven miles east of Cape Pillar, Tasmania, 100 fathoms.

C. Clutton, Austr. Mus., photo.

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